

FACULTY OF SCIENCES

SYLLABUS of BACHELOR OF SCIENCE (NON-MEDICAL) (Semester III-VI)

(Under Continuous Evaluation System)

Session: 2023-24



**The Heritage Institution
KANYA MAHA VIDYALAYA
JALANDHAR (AUTONOMOUS)**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
CURRICULUM AND SCHEME OF EXAMINATIONS OF THREE-YEAR DEGREE PROGRAM (2023-24)

Bachelor of Science (Non-Medical) Semester - III							
Course Code	Course Name	Course Type	Marks				Examination time (in Hours)
			Total	Ext.		CA	
				L	P		
BSNL-3421	Punjabi (Compulsory)	C	50	40	-	10	3
BSNL-3031	¹ Basic Punjabi						
BSNL-3431	² Punjab History & Culture						
BSNL-3212	English (Compulsory)	C	50	40	-	10	3
BSNM-3395	(I) Physics (Statistical Physics and Thermodynamics)	C	100	30	-	20	3
	(II) Physics (Optics and Laser)			30	-		3
	(P) Physics (Physics Practical)			-	20		3
BSNM-3084	(I) Chemistry (Organic Chemistry)	C	100	30	-	20	3
	(II) Chemistry (Physical Chemistry)			30	-		3
	(P) Chemistry (Practical)			-	20		3.5
BSNM-3333	(I) Mathematics (Analysis)	E/C	100	40	-	20	3
	(II) Mathematics (Analytical Geometry)			40	-		3
AECE-3221	*Environmental studies	AECC**	100	60	20	20	3
SECP-3512/ SECG-3531	**Personality Development Programme (Skill Based)/ Gender Sensitization Programme	AC	25	20	-	5	2
Total							

C-Compulsory

E-Elective

AC- Audit Course

¹Special paper in lieu of Punjabi (Compulsory).

² Special paper in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.

*Marks of these papers will not be added in total marks and only grades will be provided.

** Ability enhancement compulsory course

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

CURRICULUM AND SCHEME OF EXAMINATIONS OF THREE-YEAR DEGREE PROGRAM (2023-24)

Bachelor of Science (Non-Medical) Semester - IV							
Course Code	Course Name	Course Type	Marks				Examination time (in Hours)
			Total	Ext.		CA	
				L	P		
BSNL-4421	Punjabi (Compulsory)	C	50	40	-	10	3
BSNL-4031	¹ Basic Punjabi						
BSNL-4431	² Punjab History & Culture						
BSNL-4212	English (Compulsory)	C	50	40	-	10	3
BSNM-4395	(I) Physics (Quantum Mechanics)	C	100	30	-	20	3
	(II) Physics (Atomic and Molecular Spectra)			30	-		3
	(P) Physics (Physics Practical)			-	20		3
BSNM-4084	(I) Chemistry (Inorganic Chemistry)	C	100	30	-	20	3
	(II) Chemistry (Organic Chemistry)			30	-		3
	(P) Chemistry (Practical)			-	20		3.5
BSNM-4333	(I) Mathematics (Statics and Vector Calculus)	E/C	100	40	-	20	3
	(II) Mathematics (Solid Geometry)			40	-		3
SECS-4522	*Social Outreach	AC	25	20	-	5	2
Total							

C-Compulsory

E-Elective

AC- Audit Course

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*Marks of these papers will not be added in total marks and only grades will be provided.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
CURRICULUM AND SCHEME OF EXAMINATIONS OF THREE-YEAR DEGREE PROGRAM (2023-24)

Bachelor of Science (Non-Medical)							
Semester - V							
Course Code	Course Name	Course Type	Marks				Examination time (in Hours)
			Total	Ext.		CA	
				L	P		
BSNL-5421	Punjabi (Compulsory)	C	50	40	-	10	3
BSNL-5031	¹ Basic Punjabi						
BSNL-5431	² Punjab History & Culture						
BSNL-5212	English (Compulsory)	C	50	40	-	10	3
BSNL-5395	(I) Physics (Condensed Matter Physics)	C	100	30	-	20	3
	(II) Physics (Electronics)			30	-		3
	(P) Physics (Physics Practical)			-	20		3
BSNM-5084	(I) Chemistry (Inorganic Chemistry)	C	100	30	-	20	3
	(II) Chemistry (Physical Chemistry)			30	-		3
	(P) Chemistry (Practical)			-	20		3.5
BSNM-5333	(I) Mathematics (Dynamics)	E/C	100	40	-	20	3
	(II) Mathematics (Number Theory)			40	-		3
SECJ-5551	*Job Readiness course	AC	2 credit	-	-	-	-
SECI-5541	**Innovation, Entrepreneurship and Venture Development	AC	2 credit	-	-	-	-
Total							

C-Compulsory

E-Elective

AC- Audit Course

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*Marks of these papers will not be added in total marks and only grades will be provided.

** Ability enhancement compulsory course

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
CURRICULUM AND SCHEME OF EXAMINATIONS OF THREE-YEAR DEGREE PROGRAM (2023-24)

Bachelor of Science (Non-Medical) Semester - VI							
Course Code	Course Name	Course Type	Marks				Examination time (in Hours)
			Total	Ext.		CA	
				L	P		
BSNL-6421	Punjabi (Compulsory)	C	50	40	-	10	3
BSNL-6031	¹ Basic Punjabi						
BSNL-6431	² Punjab History & Culture						
BSNL-6212	English (Compulsory)	C	50	40	-	10	3
BSNM-6395	(I) Physics (Nuclear Physics)	E	100	30	-	20	3
	(II) Physics (Radiation and Particle Physics)			30	-		3
	(P) Physics (Physics Practical)			-	20		3
BSNM-6084	(I) Chemistry (Molecular Spectroscopy)	C	100	30	-	20	3
	(II) Chemistry (Physical Chemistry)			30	-		3
	(P) Chemistry (Practical)			-	20		3.5
BSNM-6333	(I) Mathematics (Linear Algebra)	E	100	40	-	20	3
	(II) Mathematics (Numerical Analysis)			40	-		3
Total							

C-Compulsory

E-Elective

AC- Audit Course

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BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF
COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION**

Semester III

PUNJABI (COMPULSORY)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-3421

COURSE OUTCOMES

CO1: ‘ਚੋਣਵੇ ਪੰਜਾਬੀ ਨਿਬੰਧ’ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਵਾਰਤਕ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO2: ‘ਸਮਾਂ ਮੰਗ ਕਰਦਾ ਹੈ’ ਇਕਾਂਗੀ ਸੰਗ੍ਰਹਿ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਇਕਾਂਗੀ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲ ਜੋੜਣਾ ਹੈ।

CO3: ਸੰਖੇਪ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਸੰਖੇਪ ਵਿਚ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਲੇਖ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO4: ਮੂਲ ਵਿਆਕਰਣਕ ਇਕਾਈਆਂ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵੰਨਗੀਆਂ (ਭਾਵੰਸ਼, ਸ਼ਬਦ, ਵਾਕੰਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ)ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

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COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

Semester III

PUNJABI (COMPULSORY)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-3421

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

Theory: 40

CA: 10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਚੋਣਵੇ ਪੰਜਾਬੀ ਨਿਬੰਧ (ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ,ਪਰਮਜੀਤ ਸਿੰਘ ਸਿੱਧੂ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,ਪਟਿਆਲਾ।

ਘਰ ਦਾ ਪਿਆਰ, ਉਮਰ ਲੰਮੀ ਹੋ ਸਕਦੀ ਹੈ,ਅੱਥਰੂ, ਪੁਰਾਣਾ ਪੰਜਾਬ, ਇੰਗਲੈਂਡ ਦਾ ਸੋਗੀ ਸੋਮਵਾਰ,ਖਿਡਾਰੀਆਂ ਦੇ ਵਹਿਮ।

(ਪਾਠ ਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਹਨ)

(ਵਿਸ਼ਾ ਵਸਤੂ/ਸਾਰ /ਕਲਾ ਪੱਖ)

8 ਅੰਕ

ਯੂਨਿਟ-II

ਸਮਾਂ ਮੰਗ ਕਰਦਾ ਹੈ (ਇਕਾਂਗੀ ਸੰਗ੍ਰਹਿ) (ਸੰਪਾ. ਕੇਵਲ ਧਾਲੀਵਾਲ) ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ,ਲੁਧਿਆਣਾ।

(ਵਿਸ਼ਾ ਵਸਤੂ /ਸਾਰ / ਪਾਤਰ ਚਿਤਰਨ)

8 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਸੰਖੇਪ ਰਚਨਾ (ਪ੍ਰੈਸੀ)

(ਅ) ਲੇਖ ਰਚਨਾ

8 ਅੰਕ

ਯੂਨਿਟ-IV

ਮੂਲ ਵਿਆਕਰਣਕ ਇਕਾਈਆਂ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵੰਨਗੀਆਂ (ਭਾਵੰਸ਼, ਸ਼ਬਦ, ਵਾਕੰਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ)

8 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੇ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

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SEMESTER-III

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-3031

Course outcomes

CO1: ਸੰਖੇਪ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਸੰਖੇਪ ਵਿਚ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO2: ਕਵਿਤਾ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿ ਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ।

CO3: ਕਹਾਣੀ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿ ਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ।

CO4: ਨਿਬੰਧ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਮੁੱਲਵਾਨ ਇਤਿਹਾਸ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।

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SEMESTER-III

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-3031

ਸਮਾਂ: 3 ਘੰਟੇ

Maximum Marks : 50

Theory : 40

CA : 10

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ

ਸੰਖੇਪ ਰਚਨਾ

08 ਅੰਕ

ਯੂਨਿਟ-II

ਕਵਿਤਾਵਾਂ

(ੳ) ਸਮਾਂ (ਭਾਈ ਵੀਰ ਸਿੰਘ)

(ਅ) ਬੈਰ ਪੰਜਾਬੀ ਦੀ (ਫ਼ੀਰੋਜ਼ਦੀਨ ਸ਼ਰਫ਼)

(ੲ) ਖ਼ਨਗਾਹੀ ਦੀਵਾ ਬਾਲਦੀਏ (ਪ੍ਰੋ.ਮੋਹਨ ਸਿੰਘ)

(ਸ) ਰੁੱਖ (ਸ਼ਿਵ ਕੁਮਾਰ)

(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ,ਸਾਰ)

08 ਅੰਕ

ਯੂਨਿਟ-III

ਕਹਾਣੀਆਂ

(ੳ) ਭੂਆ (ਨਾਨਕ ਸਿੰਘ)

(ਅ) ਪੇਮੀ ਦੇ ਨਿਆਣੇ (ਪ੍ਰਿੰ. ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ)

(ੲ) ਕੁਲਫੀ (ਸੁਜਾਨ ਸਿੰਘ)

(ਸ) ਧਰਤੀ ਹੇਠਲਾ ਬੋਲਦ(ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ)

(ਵਿਸ਼ਾ ਵਸਤੂ,ਸਾਰ)

08 ਅੰਕ

ਯੂਨਿਟ-IV

ਨਿਬੰਧ

(ੳ) ਘਰ ਦਾ ਪਿਆਰ (ਤੇਜਾ ਸਿੰਘ)

(ਅ) ਮਾਂ (ਗੁਰਬਖਸ਼ ਸਿੰਘ)

(ੲ) ਭਾਈ ਮਰਦਾਨਾ ਜੀ (ਹਰਪਾਲ ਸਿੰਘ ਪੰਨੂ)

(ਸ) ਮਨੁੱਖ ਕੁਦਰਤ ਦੀ ਨੇਕ ਔਲਾਦ ਨਹੀਂ (ਸੁਰਿੰਦਰ ਮੰਡ)

(ਵਿਸ਼ਾ ਵਸਤੂ,ਸਾਰ)

08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**BACHELOR OF SCIENCE
SEMESTER III (SESSION: 2023-24)
PUNJAB HISTORY AND CULTURE**

**Course Title: Punjab History and Culture (From 1000-1605 A. D.)(Special paper in lieu of
Punjabi Compulsory)**

(For those students who are not domicile of Punjab)Course Code- BSML-3431

After completing the paper the students will have a thorough insight into the origin of Sikh faith and its major institutions in Punjab. They will be able to

CO 1: Understand the society and culture of Medieval Punjab.

CO 2: Understand the growth of various sects during the Bhakti Movement in Punjab.

CO 3: Comprehend and analyse the teachings of Guru Nanak Dev and its relevance today

CO 4: Make a comparison between the philosophy and teachings of first five Sikh Gurus and their relevance in the present scenario and also to understand and analyse the institutions started by Sikh Gurus and their implications till date

**BACHELOR OF SCIENCE
SEMESTER III (SESSION: 2023-24)
PUNJAB HISTORY AND CULTURE**

**Course Title: Punjab History and Culture (From 1000-1605 A. D.)(Special paper in lieu of
Punjabi Compulsory)**

(For those students who are not domicile of Punjab)Course Code- BSML-3431

Examination Time: 3 Hours

Max. Marks: 50

Theory: 40

CA: 10

Instructions for the Paper Setters

1. Question paper shall consist of four Units
2. Examiner shall set 8 questions in all by selecting **Two Questions** of equal marks from each Unit.
3. Candidates shall attempt **5 questions** in **600 words**, by at least selecting **One Question** from each Unit and the **5th question** may be attempted from any of the **four Units**.
4. Each question will carry 8 marks

Unit -I

1. Society and Culture of Punjab during Turko-Afghan Rule
2. The Punjab under the Mughals

Unit-II:

3. Bhakti Movement and Impact on Society of Punjab
4. Sufism in Punjab

Unit-III:

5. Guru Nanak: Early Life and Teachings
6. Concept of Sangat and Pangat

Unit-IV:

7. Contribution of Guru Angad Dev, Guru Amar Das and Guru Ram Das

8. Guru Arjun Dev and Compilation of Adi Granth

Suggested Readings:

- Chopra, P. N., Puri, B.N., & Das. M.N. (1974). A Social, Cultural and Economic History of India, Vol. II. New Delhi : Macmillan India.
- Grewal, J.S. (1994) The Sikhs of the Punjab, Cambridge University Press, New Delhi.
- Singh, Fauja (1972), A History of the Sikhs, Vol. II, I. Patiala: Punjabi University.
- Singh, Khushwant (2011). A History of Sikhs- Vol. I (1469-1839), New Delhi, Oxford University Press.

BACHELOR OF SCIENCE
SEMESTER III (SESSION: 2023-24)
ENGLISH
Course Title: English (Compulsory)
Course Code: BSML -3212

COURSE OUTCOMES

After passing this course, the students will be able to:

- CO 1:** Comprehend the basics of grammatical rules governing relative clauses, adjectives, adverbs, conjunctions and prepositions through the study of “English Grammar in Use” by Raymond Murphy
- CO 2:** Develop skills to write an essay on a given topic and enhance their vocabulary through the study of “The Students’ Companion” by Wilfred D. Best
- CO 3:** Enhance their reading and analysing power of texts through guided reading through the study of “Making Connections” by Kenneth J. Pakenham
- CO 4:** Develop an understanding of the poems taught, relate to the socio-cultural background of England and be able to answer questions regarding tone, style and central idea through the study of the poems in the prescribes text “Moments in Time”

BACHELOR OF SCIENCE
SEMESTER III (SESSION: 2023-24)
ENGLISH
Course Title: English (Compulsory)
Course Code: BSML -3212

Examination Time: 3 Hrs

Max. Marks: 50

Theory: 40

CA: 10

Instructions for the Examiner:

(The paper setters should avoid questions of theoretical nature from *Making Connections*.)

Section A: One question with sub-parts will be set from Unit I of the syllabus. Fifteen sentences will be set and the students would be required to attempt any ten. Each sentence will carry one mark.

(1

0×1=10)

Section B: Two questions will be set from Unit II of the syllabus. The students would be required to attempt one essay out of the given two topics carrying six marks (word limit 300 words). The second question will be based on vocabulary. The students would be required to write single words for phrases and sentences choosing any four out of six and each carrying one mark.

(1

×6 + 4×1=10)

Section C: The students would be required to attempt two questions (with sub parts) based on exercises as given before and after reading essays in the prescribed text book *Making Connections*.

(2×5=10)

Section D: This section will be divided into two parts. In part one, three questions based on Central idea, theme, tone and style etc. of the poems from the prescribed textbook, *Moments In Time* from Unit IV of the syllabus will be set. The students would be required to attempt any two, each carrying three marks (100 words each).

(2×3=6)

Part two will have one question (with internal choice) requiring students to explain a stanza with reference to context carrying four marks (word limit 200 words). The stanzas for explanation will be taken from the prescribed textbook, *Moments in Time* from Unit IV in the syllabus.

(1×4=4)

Unit I

English Grammar in Use, 4th Edition by Raymond Murphy, CUP (Units 92-120)

Unit II

Essay Writing and *The Students' Companion* by Wilfred D. Best (Section 1:
Single words for phrases and sentences: Words denoting Numbers and words
denoting Places)

Unit III

Making Connections by Kenneth J. Pakenham, 2nd Edn. CUP: Unit-II

Unit IV

Moments in Time: Poems at Sr. No. 1-6

Texts Prescribed:

1. *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP
2. *The Students' Companion* by Wilfred D. Best
3. *Making Connections* by Kenneth J. Pakenham, 2nd Edn. CUP
4. *Moments in Time: An Anthology of Poems*, GNDU, Amritsar

Bachelor of Science (Semester System) (12+3 System of Education)
(Session-2023-24)

Course code: BSNM-3395 (I) for Bachelor of Science (Non Medical)
BCSM-3395 (I) for Bachelor of Science (Computer Science)

Course Outcomes: PHY-Statistical Physics and Thermodynamics

After passing this programme the students will be able to:

- CO1: Understand the basic ideas and scope of probability as well as distribution of n particles in different compartments.
- CO2: Concept of different types of Statistics and the need for Quantum Statistics.
- CO3: Understand the concept of entropy, Laws of Thermodynamics and applications to thermoelectric effect.
- CO4: Understand the Maxwell Thermodynamics relations, Change of state and Claypron equation.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3395 (I) for Bachelor of Science (Non Medical)

BCSM-3395 (I) for Bachelor of Science (Computer Science)

STATISTICAL PHYSICS AND THERMODYNAMICS

Time: 3 Hours

Marks: 30
Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT-I

Basic ideas of Statistical Physics, Scope of Statistical Physics, Basic ideas about probability, Distribution of four distinguishable particles into compartments of equal size. Concept of macro states, microstates, Thermodynamic Probability, Effects of constraints on the system. Distribution of n particles in two compartments, Deviation from the state of maximum probability. Equilibrium state of dynamic system, Distribution of distinguishable n particles in k compartments of unequal sizes.

UNIT-II

Phase space and division into elementary cells. Three kinds of statistics. The basic approach in three statistics. Maxwell Boltzmann (MB) statistics applied to an ideal gas in equilibrium. Experimental verification of law of distribution of molecular speeds. Need for Quantum Statistics – B.E. Statement of Planck's law of Radiation Wien's Displacement and Stefan's law. Fermi Dirac (FD) statistics. Comparison of M.B, B.E and F.D statistics.

UNIT-III

Statistical definition of entropy, Change of entropy of system, additive nature of entropy, Law of increase of entropy, Reversible and irreversible processes, and their examples, work done in reversible process, examples of increase in entropy in natural processes, entropy and disorder, Brief review of Terms, Laws of Thermodynamics, Carnot Cycle, Entropy changes in Carnot cycle, Absolute thermodynamics or Kelvin Scale of Temperature, Applications of thermodynamics to thermoelectric effect, Peltier Effect, Thomson Effect, change of entropy along reversible path in P-V diagram. Heat death of universe.

UNIT-IV

Derivation of Maxwell Thermodynamics relations, Cooling produced by adiabatic stretching, Adiabatic Compression, change of internal energy with volume, Specific heat and constant pressure and constant volume. Expression for C_p-C_v , Change of state and Clausius equation, Joule-Thomson effect.

Text Reference Books:

1. Statistical Physics and Thermodynamics by V.S. Bhatia (Sohan Lal Nagin Chand), Jal.
2. A Treatise on Heat by M.N. Saha & B.N. Srivastava (The Indian Press Pvt. Ltd., Allahabad), 1965.

3. Statistical Mechanics: An Introductory Text by Bhattacharjee, J.K. (Allied Pub., Delhi), 2000.
4. Statistical Physics by Bhattacharjee, J.K. (Allied Pub., Delhi) 2000.
5. Statistical Mechanics by B.B. Laud, (Macmillan India Ltd.) 1981.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3395 (II) for Bachelor of Science (Non Medical)

BCSM-3395 (II) for Bachelor of Science (Computer Science)

PHYSICS (OPTICS AND LASER)

Course Outcomes:

After passing this programme the students will be able to:

CO1: understand the concept of interference of waves by division of wave front and by division of Amplitude, its different methods and interferometers.

CO2: understand the Huygen's Fresnel theory and diffraction, Fraunhofer diffraction due to single slit, double slit and n slits, the concept of resolving power.

CO3: understand the concept the polarization of light and types of polarisers.

CO4: understand the fundamentals of lasers and its processes. The knowledge of different components and types of lasers and its applications

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3395 (II) for Bachelor of Science (Non Medical)

BCSM-3395 (II) for Bachelor of Science (Computer Science)

PHYSICS (OPTICS AND LASER)

Time: 3 Hours

Marks: 30

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT-I

Interference of Light:

Superposition of light waves and interference, Young's double slit experiment, Conditions for sustained interference pattern, Coherent sources of light, Interference pattern by division of wave front, Fresnel Biprism, Displacement of fringes, Change of phase on reflection, Interference in thin films due to reflected and transmitted light, non reflecting films, Newton's Rings. Michelson Interferometer.

UNIT-II

Diffraction:

Huygen's Fresnel theory, half-period zones, Zone plate, Distinction between Fresnel and Fraunhofer diffraction. Fraunhofer diffraction due to single slit, rectangular and circular apertures, Effect of diffraction in optical imaging, Resolving power of telescope in diffraction grating, its use as a spectroscopic element and its resolving power, Resolving power of microscope

UNIT-III

Polarization:

Plane Polarized light, Elliptically polarized light, wire grid polarizer, Sheet polarizer, Malus' Law, Brewster Law, Polarization by reflection and scattering, Double reflection, Nicol prism, Retardation plates, Production and Analysis of polarized light, Quarter and half wave plates.

UNIT-IV

Laser Fundamentals:

Derivation of Einstein relations, Concept of stimulated emission and population inversion, broadening of spectral lines, three level and four level laser schemes, Threshold and Schawlow Tonnes condition, Components of laser devices, types of lasers, Ruby and Nd:YAG lasers, He-

Ne and CO₂ lasers construction, mode of creating population inversion and output characteristics, application of lasers –a general outline.

Text Reference Books:

1. Fundamentals of Optics: F.A. Jenkins and Harvey E White, (McGraw Hill) 4th Edition, 2001.
2. Optics: Ajoy Ghatak, (McMillan India) 2nd Edition, 7th Reprint, 1997
3. Optics: Born and Wolf, (Pergamon Press) 3rd Edition, 1965.
4. Laser Fundamentals: W.T. Silfvast (Foundation Books), New Delhi, 1996.
5. Laser and Non-Linear Optics: B.B. Laud (New Age Pub.) 2002
6. Laser: Svelto, Plenum Press) 3rd Edition, New York

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3395 for Bachelor of Science (Non Medical)

BCSM-3395 for Bachelor of Science (Computer Science)

PHYSICS (PRACTICAL)

After passing this programme the students will be able to:

- CO1: use spectrometer to determine the refractive index of different transparent materials wills dispersive power and resolving power of different transparent prisms and liquids using spectrometer.
- CO2: use diffraction grating and apply it to determine dispersive power, resolving power, the wavelengths of Hg source and the Cauchy's constants.
- CO3: to measure an accessible (Horizontal and vertical) and inaccessible heights using sextant.
- CO4: set up of Newton's rings to determine wavelength of sodium light.
- CO5: demonstrate the verification of laws of probability distribution.

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-III
(Session-2023-24)
Course code: BSNM-3395 for Bachelor of Science (Non Medical)
BCSM-3395 for Bachelor of Science (Computer Science)
PHYSICS (PRACTICAL)

Instructions to Practical Examiner

Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar

General Guidelines for Practical Examination

I. The distribution of marks is as follows: **Marks: 20**

i) One experiment **7 Marks**

ii) Brief Theory **3 Marks**

iii) Viva-Voce **5 Marks**

iv) Record (Practical file) **5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment is to be allotted to more than three examinees in any group.

List of Experiments

1. To determine refractive index of glass/ liquid using spectrometer.
2. To determine the Cauchy's constants.
3. To study the refractive index of a doubly refracting prism.
4. To set up Newton's rings to determine wavelength of sodium light.
5. To determine the wavelength by using plane diffraction grating (Use Hg source)
6. To determine dispersive power of plane diffraction grating.
7. To determine resolving power of a telescope.
8. To measure an accessible (Horizontal and vertical) height using sextant.
9. To measure inaccessible height by using sextant.
10. Verify laws of probability distribution by throwing of similar coins.
11. To determine the wavelength of given laser source using Young's double slit experiment



**Bachelor of Science
(SEMESTER-III)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-3084(I)
COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)**

Course outcomes:

Students will be able to

CO1: to resolve the different enantiomers and differentiate between dextrorotatory-leavorotatory chiral and achiral compounds, understand the concept of isomerism, axial and equatorial bonds.

CO2: understand the methods of formation, chemical reactions, acidic character of alcohols

CO3: preparation of understand structure and bonding phenols, acidic character of phenols

CO4: compare reactivity of aliphatic and aromatic aldehydes and ketones, to understand the various reactions given by carbonyl compounds

**Bachelor of Science
(SEMESTER-III)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-3084(I)
COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)**

Time: 3 Hrs.

Max. Marks: 30

Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Stereochemistry of Organic Compounds

Concept of isomerism, types of isomerism, Optical isomerism, elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D and L and R and S systems of nomenclature. Geometric isomerism—determination of configuration of geometric isomers. E and Z system of nomenclature. Conformational isomerism—conformational analysis of ethane and n-butane; conformation of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives. Newman projection and Sawhorse formulae, Fischer and flying wedge formulae. Difference between configuration and conformation.

Unit-II

Alcohols

Classification and nomenclature. Monohydric alcohols—nomenclature, Acidic nature, Reactions of alcohols, Dihydric alcohols—nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage $[\text{Pb}(\text{OAc})_4]$ and $[\text{HIO}_4]$ and pinacol-pinacolone rearrangement.

Unit-III

Phenols

Nomenclature, structure and bonding, preparation of phenols, physical properties and acidic character, Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols—electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Reimer Tiemann reaction.

Unit-IV

Aldehydes and Ketones

Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction, Mannich reaction. Use of acetals as protecting group. Oxidation of aldehydes, Baeyer-Villiger oxidation of Ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAlH_4 and NaBH_4 reductions. Halogenation of enolizable ketones. Halogenation of enolizable ketones

Books suggested:

1. Morrison, R.T., Boyd, R.N., Organic Chemistry; 6th edition, Pubs: Prentice-Hall, 1992.
2. Wade Jr., L.G., Singh, M.S., Organic Chemistry; 6th edition, Pubs: Pearson Education, 2008.
3. Mukherji, S.M., Singh, S.P., Kapoor, R.P., Organic Chemistry; Pubs: Wiley Eastern Limited, 1985, Vol. I, II, III.
4. Solomons, T.W., Fryhle, C.B., Organic Chemistry; 9th edition, Pubs: Wiley India, 2007.
5. Carey, F.A., Organic Chemistry; 4th edition, Pubs: McGraw-Hill, 2000.
6. Streitwieser, A., Clayton, Jr., Heathcock, H., Introduction to Organic Chemistry; 3rd edition, Pubs: Macmillan Publishing Company, 1989.
7. University General Chemistry, C.N.R. Rao, Macmillan.

**Bachelor of Science
(SEMESTER-III)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-3084(II)
COURSE TITLE: CHEMISTRY (PHYSICALCHEMISTRY)**

Course outcomes:

Students will be able to

CO1: understand and evaluate thermodynamic property of any system and its applications to various systems, acquire the knowledge of phase equilibria of various systems

CO2: demonstrate the carnot cycle, understand the concept of Entropy

CO3: understand the concept of Residual entropy, demonstrate Clausius-Clapeyron equation,

CO4: understand concept of spontaneity of a reaction in terms of free energy change.

CO4: understand and demonstrate the concept of phase equilibria of one component system, two component system

**Bachelor of Science
(SEMESTER-III)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-3084(II)
COURSE TITLE: CHEMISTRY (PHYSICAL CHEMISTRY)**

Time: 3 Hrs.

Max. Marks: 30

Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Thermodynamics-I Definition of thermodynamic terms: System, surroundings etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.

First Law of Thermodynamics:

Statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law-Joule-Thomson coefficient and inversion temperature, Calculation of w, q, dU and dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process.

Thermochemistry:

Standard state, standard enthalpy of formation-Hess's Law of heat summation and its applications. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy. Kirchhoff's equation.

Unit-II

Thermodynamics-II

Second Law of Thermodynamics: Need for the law, different statements of the law, Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature.

Concept of Entropy: Entropy as a state function, entropy as a function of V and T, entropy as a function of P and T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

Unit-III

Thermodynamics-III

Third Law of Thermodynamics: Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A and G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change, Variation of G and A with P,V and T.

Chemical Equilibrium

Equilibrium constant and free energy. Thermodynamic derivation of law of mass action. Determination of K_p , K_c , K_a and their relationship, Clausius-Clapeyron equation, applications.

Unit-IV

Introduction to Phase Equilibrium

Statement and meaning of the terms-phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system-water, CO_2 and S systems. Phase equilibria of two component systems-solid-liquid equilibria, simple eutectic-Bi-Cd, Pb-Ag systems, desilverisation of lead. Solid solutions-compound formation with congruent melting point (Mg-Zn) and incongruent melting point, ($\text{NaCl-H}_2\text{O}$), ($\text{FeCl}_3\text{-H}_2\text{O}$) and ($\text{CuSO}_4\text{-H}_2\text{O}$) system. Freezing mixtures, acetone-dry ice. Non-ideal system-azeotropes-HCl-H₂O and ethanol-water system. Partially miscible liquids Phenol-water, trines-thylamin-water, Nicotine-water System. Lower and upper consolute temperature, Effect of impurity on consolute temperature, immiscible liquids, steam distillation. Nernst distribution law-thermodynamic derivation and applications.

Books suggested:

1. Atkins, P., Paula, J.de, Atkins Physical Chemistry; 8th edition, Pubs: Oxford University Press, 2008.
2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co., 2008.
3. Barrow, G.M., Physical Chemistry; 6th edition, Pubs: McGraw Hill Inc, 1996.

4. Rao, C.N.R., University General Chemistry; Pubs: Macmillan India, 1985.
5. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford University Press, 2000.
6. Albert, R.A., Silbey, R.J., Physical Chemistry; 1st edition, Pubs: John Wiley and Sons Inc., 1992.
7. Dogra, S.K., Dogra, S., Physical Chemistry Through Problems; Pubs: Wiley Eastern Limited, 1991.
8. Levine, I.N., Physical Chemistry; 5th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd., 2002.
9. Moore, W. J., Basic Physical Chemistry; Pubs: Prentice Hall of India Pvt. Ltd, 1983.
10. Metz, C.R., Theory and Problems of Physical Chemistry; Schaum's outline series, 2nd edition, Pubs: McGraw-Hall Book company, 1989.

**Bachelor of Science
(SEMESTER-III)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-3084(P)
COURSE TITLE: CHEMISTRY PRACTICAL**

Course outcomes:

Students will be able to

CO1: understand and master the technique of volumetric analysis, analyze an acidic and alkali content in different samples,

CO2: To analyze calcium content in various samples permanganometricall, understand the concept of hardness of water and its analysis by EDTA method

CO3: understand and master the technique of gravimetric analysis

CO4: to understand the concept of TLC and its applications

**Bachelor of Science
(SEMESTER-III)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-3084(P)
COURSE TITLE: CHEMISTRY PRACTICAL**

Duration: 3½ Hrs.

Max. Marks: 20

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar.

Quantitative Analysis

Volumetric Analysis

- a. Determination of acetic acid in commercial vinegar using NaOH.
- b. Determination of alkali content-antacid tablet using HCl.
- c. Estimation of calcium content in chalk as calcium oxalate by permanganometry.
- d. Estimation of hardness of water by EDTA.
- e. Estimation of ferrous and ferric by dichromate method.
- f. Estimation of copper using sodiumthiosulphate.

Gravimetric Analysis

Analysis of Cu as CuSCN and Ni as Ni (dimethylgloxime)

Organic Chemistry Laboratory Techniques

Thin Layer Chromatography

Determination of R_f values and identification of organic compounds.

- (a). Separation of green leaf pigments (spinach leaves may be used).

(b). Preparation and separation of 2, 4. dinitrophenylhydrazones of acetone, 2-butanone, 2-Butanone, hexan-2 and 3-one using toluene and light petroleum (40 : 60).

(c). Separation of a mixture of dyes using cyclohexane and ethyl acetate (8.5:1.5).

Practical Examination

1) Volumetry / Gravimetry	11
2) Thin Layer chromatography	04
3) Viva-Voce	03
4) Note Book	02

Books suggested:

1. Vogel's Textbook of Quantitative Inorganic Analysis (revised), J. Bassett, R.C. Denney, G.H. Jeffery and J. Mandham, ELBS.
2. Standard Methods of Chemical. Analysis, W.W. Scott: The Technical Press.
3. Experimental Inorganic Chemistry, W.G. Palmer, Cambridge.
4. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
5. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
6. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.
7. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester-III

Session: 2023-24

Course Title: Mathematics (Analysis)

Course Code: BARM/ BECM/ BCSM/ BSNM-3333(I)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate an understanding of limits and how they are used in sequences.

CO 2: Understanding how limits are used in series and apply various test on series.

CO 3: To understand the concepts of Riemann sum, partitions, upper and lower sums, Riemann Integrability of continuous functions and of monotone functions. Distinguish between the absolute convergence and conditional convergence.

CO 4: To know and describe the converging behaviour of improper integrals and Beta , Gamma functions. To find the relation between Beta and Gamma functions.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–III

Session: 2023-24

Course Title: Mathematics (Analysis)

Course Code: BARM/ BECM/ BCSM/ BSNM-3333(I)

Examination Time: 3 Hours

Max Marks :50

Theory : 40

CA:10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion.

Unit-II

Series of non-negative terms. Comparison tests. Cauchy's integral tests. Ratio tests. Cauchy's root test. Raabe's test, logarithmic test. Demorgan's and Bertrand's tests. Kummer's test, Cauchy Condensation test, Gauss test, Alternating series. Leibnitz's test, absolute and conditional convergence

Unit-III

Partitions, Upper and lower sums. Upper and lower integrals, Riemann integrability. Conditions of existence of Riemann integrability of continuous functions and of monotone functions. Algebra of integrable functions.

Unit-IV

Improper integrals and statements of their conditions of existence. Test of the convergence of improper integral, beta and gamma functions.

Text Book:

A. Kumar and S. Kumaresan , A Basic Course in Real Analysis, CRC Press, New York, 2014.

Reference Books:

1.S.C Malik and S. Arora, Mathematical Analysis, New Age international Publishers, New Delhi, second edition, 2005.

2.T. M. Apostol, Mathematical Analysis, Pearson education, second edition, 2004.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–III

Session: 2023-24

Course Title: Mathematics (Analytical Geometry)

Course Code: BARM/ BECM/ BCSM/ BSNM-3333(II)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of the geometry of lines, shifting of origin and rotation of axis in the Euclidian plane.

CO 2: Develop geometry with a degree of confidence and will gain fluency in the basics of parabola in Euclidian geometry.

CO 3: Demonstrate the concept of ellipse and hyperbola in general quadratic equation.

CO 4: Understand the concept of geometry and real time characteristics of plain and spheres.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–III

Session: 2023-24

Course Title: Mathematics (Analytical Geometry)

Course Code: BARM/ BECM/ BCSM/ BSNM-3333(II)

Examination Time: 3 Hours

Max Marks: 50

Theory :40

CA:10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Transformation of axes, shifting of origin, Rotation of axes in two dimension and three dimension, the invariants, Joint equation of pair of straight lines, equations of bisectors

Unit-II

Parabola and its properties. Tangents and normal, Pole and polar, pair of tangents at a point, Chord of contact, equation of the chord in terms of mid point and diameter of conic.

Unit-III

Ellipse and hyperbola with their properties. Tangents and normal, Pole and polar. pair of tangents at a point, Chord of contact, Identifications of curves represented by second degree equation (including pair of lines).

Unit-IV

Intersection of three planes, condition for three planes to intersect in a point or along a line or to form a prism. Sphere: Section of a sphere by a plane, spheres of a given circle. Intersection of a line and a sphere. Tangent line, tangent plane, power of a point with respect to a sphere, radical planes.

Text Book:

S.L. Loney, The Elements of Coordinate Geometry, Arihant Publications, Sixth edition, 2016.

Reference Books:

1. G. Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Private Limited, Allahabad, 2000.
2. S. Narayan and P.K. Mittal, Analytical Solid Geometry, S. Chand & company, Seventeenth edition, 2007.
3. E. Kreyszig, Advanced Engineering Mathematics, Wiley Publisher, Tenth edition, 2010.
4. G.B. Thomos, and R.L. Finney, Calculus and Analytic Geometry, Addison Wesley, Ninth edition, 1995.

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION
(Semester IV)

Punjabi (Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-4421

COURSE OUTCOMES

CO1: ‘ਪਗਡੰਡੀਆਂ’ (ਸਵੈਜੀਵਨੀ) ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਸਵੈ ਜੀਵਨੀ ਸਾਹਿਤ ਰੂਪ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੁਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO2: ‘ਫ਼ਾਸਲੇ’ (ਨਾਟਕ) ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਨਾਟਕ ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਨਾਟਕ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।

CO3: ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਅਤੇ ਅਖ਼ਬਾਰ ਵਿਚ ਇਸ਼ਤਿਹਾਰ ਲਿਖਣਾ ਸਿਖਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ।

CO4: ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰਨ ਦਾ ਮਕਸਦ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਲਿਖਤ ਵਿਚ ਕੀਤੀਆਂ ਜਾਣ ਵਾਲੀਆਂ ਗਲਤੀਆਂ ਨੂੰ ਸੁਧਾਰਨਾ ਹੈ। ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

Session 2023-24

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

(Semester IV)

Punjabi (Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-4421

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

Theory: 40

CA: 10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਪਗਡੰਡੀਆਂ (ਸਵੈਜੀਵਨੀ) : ਡਾ.ਬਚਿੰਤ ਕੌਰ

(ਸਾਰ /ਵਿਸ਼ਾ ਵਸਤੂ / ਆਤਮ ਬਿੰਬ)

8 ਅੰਕ

ਯੂਨਿਟ-II

ਫ਼ਾਸਲੇ (ਨਾਟਕ) :ਜਤਿੰਦਰ ਬਰਾੜ,

(ਵਿਸ਼ਾ ਵਸਤੂ/ਸਾਰ /ਨਾਟ ਜੁਗਤਾਂ)

8 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ

(ਅ) ਅਖ਼ਬਾਰ ਵਿਚ ਇਸ਼ਤਿਹਾਰ

8 ਅੰਕ

ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ

(ੳ) ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮ

(ਅ) ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ

8 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

Session 2023-24

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

SEMESTER-IV

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-4031

Course outcomes

CO1: ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦੇ ਵਿਦਿਆਰਥੀ 'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਨਾਮਵਰ ਕਵੀਆਂ ਮੋਹਨ ਸਿੰਘ, ਜਗਤਾਰ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼ ਦੀਆਂ ਰਚਨਾਵਾਂ ਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

CO2: ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦੇ ਵਿਦਿਆਰਥੀ 'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਵੱਖੇ ਵੱਖਰੀਆਂ ਧਾਰਾਵਾਂ ਨਾਲ ਸਬੰਧਤ ਮੋਹਨ ਸਿੰਘ, ਜਗਤਾਰ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼ ਦੀਆਂ ਰਚਨਾਵਾਂ ਦੇ ਸਾਰ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

CO3: ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦੇ ਵਿਦਿਆਰਥੀ 'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਵੱਖੇ ਵੱਖਰੀਆਂ ਧਾਰਾਵਾਂ ਨਾਲ ਸਬੰਧਤ ਮੋਹਨ ਸਿੰਘ, ਜਗਤਾਰ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼ ਕਵੀਆਂ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

CO4: ਲੇਖ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ। ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰਨ ਦਾ ਮਕਸਦ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਲਿਖਤ ਵਿਚ ਕੀਤੀਆਂ ਜਾਣ ਵਾਲੀਆਂ ਗਲਤੀਆਂ ਨੂੰ ਸੁਧਾਰਨਾ ਹੈ।

Session 2023-24

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

SEMESTER-IV

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-4031

ਸਮਾਂ: 3 ਘੰਟੇ

Maximum Marks : 50

Theory : 40

CA : 10

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਆਤਮ ਅਨਾਤਮ (ਕਵਿਤਾ ਭਾਗ)(ਸੰਪਾਦਕ ਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਮੋਹਨ ਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਸ਼ ਸਿਲੇਬਸ ਦਾ ਹਿੱਸਾ ਹਨ।

ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ

08 ਅੰਕ

ਯੂਨਿਟ-II

ਆਤਮ ਅਨਾਤਮ (ਕਵਿਤਾ ਭਾਗ)(ਸੰਪਾਦਕ ਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਮੋਹਨ ਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਸ਼ ਸਿਲੇਬਸ ਦਾ ਹਿੱਸਾ ਹਨ।

(ਸਾਰ)

08 ਅੰਕ

ਯੂਨਿਟ-III

ਆਤਮ ਅਨਾਤਮ (ਕਵਿਤਾ ਭਾਗ)(ਸੰਪਾਦਕ ਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਮੋਹਨ ਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਸ਼ ਸਿਲੇਬਸ ਦਾ ਹਿੱਸਾ ਹਨ।

(ਕਵੀਆਂ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾ ਬਾਰੇ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ)

08 ਅੰਕ

ਯੂਨਿਟ-IV

ਲੇਖ ਰਚਨਾ

ਅਸ਼ੁੱਧ ਸ਼ਬਦ ਜੋੜਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖਣਾ

08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**BACHELOR OF SCIENCE
SEMESTER IV (SESSION: 2023-24)
PUNJAB HISTORY AND CULTURE**

**Course Title: Punjab History and Culture (Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
Course Code- BSML -4431**

After completing the paper the students will have a thorough insight into the origin of Sikh faith and its major institutions in Punjab

- CO 1:** understand the adoption of new policy by Guru Hargobind and martyrdom of Guru Tegh Bahadur
- CO 2:** To understand the factors leading to the establishment of Khalsa Panth and its impact
- CO 3:** Have deep insight into the conflict with Mughals and the rise of Banda Singh Bahadur and aftermath.
- CO 4:** Understand the administration under Maharaja Ranjit Singh, also the fairs, festivals and folk music of Punjab.

**BACHELOR OF SCIENCE
SEMESTER IV (SESSION: 2023-24)
PUNJAB HISTORY AND CULTURE**

**Course Title: Punjab History and Culture (Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
Course Code- BSML -4431**

Examination Time: 3 Hours

**Max. Marks: 50
Theory: 40
CA: 10**

Instructions for the Paper Setters

- 1. Question paper shall consist of four Units**
- 2. Examiner shall set 8 questions in all by selecting Two Questions of equal marks from each Unit.**
- 3. Candidates shall attempt 5 questions in 600 words, by at least selecting One Question from each Unit and the 5th question may be attempted from any of the four Units.**
- 4. Each question will carry 8 marks**

UNIT I

- 1. Transformation of Sikhism under Guru Hargobind.**
- 2. Martydom of Guru Teg Bahadur**

UNIT II

- 3. Creation of Khalsa**
- 4. Khalsa and its impact on the Punjab**

UNIT III

- 5. Banda Bahadur and his achievements**
- 6. Rise of Misls.**

UNIT IV

- 7. Maharaja Ranjit Singh:- Civil, Military and Land Revenue Administration.**
- 8. Fair, Festivals and Folk Music in the Punjab during the medieval period (Jarag, Baisakhi and Diwali)**

Suggested Readings

- Chopra P.N., Puri, B.N., & Das, M.N.(1974), A Social, Cultural & Economic History of India. Vol.II, Macmillan India Limited, New Delhi.
- Grewal, J.S. (1994). The Sikhs of the Punjab, Cambridge University Press, New Delhi.
- Singh, Fauja (1972). A History of the Sikhs, Vol. III, Patiala: Punjabi University.
- Singh, Kushwant (2011). A History of the Sikhs- Vol. I (1469-1839). New Delhi:
- Singh, Kirpal (1990). History and Culture of the Punjab-Part II (Medieval Period).

BACHELOR OF SCIENCE
SEMESTER IV (SESSION: 2023-24)
ENGLISH
Course Title: English (Compulsory)
Course Code- BSML -4212

COURSE OUTCOMES

After passing this course, the students will be able to:

- CO 1:** Comprehend the basics of grammatical rules governing prepositions and phrasal verbs through the study of “English Grammar in Use” by Raymond Murphy
- CO 2:** Develop skills to write an essay on a given topic and enhance their vocabulary through the study of “The Students’ Companion” by Wilfred D. Best
- CO 3:** Enhance their reading and analysing power of texts through guided reading through the study of “Making Connections” by Kenneth J. Pakenham
- CO 4:** Develop an understanding of the poems taught, relate to the socio-cultural background of England and be able to answer questions regarding tone, style and central idea through the study of the poems in the prescribed text “Moments in Time”

BACHELOR OF SCIENCE
SEMESTER IV (SESSION: 2023-24)
ENGLISH
Course Title: English (Compulsory)
Course Code- BSML -4212

Examination Time: 3 Hrs

Max. Marks: 50
Theory: 40

CA: 10

Instructions for the Examiner:

The paper setters should avoid questions of theoretical nature from *Making Connections*.

Section A: One question with sub-parts will be set from Unit I of the syllabus. Fifteen sentences will be set and the students would be required to attempt any ten. Each sentence will carry one mark. **(10×1=10)**

Section B: Two questions will be set from Unit II of the syllabus. The students would be required to attempt one essay out of the given two topics carrying six marks (word limit 300 words). The second question will be based on vocabulary. The students would be required to write single words for phrases and sentences choosing any four out of six and each carrying one mark. **(1×6 + 4×1=10)**

Section C: The students would be required to attempt two questions (with sub parts) based on exercises as given before and after reading essays in the prescribed text book *Making Connections*. **(2×5=10)**

Section D: This section will be divided into two parts. In part one, three questions based on central idea, theme, tone and style etc. of the poems from the prescribed textbook, *Moments In Time* from Unit IV of the syllabus will be set. The students would be required to attempt any two, each carrying three marks (100 words each). **(2**

×3=6)

Part two will have one question (with internal choice) requiring students to explain a stanza with reference to context carrying four marks (word limit 200 words). The stanzas for explanation will be taken from the prescribed textbook, *Moments in Time* from Unit IV in the syllabus. **(1×4=4)**

Unit I

English Grammar in Use, 4th Edition by Raymond Murphy, CUP (Units 121-145)

Unit II

Essay Writing and *The Students' Companion* by Wilfred D. Best (Section 1: Single words for phrases and sentences: Words pertaining to Government, words pertaining to Marriage, Opposites and Negatives)

Unit III

Making Connections by Kenneth J. Pakenham, 2nd Edn. CUP: Unit-IV

Unit IV

Moments in Time: Poems at Sr. No. 7-12

Texts Prescribed:

1. *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP
2. *The Students' Companion* by Wilfred D. Best
3. *Making Connections* by Kenneth J. Pakenham, 2nd Edn. CUP
4. *Moments in Time: An Anthology of Poems*, GNDU, Amritsar

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4395 (I) for Bachelor of Science (Non Medical)

BCSM-4395 (I) for Bachelor of Science (Computer Science)

PHYSICS (Quantum Mechanics)

Course Outcomes: Quantum Mechanics

After completing this course

CO1: Students will be familiar with the main aspects of the historical development of quantum mechanics

CO2: Students will understand the central concepts and principles in quantum mechanics

CO3: Students will be able to find the solution of Schrödinger wave equation for simple systems in one dimension and for Hydrogen atom.

CO4: Students will be able to find the solution of Schrödinger wave equation for simple systems in three dimensions and for Hydrogen atom in spherical coordinates.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

PHYSICS

Course code: BSNM-4395 (I) for Bachelor of Science (Non Medical)

BCSM-4395 (I) for Bachelor of Science (Computer Science)

QUANTUM MECHANICS

Time: 3 Hours

Marks: 30

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT-I

Formalism of Wave Mechanics:

Brief introduction to need and development of quantum mechanics, photoelectric effect, Compton effect, Wave particle duality, De broglie hypothesis, Wave packet, Group velocity, Uncertainty principle, Fundamental postulates of wave mechanics, Time dependent and time independent Schrodinger wave equation for a free particle and equation of a particle subject to forces. Stationary states, Superposition principle.

UNIT-II

Normalization and probability interpretation of wave function, Gaussian wave packet. Admissibility conditions of wave function, Eigen function and Eigen value, Expectation value, Operator and commutator formalism, Hermitian operator, orthogonal system, Probability current and conservation of probability, Ehrenfest theorem,.

UNIT-III

Application of Schrodinger wave equation to one dimensional problems:

Application of Schrodinger Equation for solving one dimensional Particle in a box, One dimensional step potential for $E > V_0$, one dimensional step potential for $0 < E < V_0$,

one dimensional potential barrier of finite height and width, Quantum mechanical tunnelling effect, one dimensional square well of finite depth

UNIT-IV

Application of Schrodinger equation to three dimensional problems:

Free particle in three dimensional rectangular box, Eigen wave function, Eigen values of momentum, energy and degeneracy, three dimensional harmonic oscillator (Cartesian coordinates) wave function, energy levels, degeneracy, Schrodinger's wave equation in spherical polar co-ordinates, Schrodinger wave equation for spherically symmetric potential for hydrogen atom, wave function of H atom, $\phi(\Phi), \theta(\Theta)$ solution of $R(r)$, equations.

Text Reference Books:

1. A Text book of Quantum Mechanics by P.M. Mathews and K. Venkatesan, (Tata McGraw Hill Pub., Co., Delhi) 2002.
2. Quantum Mechanics by J.L. Powell and B. Craseman (Narosa Pub. House, New Delhi) 1997.
3. Concepts of Modern Physics by Arthur Beiser (McGraw Hill Pub. Co., New Delhi, 9th Ed.)
4. 1995.
5. Elements of Modern Physics by S.H. Patil (McGraw Hill), 1998.
6. Quantum Mechanics by E. Merzbacher (John Wiley, 2nd Edition)
7. Fundamentals of Molecular Spectroscopy by C.N. Banwell (Tata McGraw Hill Pub. Co.,
8. Delhi), 2001.
9. Atomic Spectra by H.G. Kuhn (Longmans), 2nd Ed., 1969.
10. Introduction to Quantum Mechanic by L. Pauling and E.B. Wilson (Tata McGraw Hill Pub. Co., Delhi), 2002.
11. Quantum Mechanics by W. Greiner (Springer Verlag), 1994.
12. Fundamentals of Molecular Spectroscopy by C.B. Banwell-Tata McGraw Hill, 1986.
13. Molecular Spectroscopy: Jeanne L McHale.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

PHYSICS (ATOMIC AND MOLECULAR SPECTRA)

Course code: BSNM-4395 (II) for Bachelor of Science (Non Medical)

BCSM-4395 (II) for Bachelor of Science (Computer Science)

Course Outcomes: PHY- ATOMIC AND MOLECULAR SPECTRA

(Session-2023-24)

- CO1: understand fine and hyperfine spectrum of hydrogen atom and the concept of spin and magnetic moment of an electron
- CO2: understand spectra of alkali atoms and Zeeman effect
- CO3: demonstrate understanding of exchange symmetry of wave function, different coupling schemes and spectra of atoms with more than one electron.
- CO4: Students will understand concept of X rays spectra and molecular spectra including rotational, vibrational and Raman Spectra

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

PHYSICS (ATOMIC AND MOLECULAR SPECTRA)

Course code: BSNM-4395 (II) for Bachelor of Science (Non Medical)

BCSM-4395 (II) for Bachelor of Science (Computer Science)

Time: 3 Hours

Marks: 30

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT-I

Introduction to Atomic Spectra:

Observation of spectra, Types of spectra, Spectral analysis, Units in spectroscopy, Bohr's Theory and Hydrogen spectrum, Spectral series, Bohr's correspondence Principle, quantum numbers, The Spinning electron and the vector model, Stern Gerlach Experiment, Total Quantum number, Term values, Magnetic moment(Orbital, Spin and Total)

UNIT-II

One Electron Atomic Spectra:

Electron Spin orbit interaction, Fine and Hyperfine structure of Hydrogen atom, Energy level and different series of alkali spectra, Doublet structure in alkali Spectra (Fine Structure), Selection rules for doublets, Zeeman Effect and its experimental setup, Classical theory of Normal Zeeman effect, Quantum theory of Normal and anomalous Zeeman effect

UNIT-III

Many Electron System Spectra:

Exchange symmetry of wave function, Pauli's Exclusion principle, Electronic configuration and atomic states, shells, subshells in atoms, Two valence electron atoms: LS and JJ coupling schemes and resulting spectral terms, optical spectra for one and many electron system (Helium), spectra of alkaline earth atoms.

UNIT-IV

X Ray and Molecular Spectra:

Production of X-rays and Types of X-ray spectra, Mosley law, Molecular bonding, Molecular spectra, selection rules, symmetric structure, Rotational Vibrational, electronic level and spectra of molecules, Raman spectra. Introduction to Raman spectra.

Text Reference Books:

1. Introduction to Atomic Spectra by: H.E. White-Auckland McGraw Hill, 1934.
2. Spectroscopy Vol. I, II & III by Walker & Straughen
3. Introduction to Molecular Spectroscopy by G.M. Barrow-Tokyo McGraw Hill, 1962.
4. Spectra of Diatomic Molecules by Herzberg-New York, 1944
5. Introduction to Atomic Spectra by H.E. White (Mcgraw Hill, Book Co., Inc., New York)

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course Outcomes: PHYSICS Lab Sem IV

Course code: BSNM-4395 for Bachelor of Science (Non Medical)

BCSM-4395 for Bachelor of Science (Computer Science)

CO1: The exercises included in this laboratory course are aimed at training the students to handle different type of equipment for verification of some of the laws and concepts studied in theory like concepts of thermodynamics, photoelectric effect and for carrying out precise measurements so that they develop confidence to use later the sophisticated instruments in their respective fields.

CO2: After the completion of this course students will be able to use spectrometer and hence will be able to study absorption spectra of iodine.

CO3: At the end of this course students will be able to prepare cane sugar solution and hence will be able to find its specific rotation by using polarimeter.

S Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

PHYSICS

(PRACTICAL)

Course code: BSNM-4395 for Bachelor of Science (Non Medical)

BCSM-4395 for Bachelor of Science (Computer Science)

Instructions to Practical Examiner

Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar

General Guidelines for Practical Examination

I. The distribution of marks is as follows: **Marks: 20**

i) One experiment **7 Marks**

ii) Brief Theory **3 Marks**

iii) Viva-Voce **5 Marks**

iv) Record (Practical file) **5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment is to be allotted to more than three examinees in any group.

List of Experiments

1. To study adiabatic expansion of gas and hence to calculate value of γ .
2. To find the coefficient of Thermal Conductivity of a bad conductor by Lee's method.
3. To plot a calibration curve of a given thermocouple (copper constantan).
4. To study the photoelectric effect and determine the value of Planck's constant.
5. To determine the ionization potential of mercury.
6. Study of variation of light intensity with distance using photovoltaic cell (Inverse Square Law)
7. To determine the heating efficiency of an electric kettle with varying voltage.
8. To study the absorption spectra of iodine vapours.
9. To study the rotation of plane of polarization by using polarimeter.
10. To determine the specific rotation of sugar using Laurent's half shade polarimeter
11. To study the characterizations of Photovoltaic cell.



**Bachelor of Science
(SEMESTER-IV)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-4084(I)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)**

Course outcomes:

Students will be able to

CO1: understand the key features of coordination compounds viz. Nomenclature, Isomerism and electronic configurations of coordination compounds, have general knowledge of Chelates, Postulates of VBT

CO2: understand the properties and reactions of non-aqueous solvents.

CO3: write both reduction and oxidation half reactions for a simple redox reaction, Frost and understand the Latimer Pourbaix diagram.

CO4: understand the positions, electronic configurations, relative stability, preparation, properties, structures and characteristics of the f-block elements in the periodic table and understand the role of metal ions and other inorganic elements in biological systems

Bachelor of Science
(SEMESTER-IV)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-4084(I)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)

Time: 3 Hrs.

Max. Marks: 30

Note: Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Coordination Compounds

(10 Hrs)

Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes

Non-Aqueous Solvents

(5 Hrs)

Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2 .

Unit-II

Oxidation and Reduction

(8 Hrs)

Use of redox potential data-analysis of redox cycle, redox stability in water, Frost, Latimer and Pourbaix diagrams

Chemistry of Lanthanide Elements

(7 Hrs)

Electronic structure, oxidation states and ionic radii and lanthanide contraction. Electronic absorption and magnetic properties of lanthanides

Unit-III

Chemistry of Actinides

(5 Hrs)

General features and chemistry of actinides, similarities between the later actinides and the later lanthanides. Electronic and magnetic properties of actinides and their general comparison with the lanthanide elements

Unit-IV

Bioinorganic Chemistry

(10 Hrs)

Essential and trace elements in biological processes, metalloporphyrins and special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca^{2+}

Books Suggested:

1. Cotton, F.A., Wilkinson, G., Gaus, P.L., Basic Inorganic Chemistry; 3rd edition, Pubs: John Wiley Sons. 1995.
2. Lee, J.D., Concise Inorganic Chemistry; 4th edition, Pubs: Chapman Hall Ltd., 1991.
3. Shriver, D.E., Alkins, P.W., Langford, C.H., Inorganic Chemistry; 4th edition, Oxford Publisher: Oxford University Press, 2006.
4. Douglas, B. McDaniell, D., Alexander, J., Concepts and Models of Inorganic Chemistry; 3rd edition, Pubs: John Wiley and Sons Inc., 1994.
5. Porterfield, W.W., Wesley, A., Inorganic Chemistry; Pubs: Addison-Wesley Publishing Company, 1984.
6. Miessler, G.L., Larr, D.A., Inorganic Chemistry; 3rd edition, Pubs: Pearson Education Inc., 2004.
7. Jolly, W.L., Modern Inorganic Chemistry; 2nd edition, Pubs: McGraw-Hill Publishing Company Limited, 1991.
8. Purcell, K.F., Kotz, J.C., Inorganic Chemistry; Pubs: W.B. Saunders Company, 1977.
9. Puri, B.R., Sharma, L.R., Kalia, K.C., Principles of Inorganic Chemistry; 30th edition, Pubs: Milestones Publisher, 2006-07.
10. Inorganic Chemistry, W.W. Porterfield Addison-Wesley.
11. Inorganic Chemistry, A.G. Sharpe, ELBS.
12. University General Chemistry, C.N.R. Rao, Macmillan.

**Bachelor of Science
(SEMESTER-IV)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-4084(II)
COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)**

Course outcomes:

Students will be able to

CO1: understand structure and bonding in carboxylic acids and carboxylic acid derivatives, Compare the acidity of alcohols, phenols and acids

CO2: understand preparations and reactions of ethers and epoxides, understand cleavages in ethers, the ring opening reactions of epoxides

CO3: understand preparation and reactions of nitroalkanes and nitroarenes, differentiate between primary, secondary and tertiary amines, basicity of amines

CO4: understand nomenclature, structural features, methods of formation and chemical reactions of Organomagnesium, Organolithium, Organozinc and Organocopper compounds and to know the various methods of synthesis and compare electrophilic substitution, basicity, reactions of pyrrole, furan, thiophene and nucleophilic substitution reactions of pyridine.

Bachelor of Science
(SEMESTER-IV)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-4084(II)
COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)

Time: 3 Hrs.

Max. Marks: 30

Note:

Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Carboxylic Acids

(8 Hrs)

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Synthesis of acid chlorides, esters and amides. Reduction of carboxylic acids. Mechanism of decarboxylation.

Carboxylic Acids Derivatives

(7 Hrs)

Structure and nomenclature of acid chlorides, esters, amides and acid anhydrides, Relative stability and reactivity of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution. Preparation of carboxylic acid derivatives, chemical reactions. Mechanisms of esterification and hydrolysis (acidic and basic).

Unit-II

Ethers and Epoxides

(5 Hrs)

Nomenclature of ethers and methods of their formation, physical properties. Chemical reaction-cleavage and autoxidation, Ziesel's method. Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and organolithium reagents with epoxides.

Unit-III

Organic Compounds of Nitrogen

(10 Hrs)

Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes, Mechanisms of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline media. Reactivity, Structure and nomenclature of amines, Methods of preparation of amines by Reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction and Hoffmann bromamide reaction. Physical properties. Stereochemistry of amines. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Amine salts as phase-transfer catalysts.

Unit-IV

Organometallic Compounds

(7 Hrs)

Organomagnesium Compounds: The Grignard reagents formation, structure and chemical reactions. Organolithium Compounds: Formation and chemical reactions. Organozinc and Organo copper Compounds: Nomenclature, structural features, Methods of formation and chemical reactions.

Heterocyclic Compounds

(8 Hrs)

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.

Book Suggested:

1. Morrison, R.T., Boyd, R.N., Organic Chemistry; 6th edition, Pubs: Prentice-Hall, 1992.
2. Wade Jr., L.G., Singh, M.S., Organic Chemistry; 6th edition, Pubs: Pearson Education, 2008.
3. Mukherji, S.M., Singh, S.P., Kapoor, R.P., Organic Chemistry; Pubs: Wiley Eastern Limited, 1985, Vol. I, II, III.
4. Solomons, T.W., Fryhle, C.B., Organic Chemistry; 9th edition, Pubs: Wiley India, 2007.
5. Carey, F.A., Organic Chemistry; 4th edition, Pubs: McGraw-Hill, 2000.
6. Streitwieser, A., Clayton, Jr., Heathcock, H., Introduction to Organic Chemistry; 3rd edition, Pubs: Macmillan Publishing Company, 1989.
7. Introduction to Organic Chemistry, Sreiwieser, Heathcock and Kosover, Macmilan.

**Bachelor of Science
(SEMESTER-IV)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-4084(P)
COURSE TITLE: CHEMISTRY PRACTICAL**

Course outcomes:

Students will be able to analyze the given organic compound through

CO1: understand the basics of Qualitative analysis

CO2: detection of elements (N, S and halogens) in organic compounds.

CO3: detection of functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide) in simple organic compounds

CO4: preparation of their derivatives

Bachelor of Science
(SEMESTER-IV)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-4084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Duration: 3½ hrs.

Max. Marks: 20

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar.

Qualitative Analysis

Detection of elements: N, S and halogens

Detection of functional groups: phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide in simple organic compounds and preparing their derivatives.

Practical Examination

1) Detection of Elements, functional group and derivative preparation	15
2) Viva-Voce	03
3) Note Book	02

Book Suggested:

1. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
3. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
4. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–IV

Session: 2023-24

Course Title: Mathematics (Statics and Vector Calculus)

Course Code: BARM/BECM/ BCSM/BSNM-4333(I)

Course Outcomes

After passing this course, the students will be able:

CO 1: To apply parallelogram law of forces, triangle law of forces, Lami's theorem to real life problems and also understand that how one can resolve number of coplanar forces, parallel forces and concurrent forces acting at a body.

CO 2: To find the applications of CG of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

CO 3: To find the values of gradient, divergence and curl operator of given vectors

CO 4: To find the application of Gauss theorem, Green's theorem and Stokes's theorem in real life problems.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–IV

Session: 2023-24

Course Title: Mathematics (Statics and Vector Calculus)

Course Code: BARM/BECM/ BCSM/BSNM-4333(I)

Examination Time: 3 Hours

Max Marks: 50

Theory :40

CA:10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Composition and resolution of forces (parallelogram law, triangle law, polygon law, Lami's Theorem(λ - μ) theorem). Resultant of a number of coplanar forces, parallel forces. Moments, Varignon's Theorem of moments, Couples, Resultant of two Coplanar Couples, Equilibrium of two coplanar couples, Resultant of a force and a couple, Equilibrium of coplanar forces.

Unit-II

Friction, Laws of friction, Equilibrium of a particle on a rough plane. Centre of Gravity: Centre of gravity of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

Unit-III

Vector differentiation, Gradient, divergence and curl operators, line integrals, Vector identity, and Vector integration.

Unit-IV

Theorems of Gauss, Green, Stokes and problems based on these.

Reference Books:

1. N.P. Bali, Statics, Laxmi Publications, Sixth edition, 2007.
2. M.R. Spiegel, Vector Analysis, Schaum's outline Series, McGraw Hill, Second edition, 2017.
3. S.L. Loney, The Elements of Statics and Dynamics, Arihant Publications, Sixth edition, 2016.
4. R.S. Verma, A Text Book on Statics, Pothishala Private Limited, Allahabad, 1962.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester-IV

Session: 2023-24

Course Title: Mathematics (Solid Geometry)

Course Code: BARM/BECM/ BCSM/BSNM-4333(II)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of cylinder, enveloping cylinder and its limiting form.

CO 2: Demonstrate the concept of cone, classification of cone, intersection of line and cone, reciprocal cone.

CO 3: Describe the concept of conicoids or quadratic surface, its classification, trace different types of conicoids and hence find surface of revolution.

CO 4: Describe the concept of tangent and normal plane to the conicoid and Identify the conicoids, representing it in the form of hyperboloid, ellipsoid, paraboloid.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–IV

Session: 2023-24

Course Title: Mathematics (Solid Geometry)

Course Code: BARM/BECM/ BCSM/BSNM-4333(II)

Examination Time: 3 Hours

Max Marks:50

Theory :40

CA:10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Cylinder as surface generated by a line moving parallel to a fixed line and through fixed curve. Different kinds of cylinders such as right circular, elliptic, hyperbolic and parabolic in standard forms

Unit-II

Cone with a vertex at the origin as the graph of homogeneous equation of second degree in x, y, z . Cone as a surface generated by a line passing through a fixed curve and fixed point outside the plane of the curve. Right circular and elliptic cones.

Unit-III

Equation of surface of revolution obtained by rotating the curve $f(x,y)=0$ about the z -axis in the form of $f(x^2+y^2, z) = 0$. Equation of ellipsoid, hyperboloid and Paraboloid in standard forms.

Unit-IV

Surfaces represented by general equation of 2nd degree $S = 0$. Tangent lines, tangent planes and Normal Plane.

Text Book:

P. K. Jain & Khalil Ahmed, A text book of Analytical Geometry of three dimensions, New age international limited, Second edition, 2003.

Reference Books:

1. S. Narayan, & P.K.Mittal , Analytical Solid Geometry, Sultan Chand & Sons, New Delhi, Sixteenth edition, 2002 (Scope in Chapters-7,8,11).
2. E. Kreyszig, Advance Engineering Mathematics, John Willey & Sons, tenth edition, 2011.

Session 2023-24

**BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) /
BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF
COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION**

Semester V

PUNJABI (COMPULSORY)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-5421

COURSE OUTCOMES

CO1: ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀਆਂ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO2: ਨਾਵਲ 'ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ' (ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ) ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਨਾਵਲ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲ ਜੋੜਣਾ ਹੈ।

CO3: ਪੈਰਾ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO4: ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ : ਮੇਲ ਤੇ ਅਧਿਕਾਰ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

Session 2023-24

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) /
BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF
COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

Semester V

PUNJABI (COMPULSORY)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-5421

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

Theory: 40

CA: 10

ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ

(ਸੰਪਾ.ਡਾ.ਰਮਿੰਦਰ ਕੌਰ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ, 2018)

ਲੇਖਕ	ਕਹਾਣੀ	ਕਹਾਣੀ ਸੰਗ੍ਰਹਿ
ਅਜੀਤ ਕੌਰ	ਨਿਊ ਯੀਅਰ	ਮੌਤ ਅਲੀ ਬਾਬੇ ਦੀ
ਜਿੰਦਰ	ਸੌਰੀ	ਜਖ਼ਮ
ਸੁਖਜੀਤ	ਹਜ਼ਾਰ ਕਹਾਣੀਆਂ ਦਾ ਬਾਘ	ਮੈਂ ਇੰਜੁਆਏ ਕਰਦੀ ਹਾਂ
ਜ਼ਤਿੰਦਰ ਹਾਂਸ	ਰਾਹੂ ਕੇਤੂ	ਈਸ਼ਵਰ ਦਾ ਜਨਮ
ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼	ਅਰਜਨ ਛੇੜ ਗਡੀਰਨਾ	ਕੁਝ ਅਣਕਿਹਾ ਵੀ
ਚੰਦਨ ਨੇਗੀ	ਹਰਖ ਸੋਗ	ਹਰਖ ਸੋਗ
ਜਸਵਿੰਦਰ ਸਿੰਘ	ਖੂਹ ਖਾਤੇ	ਖੂਹ ਖਾਤੇ
ਗੁਰਦੇਵ ਸਿੰਘ ਰੁਪਾਣਾ	ਸ਼ੀਸ਼ਾ	ਸ਼ੀਸ਼ਾ ਅਤੇ ਹੋਰ ਕਹਾਣੀਆਂ
(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ / ਪਾਤਰ ਚਿਤਰਨ)		8 ਅੰਕ

ਯੂਨਿਟ-II

ਨਾਵਲ : ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ(ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ)

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ / ਬਿਰਤਾਂਤਕ ਜੁਗਤਾਂ)

8 ਅੰਕ

ਯੂਨਿਟ-III

ਲਗਪਗ 200 ਸ਼ਬਦਾਂ ਵਿਚ ਪੈਰ੍ਹਾ ਰਚਨਾ

ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ

8 ਅੰਕ

ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ :

(ੳ) ਨਾਂਵ ਵਾਕੰਸ਼

(ਅ) ਮੇਲ ਤੇ ਅਧਿਕਾਰ

8 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

Session 2023-24

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

SEMESTER-V

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-5031

COURSE OUTCOMES

CO1: ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ, ਲੋਕ ਕਾਵਿ, ਲੋਕ ਵਾਰਤਕ ਬਿਰਤਾਂਤ ਦੀ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO2: ਵਿਦਿਆਰਥੀ ਸੁਹਾਗ, ਘੋੜੀਆਂ, ਸਿੱਠਣੀਆਂ ਦੀ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO3: ਵਿਦਿਆਰਥੀ ਗਿੱਧਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ), ਭੰਗੜਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ), ਝੂਮਰ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO4: ਵਿਦਿਆਰਥੀ ਲੋਕ ਖੇਡਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ), ਲੋਕ ਤਮਾਸ਼ੇ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ), ਲੋਕ ਕਲਾਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਦਾ ਵਿਹਾਰਕ ਅਧਿਐਨ ਕਰ ਸਕਣ ਦੇ ਸਮਰੱਥ ਹੋ ਸਕਣਗੇ।

Session 2023-24

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

SEMESTER-V

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-5031

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਲੋਕ ਕਾਵਿ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਲੋਕ ਵਾਰਤਕ ਬਿਰਤਾਂਤ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

08 ਅੰਕ

ਯੂਨਿਟ-II

ਸੁਹਾਗ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਘੋੜੀਆਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਸਿੱਠਣੀਆਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

08 ਅੰਕ

ਯੂਨਿਟ-III

ਗਿੱਧਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਭੰਗੜਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਝੂਮਰ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

08 ਅੰਕ

ਯੂਨਿਟ-IV

ਲੋਕ ਖੇਡਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਲੋਕ ਤਮਾਸ਼ੇ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਲੋਕ ਕਲਾਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

**BACHELOR OF SCIENCE
SEMESTER-V (SESSION 2023-24)
PUNJAB HISTORY AND CULTURE**

Course Title: Punjab History and Culture (From 1849-1947 A.D)(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

Course Code: BSML-5431

COURSE OUTCOMES:-

After completing the course students will be able to understand:

CO 1: The causes that led to war between the British and Sikhs that led to the annexation of the Punjab and how the region was put under the control of Board of Administration

CO 2: Various agrarian, industrial and educational policies introduced by the British in Punjab.

CO 3: Analyse and evaluate the socio-religious reforms movements of Punjab.

CO 4: Factors that led to Gurudwara reform movement and various other freedom struggle movements in which the Punjab played a prominent role

**BACHELOR OF SCIENCE
SEMESTER-V (SESSION 2023-24)
PUNJAB HISTORY AND CULTURE**

**Course Title: Punjab History and Culture (From 1849-1947 A.D)(Special paper in lieu
of Punjabi Compulsory)**

(For those students who are not domicile of Punjab)

Course Code: BSML-5431

Examination Time: 3 Hours

Max. Marks: 50

Theory: 40

CA: 10

Instructions for the Paper Setters

1. Question paper shall consist of four Units
2. Examiner shall set 8 questions in **600 words** by selecting **Two Questions** of equal marks from each Unit.
3. Candidates shall attempt **5 questions** in all, by at least selecting **One Question** from each Unit and the **5th question** may be attempted from any of the **four Units**.
4. Each question will carry 8 marks

Unit- I

1. First Anglo-Sikh War.
2. Annexation of Punjab and Board of Administration

Unit-II

3. British Policy towards agriculture and industry
4. Spread of modern education

Unit-III

5. Socio- religious reform movements: Namdhari, Singh Sabha, AryaSamaj and Ad Dharm
6. Gadhar Movement

Unit-IV

7. Gurdwara Reform Movement
8. Contribution to freedom struggle: Jallianwala Bagh tragedy; Non-cooperation and Quit India Movement.

Suggested Readings

- Chopra, P.N.& Das, M.N. (1974), *A Social, Cultural & Economic History of India*. Vol.III, Macmillan India, 1974.
- Grewal, J.S., *The Sikhs of the Punjab*, New Cambridge House, New Delhi, 2005.

- Mittal, S.C, *Freedom Movement in the Punjab (1905-29)*, Concept Publishing Company Delhi, 1977.
- Rai, Satya. M (1978), *Heroic Tradition in the Punjab (1900-1947)*. Punjabi University, Patiala, 1978.
- Saini B. S, *The Social & Economic History of the Punjab 1901-1939*, EssEss Publications, Delhi, 1975.
- Singh, Fauja, *Freedom Struggle in the Punjab*, Publication Bureau, Punjabi University, Patiala, 1974.
- Singh, Fauja, *History and Culture of the Punjab*, Part II, Publication Bureau, Punjabi University, Patiala, 1987.
- Singh, Kushwant , *A History of the Sikhs*. Vol. II (1839-1998), Oxford University Press, Delhi, 1991.

BACHELOR OF SCIENCE
SEMESTER–V (SESSION 2023-24)
ENGLISH
Course Title: English (Compulsory)
Course Code: BSML -5212

COURSE OUTCOMES

After passing this course, the students will be able to:

- CO 1:** Analyze and appreciate the dramatic technique, plot development and art of characterisation in the prescribed play, “All My Sons” by Arthur Miller
- CO 2:** Widen their knowledge about various literary devices used in poetry such as tone, style, imagery, figures of speech, symbolism etc. thorough the study of prescribed poems from the text “Poems of Nature and Culture”
- CO 3:** Develop the knowledge, skills and capabilities for effective business writing such as formal letter writing, job application and resume writing
- CO 4:** Will develop skills for writing job application and suitable resume along with.

BACHELOR OF SCIENCE
SEMESTER-V (SESSION 2023-24)
ENGLISH
Course Title: English (Compulsory)
Course Code: BSML -5212

Examination Time: 3 Hrs

Max. Marks: 50

Theory: 40

CA: 10

Instructions for the Examiner:

Section A: Three questions from the play *All My Sons* from Unit I and three questions from *Poems of Nature and Culture* from Unit II requiring very short answers will be set. The students would be required to answer any five, each carrying two marks (50 words each). **(5×2=10)**

Section B: Four questions requiring brief descriptive answers based on character, tone, plot and theme(s) in the play *All My Sons* from Unit I will be set and the students would be required to attempt any two, each carrying five marks (250 words each). **(2×5= 10)**

Section C: Four questions based on the central idea, theme, tone or style etc. of the prescribed poems from the textbook, *Poems of Nature and Culture* from Unit II will be set for the students to attempt any two of these, each carrying five marks (250 words each). The questions can also be set based on stanzas with reference to context. **(2×5= 10)**

Section D: Two questions with internal choice will be set based on unit 3 (formal letter) and unit 4 (Job application and Resume Writing) each carrying five marks. **(2×5=10)**

Unit I

All My Sons by Arthur Miller

Unit II

Poems of Nature and Culture:

William Wordsworth: The World is Too Much with Us

Gordon Lord Byron: She Walks in Beauty

P.B. Shelly: Ozymandias

Alfred Lord Tennyson: In Memoriam

Mathew Arnold: Dover Beach

Wilfred Owen: Strange Meeting

Robert Graves: The Portrait

W.H. Auden: The Unknown Citizen

Ted Hughes: The Thought-Fox

Sylvia Plath: Mirror

Rabindranath Tagore: False Religion

Nissim Ezekiel: Night of Scorpion

Unit III

Formal letter,

Job Application and Resume Writing

Texts Prescribed:

1. *All My Sons* by Arthur Miller
2. *Poems of Nature and Culture*, Guru Nanak Dev University, Amritsar
3. *Oxford Guide to Effective Writing and Speaking* by John Seely.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester-V)
(Session-2023-24)

PHYSICS (CONDENSED MATTER PHYSICS)
(THEORY)

Course code: BSNM-5395 (I) for Bachelor of Science (Non Medical)
BCSM-5395 (I) for Bachelor of Science (Computer Science)

Course Outcomes

After passing this course, students will be able to:

- CO 1. Understand basics about crystal structures in solids, various types of crystal structure, unit cells and symmetry operations.
- CO 2. Understand the experimental methods to determine crystal structures, reciprocal lattice, Brillouin zones and form factor.
- CO 3. Understand the concept of lattice vibrations and role of phonons in determining specific heat of solids at low temperatures and models of specific heat.
- CO 4. Build concept from free electron model to Kronig Penny model and its application to band theory to differentiate insulators, semiconductors and conductors.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester-V)
(Session 2023-24)

PHYSICS (CONDENSED MATTER PHYSICS)
(THEORY)

Course code: BSNM-5395 (I) for Bachelor of Science (Non Medical)
BCSM-5395 (I) for Bachelor of Science (Computer Science)

Time: 3 Hours

Max. Marks: 30

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT-I

Crystal structure, Symmetry operations for a two and three dimensional crystal, Two dimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells, Crystal planes and Miller indices, Diamond and NaCl structure.

UNIT-II

Crystal Diffraction: Bragg's law, Experimental methods for crystal structure studies, Laue equations, Reciprocal lattices of SC, BCC and FCC, Bragg's law in reciprocal lattice, Brillouin zones and its construction in two and three dimensions, Structure factor and atomic form factor.

UNIT-III

Lattice vibrations, One Dimensional Monoatomic Lattice, Dispersion relation, phonons, phonon momentum during elastic and inelastic scattering, Inelastic scattering of photons by phonons, Specific heat of solids, Classical Model of specific heat of solids (Dulong and Petit's Law), Einstein and Debye Models of Specific Heat of Solids. T₃ law.

UNIT-IV

Free electron model of metals, Free electron, Fermi gas and Fermi energy. Band Theory: Kronig Penney model, Metals and insulators, Conductivity and its variation with temperature in semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, band gap in semiconductors.

Books Suggested:

1. Introduction to Solid State Physics by C. Kittel (Wiley Eastern)
2. Elements of Modern Physics by S.H. Patil (TMGH, 1985).
3. Solid State Physics by Puri and Babbar.
4. Condensed Matter Physics by T.S. Bhatia (Vishal Publishing Co.)

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester-V)
(Session 2023-24)

PHYSICS (ELECTRONICS)

Course code:BSNM-5395 (II) for Bachelor of Science (Non Medical)
BCSM-5395 (II) for Bachelor of Science (Computer Science)

Course Outcomes-After completing this course a student will be able to

CO1: understand, concept of voltage and current sources, working of a p-n junction

diode, zener diode, and their use in basic gates, photonic devices, rectification and voltage regulation.

CO2: understand the characteristics, biasing and working of BJT and FETs.

CO3: able to understand h-parameters, amplifiers using BJT & FETs and types of feedbacks and practical example of negative feedback (emitter follower).

CO4: understand LC and RC oscillators and their comparison.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester-V)
(Session 2023-24)

PHYSICS (ELECTRONICS)

Course code:BSNM-5395 (II) for Bachelor of Science (Non Medical)
BCSM-5395 (II) for Bachelor of Science (Computer Science)

(THEORY)

Time: 3 Hours

Marks: 30

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. **Each question carries 6 marks.**

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT-I

Concepts of current and voltage sources, p-n junction, Biasing of diode, V-I characteristics, Rectification: half wave, full wave rectifiers and bridge rectifiers, Efficiency, Ripple factor, Qualitative ideas of filter circuits (Shunt capacitor, L section and π filters), Zener diode and voltage regulation, Introduction to Photonic devices (construction and working of solar cell, photo diode and LED). Basic concepts of Boolean algebra, AND, OR, NOT and NAND gates using diodes.

UNIT-II

Junction transistor : Structure and working relation between different currents in transistors, Sign conventions, Amplifying action, Different configurations of a transistor and their comparison, CB and CE characteristics, Structure and characteristics of JEFT, Transistor biasing and stabilization of operating point, Voltage divider biasing circuit.

UNIT-III

Working of CE amplifier, Amplifier analysis using h-parameters, Equivalent circuits, Determination of current gain, Power gain, Input impedance, FET amplifier and its voltage gain, Feed back in amplifiers, Different types, Voltage gain, Advantage of negative feed back, Emitter follower as negative feedback circuit.

UNIT-IV

Barkausen criterion of sustained oscillations, LC oscillator (tuned collector, tuned base Hartley), RC oscillators, Phase shift Oscillator and Wein bridge Oscillator

Books Suggested:

1. Basic Electronics and Linear Circuits by N.N. Bhargave, D.C. Kulshreshtha and S.C. Gupta.
2. Foundations of Electronics by D. Chatopadhyay, P.C. Rakshit, B. Saha and N.N. Purkit.
3. Basic Electronics by D.C. Tayal (Himalaya Pub.)

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester-V)
(Session 2023-24)

PHYSICS PRACTICAL

Course code: BSNM-5395 for Bachelor of Science (Non Medical)
BCSM-5395 for Bachelor of Science (Computer Science)

Course Outcomes : Physics Lab Sem V

- CO 1. Students will be able to characterize p-n junction, zener diode, and their use as rectifier, filters, clipping element and to find energy gap.
- CO 2. Student will be able to use CRO for AC voltage and frequency.
- CO 3. Students will be able to characterize Common base and common emitter transistors and their use as amplifier.
- CO 4. Students will be able to use diodes as basic gates.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)

PHYSICS PRACTICAL

Course code: BSNM-5395 for Bachelor of Science (Non Medical)
BCSM-5395 for Bachelor of Science (Computer Science)

Instructions to Practical Examiner

Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, Kanya MahaVidyalaya, Jalandhar

General Guidelines for Practical Examination

I. The distribution of marks is as follows: **Marks: 20**

i) One experiment **7 Marks**

ii) Brief Theory **3 Marks**

iii) Viva–Voce **5 Marks**

iv) Record (Practical file) **5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment is to be allotted to more than three examinees in any group.

LIST OF EXPERIMENTS-

1. Measurement of reverse saturation current in p-n-junction diode at various temperatures and to find the approximate value of energy gap.
2. To draw forward and reverse bias characteristics of a p-n junction diode.
3. To study working of CRO and its use to find AC signal voltage and its frequency.
4. Study of a diode as a clipping element.
5. To measure the efficiency and ripple factors for (a) halfwave (b) full wave and (c) bridge rectifier circuits.
6. To draw the characteristics of a Zener diode.
7. To study characteristics of Common Base transistor. and to find input resistance, output resistance, voltage gain and current gain.
8. To study characteristics of Common Emitter transistor. and to find h-parameters.
9. To study the gain of an amplifier at different frequencies and to find Band width
10. To study the reduction in the ripple in the rectified output with RC, LC and π filters.
11. To study logic gates (OR, AND, NOT and NAND).



**Bachelor of Science
(SEMESTER-V)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-5084(I)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)**

Course outcomes

CO1: use Crystal Field Theory to understand the structure, hybridisation, geometry and predict the colour of the complexes.

CO2: to describe the magnetic properties of coordination compounds.

CO3: describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them.

CO4: to draw Orgel diagrams for d^1 to d^{10} systems and predict the possible transitions and to calculate number of microstate and ground state term symbols and understand preparations, properties and applications of alkyls aryls of lithium and aluminium, bonding in metal-ethylenic complexes, mechanism of homogeneous hydrogenation.

**Bachelor of Science
(SEMESTER-V)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-5084(I)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)**

Time: 3 Hrs.

Max. Marks: 30

Instructions for the Paper Setters:

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

1. Metal-ligand Bonding in Transition Metal Complexes

Limitations of valence bond theory, an elementary idea of crystal-field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.

Unit-II

2. Magnetic Properties of Transition Metal Complexes

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moments, application of magnetic moment data for characterization of 3d-metal complexes.

3. Thermodynamic and Kinetic Aspects of Metal Complexes

A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes.

Unit-III

4. Electronic Spectra of Transition Metal Complexes

Term Symbols for p^2 and d^2 systems, spectroscopic ground states for d^1 - d^{10} electronic configurations. Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, Orgel diagram for d^1 - d^5 .

Unit-IV

5. Organometallic Compounds

Definition, nomenclature and classification of organometallic compounds. EAN rule, preparation, properties, and applications of alkyls aryls of lithium and aluminium, bonding in metal-ethylenic complexes, Mechanism of homogeneous hydrogenation reactions.

Books Suggested:

1. Cotton, F.A., Wilkinson, G., Gaus, P.L., Basic Inorganic Chemistry; 3rd edition, Pubs: John Wiley Sons. 1995.
2. Lee, J.D., Concise Inorganic Chemistry; 4th edition, Pubs: Chapman Hall Ltd., 1991.
3. Shriver, D.E., Alkins, P.W., Langford, C.H., Inorganic Chemistry; 4th edition, Oxford Publisher: Oxford University Press, 2006.
4. Porterfield, W.W., Wesley, A., Inorganic Chemistry; Pubs: Addison-Wesley Publishing Company, 1984. 5
- .Miessler, G.L., Larr, D.A., Inorganic Chemistry; 3rd edition, Pubs: Pearson Education Inc., 2004.
6. Puri, B.R., Sharma, L.R., Kalia, K.C., Principles of Inorganic Chemistry; 30th edition, Pubs: Milestones Publisher, 2006-07.

**Bachelor of Science
(SEMESTER-V)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-5084(II)
COURSE TITLE: CHEMISTRY (PHYSICAL CHEMISTRY)**

Course outcomes:

Students will be able to:

CO1: understand conductance and its types, applications of conductivity measurements, conductometric titrations, transport numbers

CO2: acquire knowledge about electrodes, reversible and irreversible cells, concentration cells, E.M.F, potentiometric titrations

CO3: understand radioactivity, laws of radioactive decay, nuclear reactions, applications of radioactivity

CO4: characterise the molecules with the help of various spectroscopic techniques such as vibrational, rotational, raman and electronic spectroscopy

Bachelor of Science
(SEMESTER-V)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-5084(II)
COURSE TITLE: CHEMISTRY (PHYSICALCHEMISTRY)

Time: 3 Hrs.

Max. Marks: 30

Instructions for the Paper Setters:

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit-I

1. Electrochemistry-I

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution, migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method and moving boundary method. Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, conductometric titrations.

Unit-II

2. Electrochemistry – II

Types of reversible electrodes-gas metal ion, metal ion, metal insoluble salt-anion and redox electrodes. Electrode reactions. Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode, reference electrodes, standard electrode potential, sign conventions, electrochemical series and its significance. Electrolytic and Galvanic cells - reversible and irreversible cells, conventional representation of electrochemical cells.

EMF of a cell and its measurements. Computation of cell. EMF, Calculation of thermodynamic quantities of cell reactions (ΔG , ΔH and K), polarization, over potential and hydrogen overvoltage. Concentration cells with and without transport, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient, potentiometric titrations. Definition of pH and pK_a , determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometric methods. Buffers-mechanism of buffer action, Henderson-Hasselbalch equation, Hydrolysis of salts. Corrosion-types, theories and methods of combating it.

Unit-III

3. Nuclear Chemistry

Introduction: Radioactivity, Nuclear Structure, Size of Nucleus, Mass Defects and Binding Energy, Nuclear Stability, Nuclear Forces, Nuclear Spin and Moments of Nuclei, Nuclear Models, Nuclear Decay Processes, The Laws of Radioactive Decay, Soddy-Fajans Group Displacement Law, Rate of Nuclear Decay and Half Life Time (Kinetics of Radioactive Decay), Induced Nuclear Reactions, Types of Nuclear Processes, High Energy Nuclear Reactions, Nuclear Reaction Cross-Section, Artificial radioactivity, Detection and Measurement of Radioactivity, Nuclear Fission, Nuclear Fusion, Applications of Radioactivity.

Unit-IV

4. Spectroscopy

Introduction: Electromagnetic radiation, regions of the spectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.

5. Rotational Spectrum

Diatomic molecules. Energy levels of a rigid rotor (semiclassical principles), selection rules, spectral intensity, distribution using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotor, isotope effect.

6. Vibrational Spectrum

Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.

Raman Spectrum: Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules.

7. Electronic Spectrum

Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck-Condon principle. Qualitative description of s, p, and n M.O., their energy levels and the respective transitions.

Books Suggested: -

1. Atkins, P., Paula, J.de, Atkins Physical Chemistry; 8th edition, Pubs: Oxford University Press, 2008.
2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co., 2008.
3. Barrow, G.M., Physical Chemistry; 6th edition, Pubs: McGraw Hill Companies Inc, 1996.
4. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford University Press, 2000.
5. Albert, R.A., Silbey, R.J., Physical Chemistry; 1st edition, Pubs: John Wiley and Sons Inc., 1992.
6. Levine, I.N., Physical Chemistry; 5th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd, 2002.

**Bachelor of Science
(SEMESTER-V)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-5084(P)
COURSE TITLE: CHEMISTRY PRACTICAL**

Course outcomes:

Students will be able to

CO1: synthesize and analyse the coordination compounds and to determine the end point of various conductometric titrations

CO2: know the principle and working of Abbe's Refractometer and to determine the composition of unknown mixture of two liquids by refractive index measurements.

CO3: learn the technique of Rast's methods and learn phenomenon of adsorption of acetic acid and oxalic acid on charcoal

CO4: learn distribution coefficient of iodine between CCl_4 and water

Bachelor of Science
(SEMESTER-V)
SESSION: 2022-2025
COURSE CODE: BSMM/BSNM-5084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Duration: 3½ Hrs.

Max. Marks: 20

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar.

(I) Synthesis and Analysis

- (a) Preparation of Sodium trioxalato ferrate (III)
- (b) Preparation of Ni-DMG Complex
- (c) Preparation of Copper tetrammine complex
- (d) Preparation of cis-bisoxalatodiaquachromate (III) ion

(II) Physical Chemistry

(a) Conductometric Titrations

- (i) Determine the end point of the following titrations by the conductometric methods.

Strong acid-Strong base

Strong acid-Weak base

Weak acid-Strong base

Weak acid-Weak base

- (ii) Determine the composition of a mixture of acetic acid and the hydrochloric acid by conductometric titration.

(b) (i) Molecular Weight Determination of acetanilide, naphthalene, using camphor as solvent (Rast's methods).

- (ii) To determine the molecular weight of a polymer by viscosity measurements. **(c)**

Adsorption (i) To study the adsorption of acetic acid oxalic/acid from aqueous solutions by charcoal.

(d) Phase Equilibria (i) To determine the distribution coefficient of iodine between CCl₄ and water.

(e) Refractometry

- (i) Determination of refractive index of a liquid by Abbe refractometer, and hence the specific and molar refraction.

(ii) To determine the composition of unknown mixture of two liquids by refractive index measurements.

Practical Examination

- 1) Inorganic Synthesis 07
- 2) Physical experiment 08
- 3) Viva- Voce 03
- 4) Note Book 02

Books Suggested: -

1. Experimental Inorganic Chemistry, W.G. Palmer, Cambridge.
2. Handbook of preparative Inorganic Chemistry, Vol. I and II, Brauer, Academic Press.
3. Inorganic Synthesis, McGraw Hill.
4. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press
5. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill.
6. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
7. Advanced Experimental Chemistry, Vol. I, Physical, J.N. Guru and R. Kapoor, S. Chand and Co.
8. Selected Experiments in Physical Chemistry, N.G. Mukherjee, J.N. Ghosh and Sons.
9. Experiments Physical Chemistry, J.C. Ghosh, Bharati Bhavan.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester–V

Session: 2023-24

Course Title: Mathematics (Dynamics)

Course Code: BARM /BECM / BCSM/ BSNM-5333(I)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate the basic relations between distance, time, velocity and acceleration, manage to solve the problems of Newton's Laws of Motion and the motion of particles connected by a string.

CO 2: Illustrate motion along a smooth inclined plane. Solve different types of problems with Variable Acceleration. Discuss Simple Harmonic Motion .

CO 3: Understand the concept of projectile, oscillating system.

CO 4: Define Work, Power and Energy and explain their relationship. Use measurement tools to apply the concepts of Work and power to solve real life problems. Identify the different types of energy.

Bachelor of Arts /Bachelor of Science (Economics, Non-Medical, Computer Science) Semester–V

Session: 2023-24

Course Title: Mathematics (Dynamics)

Course Code: BARM/ BECM/ BCSM/ BSNM-5333(I)

Examination Time:3 Hours

Max Marks:50

Theory:40

CA:10

Instructions for the paper setter:

Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

Unit-I

Rectilinear motion in a straight line with uniform acceleration, Newton's laws of motion. Motion of two particles connected by a string.

Unit-II

Motion along a smooth inclined plane. Variable acceleration. Simple Harmonic Motion.

Unit-III

Curvilinear motion of particle in a plane, Definition of velocity and acceleration, projectiles, velocity and direction of motion of a projectile after a given time, projectiles on an inclined plane. Oscillations: Free Vibrations, Simple Pendulum, Conical Pendulum.

Unit-IV

Work, Power and Energy: Kinetic and Potential energy, Conservative forces. Theorem of conservation of energy. Work done against gravity.

Text Book:

R. Kumar, Fundamentals of Dynamics, Pardeep Publications, Jalandhar city, second edition, 2004

Reference Books:

- 1.F. Chorlton, Text Book of Dynamics, CBS Publishers, New Delhi, second edition, 2004 (Scope in chapters 3,8).
2. S.R. Gupta, Elementary Analytical Dynamics, S. Chand and Company, New Delhi, Fourteenth Edition, 1983(Scope in chapters 1,2,3)

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester–V

Session: 2023-24

Course Title: Mathematics (Number Theory)

Course Code: BARM/ BECM/ BCSM/ BSNM-5333(II)

Course Outcomes

Successful completion of this course will enable the students to:

CO 1: Prove results involving divisibility and greatest common divisors.

CO 2: Find solutions of specified linear Diophantine equation, basic properties of Congruences.

CO 3: Solve system of linear congruences. Apply Fermat's and Wilson's theorem to solve numerical problems.

CO 4: Apply Euler's theorem and apply properties of phi functions in real world problems. Understand application of important arithmetic functions.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester-V
Session: 2023-24
Course Title: Mathematics (Number Theory)
Course Code: BARM/ BECM/ BCSM/ BSNM-5333(II)

Examination Time: 3 hrs.

Max.Marks:50
Theory: 40
CA:10

Instructions for the Paper Setter:

Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

Unit-I

The division algorithm, The greatest common divisor, least common multiple, The Euclidean algorithm.

Unit-II

The Diophantine equation $ax + by = c$, Prime numbers and their distribution, the fundamental theorem of arithmetic, Basic properties of congruences.

Unit-III

Linear congruences, Special divisibility tests, Chinese remainder theorem, The Fermat's theorem, Wilson's theorem

Unit-IV

Euler's Phi function, Euler's theorem, some properties of the Phi Function, σ and τ functions, Mobius Inversion formula, Greatest integer function

Text Book:

D. M. Burton, Elementary Number Theory, Mc Graw-Hill, seventh edition, 2010.

Reference Books,

1.Niven and Zuckerman, An Introduction to the theory of Numbers, John Willey & Sons, 1991.

Session 2023-24

**BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) /
BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF
COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION**

Semester VI

PUNJABI (COMPULSORY)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-6421

COURSE OUTCOMES

CO1: ‘ਕਾਵਿ ਗੌਰਵ’ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾਵਾਂ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੁਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO2: ‘ਧਰਤੀਆਂ ਦੇ ਗੀਤ’ (ਸਫ਼ਰਨਾਮਾ) ਨੂੰ ਸਿਲੇਬਸ ਵਿੱਚ ਸ਼ਾਮਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਸਫ਼ਰਨਾਮਾ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲ ਨਾਲ ਜੋੜਣਾ ਹੈ।

CO3: ਲੇਖ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿੱਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਸਾਹਿਤ ਰੂਪਾਂ ਕਵਿਤਾ, ਕਹਾਣੀ, ਨਾਵਲ, ਨਾਟਕ, ਇਕਾਂਗੀ ਦੀ ਪਰਿਭਾਸ਼ਾ, ਪ੍ਰਕਾਰ ਤੇ ਤੱਤ ਨਾਲ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ। ਸਾਹਿਤ ਰੂਪਾਂ ਨੂੰ ਸਿਲੇਬਸ ਵਿੱਚ ਸ਼ਾਮਲ ਕਰਨ ਦਾ ਮਕਸਦ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਨ੍ਹਾਂ ਸਾਹਿਤ ਰੂਪਾਂ ਦੀ ਪਰਿਭਾਸ਼ਾ, ਪ੍ਰਕਿਰਤੀ ਅਤੇ ਤੱਤਾਂ ਤੋਂ ਬਾਰੀਕੀ ਨਾਲ ਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।

CO4: ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ : ਲਿੰਗ, ਵਚਨ, ਕਾਰਕ ਕਿਰਿਆ ਵਾਕੰਸ਼ ਦੀ ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਤੇ ਪ੍ਰਕਾਰ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

Session 2023-24

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) /
BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF
COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

Semester VI

PUNJABI (COMPULSORY)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-6421

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

Theory: 40

CA: 10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਕਾਵਿ ਗੌਰਵ(ਪਹਿਲੇ ਛੇ ਕਵੀ)(ਸੰਪਾ.ਬਿਕਰਮ ਸਿੰਘ ਘੁੰਮਣ, ਕਰਮਜੀਤ ਕੌਰ),ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ,
ਅੰਮ੍ਰਿਤਸਰ,
(ਸ਼ੇਖ ਫਰੀਦ, ਸ਼ਾਹ ਹੁਸੈਨ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਜੀ, ਗੁਰੂ ਅਰਜਨ ਦੇਵ ਜੀ,ਵਾਰਿਸ ਸ਼ਾਹ, ਸ਼ਾਹ ਮੁਹੰਮਦ)
(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾ ਵਸਤੂ/ਸਾਰ) 8 ਅੰਕ

ਯੂਨਿਟ-II

ਧਰਤੀਆਂ ਦੇ ਗੀਤ(ਸਫਰਨਾਮਾ), ਬਰਜਿੰਦਰ ਸਿੰਘ ਹਮਦਰਦ,ਨਾਨਕ ਸਿੰਘ ਪੁਸਤਕਮਾਲਾ, ਅੰਮ੍ਰਿਤਸਰ
(ਸਮਾਜ ਸਭਿਆਚਾਰ ਪਰਿਪੇਖ/ਸਫਰਨਾਮੇ ਦੇ ਤੌਰ ਤੇ ਪਰਖ) 8 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਲੇਖ ਰਚਨਾ(ਵਿਗਿਆਨ, ਤਕਨਾਲੋਜੀ ਅਤੇ ਚਲੰਤ ਮਸਲਿਆਂ ਸਬੰਧੀ)
(ਅ) ਆਧੁਨਿਕ ਸਾਹਿਤ ਰੂਪ : ਕਵਿਤਾ, ਕਹਾਣੀ, ਨਾਵਲ, ਨਾਟਕ, ਇਕਾਂਗੀ 8 ਅੰਕ

ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ :

(ੳ) ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ : ਲਿੰਗ, ਵਚਨ,ਕਾਰਕ
(ਅ) ਕਿਰਿਆ ਵਾਕੰਸ਼ : ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਤੇ ਪ੍ਰਕਾਰ 8 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

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SEMESTER-VI

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-6031

COURSE OUTCOMES

CO1: ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦਾ ਪਿਛੋਕੜ, ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਭੂਗੋਲਿਕ ਸਥਿਤੀ, ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਨਿਖੜਵੇਂ ਲੱਛਣ ਦਾ ਅਧਿਐਨ ਕਰਨਗੇ।

CO2: ਪੰਜਾਬ ਦੇ ਮੇਲੇ, ਪੰਜਾਬ ਦੇ ਤਿਉਹਾਰ, ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਧਾਰਮਿਕ ਸਥਾਨ ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO3: ਜਨਮ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ, ਵਿਆਹ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ, ਮੌਤ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO4: ਪੰਜਾਬ ਦਾ ਖਾਣ ਪੀਣ, ਪੰਜਾਬ ਦਾ ਪਹਿਰਾਵਾ, ਪੰਜਾਬ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸ ਦਾ ਅਧਿਐਨ ਕਰਨਗੇ।

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BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

SEMESTER-VI

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-6031

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦਾ ਪਿਛੋਕੜ
ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਭੂਗੋਲਿਕ ਸਥਿਤੀ
ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਨਿਖੜਵੇ ਲੱਛਣ

08 ਅੰਕ

ਯੂਨਿਟ-II

ਪੰਜਾਬ ਦੇ ਮੇਲੇ
ਪੰਜਾਬ ਦੇ ਤਿਉਹਾਰ
ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਧਾਰਮਿਕ ਸਥਾਨ

08 ਅੰਕ

ਯੂਨਿਟ-III

ਜਨਮ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ
ਵਿਆਹ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ
ਮੌਤ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ

08 ਅੰਕ

ਯੂਨਿਟ-IV

ਪੰਜਾਬ ਦਾ ਖਾਣ ਪੀਣ
ਪੰਜਾਬ ਦਾ ਪਹਿਰਾਵਾ
ਪੰਜਾਬ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸ

08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

BACHELOR OF SCIENCE
SEMESTER–VI (SESSION 2023-24)
PUNJAB HISTORY AND CULTURE
Course Title: Punjab History and Culture (1947- 2000 A.D.)(Special paper in lieu
of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
Course Code: BSML-6431

COURSE OUTCOMES:

After completing this paper the students will be able to

- CO 1: Comprehend Punjab's contribution in the freedom struggle, the exodus and Rehabilitation and its impact on state with special reference to partition
- CO 2: Comprehend the causes that led to the formation of New Punjab in 1966 and outcomes of Green Revolution in the Punjab
- CO 3: Understand nature and reasons of diaspora, female foeticide and growth of education in Punjab and its impact on youth
- CO 4: Comprehend the growth of Punjabi literature and Drama in the Punjab after Independence and to understand the reasons of drug abuse in Punjab, its management and prevention in the Punjab

BACHELOR OF SCIENCE
SEMESTER–VI (SESSION 2023-24)
PUNJAB HISTORY AND CULTURE
Course Title: Punjab History and Culture (1947- 2000 A.D.)(Special paper in lieu
of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
Course Code: BSML-6431

Examination Time: 3 Hours

Max. Marks: 50

Theory: 40

CA: 10

Instructions for the Paper Setters

- 1. Question paper shall consist of four Units**
- 2. Examiner shall set 8 questions in all by selecting Two Questions of equal marks from each Unit.**
- 3. Candidates shall attempt 5 questions in 600 words, by at least selecting One Question from each Unit and the 5th question may be attempted from any of the four Units.**
- 4. Each question will carry 8 marks**

UNIT I

1. Partition and its Impact on Punjab
2. Rehabilitation.

UNIT II

3. Punjabi Suba Movement and Act of 1966.
4. Green Revolution.

UNIT III

5. Punjabi Diaspora (Canada)
6. Development of education in Punjab after Independence

UNIT IV

7. Development of Punjabi Literature and Drama.(With Special Reference to Bhai Veer Singh, Shiv Kumar Batalvi)
8. Emerging Concerns: Drug Addiction and Female Foeticide (In context to the Punjab)

Suggested Readings

- Chopra, P.N. & Das, M.N. (1974), *A Social, Cultural & Economic History of India*. Vol.III, Macmillan India, New Delhi, 1974.
- Grewal, J.S., *Social and Cultural History of Punjab: Prehistoric, Ancient and*

Early Medieval. Foundation Books Pvt Ltd Cambridge House, New Delhi, 2004.

- Grewal, J.S., *The Sikhs of Punjab*. New Cambridge House, New Delhi, 2005
- Rai Satya M. , *Heroic Tradition in Punjab(1900-1947)*. Publication Bureau, Punjabi University, Patiala, 1978
- Singh, Fauja., *Freedom Struggle in Punjab*. Publication Bureau, Punjabi University, Patiala, 1974
- Singh, Fauja, *History and Culture of the Punjab*. Part II, Publication Bureau, Punjabi University, Patiala, 1987.
- Singh, Kushwant, *A History of the Sikhs*. Vol. II (1839-1998), Oxford University Press, Delhi, 1991.
- Yadav, K.C., *Haryana Aitihāsik Simhavalokan* (Hindi). Haryana Sahitya Akademy, Chandigarh, 1991.

BACHELOR OF SCIENCE
SEMESTER–VI (SESSION 2023-24)
(ENGLISH)
Course Title: English (Compulsory)
Course Code: BSML -6212

COURSE OUTCOMES

After passing this course, the students will be able to:

- CO 1:** Comprehend, appreciate and critically analyse a novel through the story of the novel *Train to Pakistan* by Khushwant Singh
- CO 2:** Analyze and appreciate the dramatic technique, plot development and art of characterisation through the study of the prescribed plays from the book *Glimpses of Theatre*
- CO 3:** Enhance their writing skills by writing essay on any given topics well as to write report on any incident witnessed
- CO 4:** Write appropriate reports on any incident witnessed.

BACHELOR OF SCIENCE
SEMESTER–VI (SESSION 2023-24)
(ENGLISH)
Course Title: English (Compulsory)
Course Code: BSML -6212

Examination Time: 3 Hrs

Max. Marks: 50

Theory: 40

CA: 10

Instructions for the Examiner:

Section A: Three questions from the novel *Train to Pakistan* from Unit I and three questions from *Glimpses of Theatre* from Unit II requiring very short answers will be set. The students would be required to answer any five, each carrying 2 marks (50 words each). **(5×2=10)**

Section B: Four questions requiring brief descriptive answers based on character, plot and theme(s) in the novel *Train to Pakistan* from Unit I will be set and students would be required to attempt any two, each carrying 5 marks (250 words each). **(2×5=10)**

Section C: Four questions based on the central idea, theme, tone or style etc. of the prescribed plays from the textbook, *Glimpses of Theatre* from Unit II will be set for the students to attempt any two, each carrying 5 marks (250 words each). **(2×5=10)**

Section D: Two questions with internal choice will be set based on Unit 3 (Essay Writing) carrying six marks (word limit 300 words) and Unit 4 (Report Writing) carrying four marks word limit 200 words). **(1×6 + 1×4=10)**

Unit I

Train to Pakistan by Khushwant Singh

Unit II

Glimpses of Theatre:

- i) The Will
- ii) Villa for Sale
- iii) Progress
- iv) The Monkey's Paw

Unit III

Essay Writing

Unit IV

Report Writing

Texts Prescribed:

1. *Train to Pakistan* by Khushwant Singh
2. *Glimpses of Theatre*, Guru Nanak Dev University Amritsar

Bachelor of Science (Semester System) (12+3 System of Education)

(Semester–VI)

(Session 2023-24)

PHYSICS (NUCLEAR PHYSICS)

(THEORY)

Course code: BSNM-6395 (I) for Bachelor of Science (Non Medical)

BCSM-6395 (I) for Bachelor of Science (Computer Science)

Course Outcomes

After passing this course, students will be able to:

- CO 1. Understand basic properties of nucleus and nuclear forces.
- CO 2. Understand about radioactivity, theories of alpha, beta and gamma decay, neutrino hypothesis.
- CO 3. Understand concepts and types about nuclear reactions, reactions cross section and compound nucleus.
- CO 4. Understand nuclear models (Liquid drop and Shell model) and their failures and successes.

Bachelor of Science (Semester System) (12+3 System of Education)

(Semester–VI)

(Session 2023-24)

PHYSICS (NUCLEAR PHYSICS)

(THEORY)

Course code: BSNM-6395 (I) for Bachelor of Science (Non Medical)

BCSM-6395 (I) for Bachelor of Science (Computer Science)

Time: 3 Hours

Marks: 30

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I

Nuclear Properties: Constituents of nucleus, non-existence of electrons in nucleus, Nuclear mass and binding energy, features of binding energy versus mass number curve, nucleus radius, angular momentum and parity, nuclear moments: magnetic dipole moment and electric quadrupole moment, properties of nuclear forces, Yukawa theory.

UNIT–II

Radioactive Decays: Modes of decay of radioactive nuclides and decay Laws, radioactive series and displacement law, radioactive dating, Alpha decay: Gamow's theory of alpha decay, barrier penetration as applied to alpha decay, Geiger Nuttal law, Beta decays: β^- , β^+ and electron capture decays, Neutrino hypothesis and its detection, parity violation in β decay, Gamma transitions, internal conversion.

UNIT–III

Nuclear Reactions: Types of nuclear reactions, reactions cross section, conservation laws, Kinematics of nuclear reaction, examples of nuclear reactions: proton, deuteron, alpha particle, neutron and photon induced reactions. Q-value and its physical significance, Compound nucleus

UNIT–IV

Nuclear Models: Liquid drop model, semi-empirical mass formula, condition of stability, evidence for nuclear magic numbers, Shell Model, energy level scheme, angular momenta of nuclear ground states, parity and magnetic moment of nuclear ground states.

Reference Books:

1. Basic Ideas and Concepts in Nuclear Physics by K. Hyde
2. Introduction to Nuclear Physics by H.A. Enge
3. Nuclear Physics by I. Kaplan (Addison Wesley)
4. Nuclei and Particles by E. Segre

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI) (Session 2023-24)
PHYSICS (RADIATION AND PARTICLE PHYSICS)
Course code:BSNM-6395 (II) for Bachelor of Science (Non Medical)
BCSM-6395 (II) for Bachelor of Science (Computer Science)

Course Outcome:

After successfully completing this course a student will be able to:

CO1: understand interaction of radiation and charged particles with matter.

CO2: understand theory and working of various types of nuclear detectors like gas filled, semiconductor, solid state track detectors and nucleus emulsions.

CO3: understand theory and working of various particle accelerators, linear and cyclic and phase stability conditions.

CO4: understand about elementary particles, different types of interactions and quark model.

Bachelor of Science (Semester System) (12+3 System of Education)

(Semester–VI) (Session 2023-24)

PHYSICS (RADIATION AND PARTICLE PHYSICS)

Course code: BSNM-6395 (II) for Bachelor of Science (Non Medical)

BCSM-6395 (II) for Bachelor of Science (Computer Science)

(THEORY)

Time: 3 Hours

Marks: 30

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. **Each question carries 6 marks.**

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I

Interaction of Radiation and Charged Particles with Matter: Derivation of Bethe-Bloch formula, Stopping power and range of heavy charged particles, Energy loss of electrons and positrons, Positrons annihilation, interaction of gamma rays with matter.

UNIT–II

Nuclear Radiation Detection: Gas-filled detectors, Proportional and Geiger-Mueller counters, Scintillation detectors, Semiconductor detectors, Cherenkov effect, Solid state nuclear track detectors. Bubble chamber.

UNIT–III

Accelerators: Linear accelerators, Cyclic accelerators: Cyclotron, Synchrocyclotron, Betatron, Electron and proton synchrotron, Colliding beam machines: introduction to Large Hadron Collider

UNIT–IV

Elementary Particles: Historical introduction, high energy physics units, fermions and bosons, particles and antiparticles, Classification of particles, types of interactions, electromagnetic, weak, strong interactions, gravitational interactions, Quantum numbers and conservation laws: Charge, Baryon number, lepton number, parity, isospin, charge conjugation, strangeness. Introduction to quarks and qualitative discussion of the quark model,

Reference Books:

1. Basic Ideas and Concepts in Nuclear Physics by K. Hyde
2. Introduction to Nuclear Physics by H.A. Enge
3. Nuclear Physics by I. Kaplan (Addison Wesley)
4. Nuclei and Particles by E. Segre
5. Introduction to High Energy Physics by D.H. Perkins
6. Elementary Particles by I.S. Hughes

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)

PHYSICS PRACTICAL

Course code: BSNM-6395 (P) for Bachelor of Science (Non Medical)
BCSM-6395 (P) for Bachelor of Science (Computer Science)

Course Outcome: After successfully completing this course a student will be able to:

CO1: understand magnetic parameters and phenomenon of hysteresis and tracing of B-H curve.

CO2: understand application of zener diode as voltage regulators.

CO3: understand the characteristics and working of FET& LDR and response of RC circuits.

CO4: use of GM counter to understand the concepts of dead time and absorption coefficient and statistical fluctuations.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)

PHYSICS PRACTICAL

Course code: BSNM-6395 (P) for Bachelor of Science (Non Medical)
BCSM-6395 (P) for Bachelor of Science (Computer Science)

Instructions to Practical Examiner

Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar

General Guidelines for Practical Examination

I. The distribution of marks is as follows: **Marks: 20**

i) One experiment **7 Marks**

ii) Brief Theory **3 Marks**

iii) Viva–Voce **5 Marks**

iv) Record (Practical file) **5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment is to be allotted to more than three examinees in any group.

LIST OF EXPERIMENTS-

1. To trace the B-H curves for different materials using CRO and find the magnetic parameters from these.
2. To study the stabilization of output voltage of a power supply with Zener diode.
3. To draw output and mutual characteristics of an FET (Experiments) and determine its parameters.
4. To set up an oscillator and to study its output on CRO for different C values.
5. To draw the plateau of a GM counter and find its dead time.
6. To study the statistical fluctuations using GM counter.
7. To study the absorption of beta particles in aluminium using GM counter and determine the absorption coefficient of beta particles from it.
8. To study the characteristics of a thermistor and find its parameters.
9. To study the response of RC circuit to various input voltage (square, sine and triangular).
10. To study characteristics of LDR.

**Bachelor of Science
(SEMESTER-VI)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-6084(I)
COURSE TITLE: CHEMISTRY (Molecular Spectroscopy)**

Students will be able to

CO1: understand the principle and applications of ultraviolet and apply Woodward Fisher Rule to calculate λ_{\max}

CO2: understand the concepts of Vibrational spectroscopy, Vibrational coupling overtones and Fermi resonance and its application in Organic Chemistry

CO3: know about the Nuclear magnetic resonance spectroscopy. Proton chemical shift, spin-spin coupling, coupling constants and its applications to determine organic structures

CO4: to understand different cleavage patterns of organic compounds in Mass spectrometry and apply the knowledge for interpretation of the spectrum of an unknown compound.

**Bachelor of Science
(SEMESTER-VI)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-6084(I)
COURSE TITLE: CHEMISTRY (Molecular Spectroscopy)**

Examination Time: 3 Hrs.

Max. Marks: 30

Instructions for the Paper Setters:

Eight questions of equal marks (six marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

UNIT – I

1. Energy and Electromagnetic Spectrum (10 Hrs)

Introduction, electromagnetic spectrum and Units, Regions of the spectrum, Statement of Born-Oppenheimer approximation, Degree of freedom, Frank Condon Principle, Fluorescence and Phosphorescence.

II. Ultraviolet and Visible Spectroscopy

The energy of electronic excitation, Measurement techniques, Beer-Lambert Law, Molar extinction coefficient. Different types of transition noticed in UV spectrum of organic functional groups and their relative energies. Chromophore, Auxochromes, Absorption and intensity shifts, Factors affecting λ_{\max} , Effect of steric hindrance to coplanarity, Solvent effects.

UNIT – II

III. Infrared Spectroscopy (10 Hrs)

Vibrational energy levels, Selection rules, Force constant, Fundamental vibration frequencies, Factors influencing Vibrational Frequencies (Vibrational Coupling, Hydrogen Bonding, Electronic effect, Bond Angles, Field Effect) of different functional groups, Sampling techniques.

IV. Applications of UV and IR Spectroscopy

Applications of UV spectroscopy, Woodward Fieser rules for calculating λ_{max} of conjugated polyenes and α,β -unsaturated carbonyl compounds. Applications of IR spectroscopy, Absorption of Common functional Groups, Interpretation of simple IR spectra, Finger print regions. Simple numerical problems based on UV and IR spectroscopy.

UNIT-III

V. Proton Magnetic Resonance spectroscopy (^1H NMR) (13 Hrs)

The Nuclear spin, Larmor frequency, the NMR isotopes, Population of nuclear spin level, Spin and Spin lattice relaxation, Measurement techniques (CW and FT method), Solvent used, Reference compounds, Chemical shift, nuclear shielding and deshielding, chemical shift, spin-spin splitting and coupling constants, Anisotropic effect, Application of structure elucidation of simple organic molecules.

UNIT- IV

VI. Mass Spectrometry (12 Hrs)

Basic Principles, Elementary theory, Molecular ions, isotope ions, Fragment ions of odd and even electron types, Nitrogen rule, Factors affecting cleavage patterns, Simple cleavage, Cleavages at a hetero atom, Multicentre fragmentations, Rearrangements, Diels – Alder fragmentation, Mc Lafferty rearrangement, Interpretation of the spectrum of unknown simple molecules.

Books Recommended:

1. Organic Spectroscopy By W. Kemp; Publisher- Palgrave, NewYork
2. D.H. Williams and I. Fleming. Spectroscopic Methods in OrganicChemistry.
3. Spectrometric Identification of Organic Compounds - R.M. Silverstein and F. X. Webster; Publisher: John Willey and Sons,Inc.
4. Introductory Problems in Spectroscopy- By R.C. Banks, E.R. Matjeha and G. Mercer; Publisher : The Benzamine / Cummings Publishing CompanyInc.
5. Introduction to Spectroscopy – D. L. Pavia, G. M .Lampman, and G. S. Kriz Publisher: Brooks / Cole, a part of cengage learning.

Bachelor of Science
(SEMESTER-VI)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-6084(II)
COURSE TITLE: CHEMISTRY (PHYSICAL CHEMISTRY)

Course outcomes:

Students will be able to

CO1: understand Schrodinger wave equation (S.W.E) and its applications to particle in one, two and three dimensional boxes.

CO2: understand the applications of S.W.E to rigid rotator, harmonic oscillators, hydrogen and hydrogen like atoms, quantum numbers

CO3: acquire knowledge about unit cell, space lattice, miller indices, symmetry operations, Bragg equation, powder method

CO4: understand photophysical, photo chemical, radioactive and non-radiative processes, quantum yield, energy transfer processes

Bachelor of Science
(SEMESTER-VI)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-6084(II)
COURSE TITLE: CHEMISTRY (PHYSICAL CHEMISTRY)

Time: 3 Hrs.
30

Max. Marks:

Note: Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT-I

1. Quantum Mechanics-I

(12 Hrs)

Black-body radiation, Planck's radiation law, Photoelectric effect, heat capacity of solids, Bohr's model of hydrogen atom (no derivation) and its defects, Compton effect. de Broglie hypothesis, Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one dimensional box, quantization of energy levels, extension to two and three dimensional boxes, degeneracy.

UNIT-II

2. Quantum Mechanics-II

(12 Hrs)

Simple harmonic oscillator model of vibrational motion, setting up Schrodinger equation and discussion of solution and wave functions. Rigid rotator model of rotation of diatomic molecules transformation to spherical polar coordinates spherical harmonics and their discussion. Qualitative investigation H-atom, setting up Schrodinger equation, radial and angular part, radial distribution functions of 1s, 2s, 2p, 3s, 3p and 3d.

UNIT-III

3. Solid State

(10 Hrs)

Definition of space lattice and unit cell, Law of crystallography- (i) Law of constancy of interfacial angles, (ii) Law of rationality of indices, (iii) Symmetry elements in crystals. X-ray diffraction by crystals. Derivation of Bragg's Law in Reciprocal space. Determination of crystal structure of NaCl, KCl by use of Powder method; Laue's method.

UNIT-IV

4. Photochemistry

(11Hrs)

Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grothus-Draper law, Stark-Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).

Books Suggested :

1. Atkins, P., Paula, J.de, Atkins, Physical Chemistry; 8th edition, Pubs: Oxford University Press, 2008.
2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co., 2008.
3. Barrow, G.M., Physical Chemistry; 6th edition, Pubs: McGraw Hill Company Inc., 1996.
4. Rao, C.N.R., University General Chemistry; Pubs: Macmillan of India, 1985.
5. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford University Press, 2000.
6. Albert, R.A., Silbey, R.J., Physical Chemistry; I edition, Pubs: John Wiley and Sons Inc., 1992.
7. Dogra, S.K., Dogra, S., Physical Chemistry Through Problems, Pubs: Wiley Eastern Ltd., 1991.
8. Levine, I.N., Physical Chemistry; 5th edition, Pubs : Tata McGraw Hill Publishing Co. Ltd., 2002.
9. Moore, W.J., Basic Physical Chemistry; Pubs : Prentice Hall of India Pvt. Ltd., 1983.
10. Metz, C.R., Theory and Problems of Physical Chemistry; Schaum's outline series, 2nd edition, Pubs: McGraw-Hall Book Company, 1989.

11. Banwell, C.N., McCash, E.M., Fundamentals of Molecular Spectroscopy; 4th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd., 1999.
12. Atkins, P. Friedman, R., Molecular Quantum Mechanics; 4th edition Pubs: Oxford University Press, 2007.
13. Levine, I.N., Quantum Chemistry; 5th edition, Pubs: Prentice Hall International Inc., 2000.
14. Inorganic Chemistry, W.W. Porterfield Addison-Wesley.
15. Inorganic Chemistry, A.G. Sharpe, ELBS.

**Bachelor of Science
(SEMESTER-VI)
SESSION: 2022-25
COURSE CODE: BSMM/BSNM-6084(P)
COURSE TITLE: CHEMISTRY PRACTICAL**

Course outcomes:

Students will be able to

CO1: separate the various mixtures by Column Chromatography technique

CO2: synthesize different Organic Compounds

CO3: synthesise the different compounds by Green Approach

CO4: prepare the different dyes

Bachelor of Science
(SEMESTER-VI)
SESSION 2022-25
COURSE CODE: BSMM/BSNM-6084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Duration: 3½ hrs.

Max. Marks: 20

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar.

(I) Organic Chemistry Laboratory Techniques

(a) Column Chromatography

Separation of o and p nitrophenol

Separation of Leaf pigments from Spinnach leaves

Separation of o and p nitro aniline

Separation of dyes.

(b) Synthesis of Organic Compounds

Preparation of p-nitroacetanilide

Preparation of p-bromoacetanilide

Preparation of benzoic acid from Benzyl-using green approach (Green Chemistry Experiment)

Preparation of Methyl Orange, Methyl Red

Practical Examination

1) Column Chromatography= 07

2) Organic Synthesis =16

3) Viva-Voce =04

4) Note Book= 03

Books suggested:

1. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
3. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
4. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)

Semester–VI

Session- 2023-24

Course Title: Mathematics (Linear Algebra)

Course Code: BARM/BECM/BCSM/BSNM-6333(I)

Course Outcomes

After the completion of this course, students should be able to:

CO 1: Express the algebraic concepts such as binary operation, groups, rings and fields. Define a vector space and subspace of a vector space and check the linear dependence and linear independence of vectors.

CO 2: Describe the concepts of basis and dimension of vector spaces.

CO 3: Investigate properties of vector spaces and subspaces using linear transformation.

CO 4: Find the matrix representing a linear transformation.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)

Semester–VI

Session: 2023-24

Course Title: Mathematics (Linear Algebra)

Course Code: BARM/BECM/ BCSM/BSNM-6333(I)

Examination Time: 3 Hours

Max. Marks:50

Theory:40

CA:10

Instructions for the paper setters/examiners:

Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Definition of groups, rings and fields with examples. Definition of a vector space, subspaces with examples. Direct sum of subspaces. Linear span, Linear dependence, Linear independence of vectors. Linear combination of vectors.

Unit-II

Basis of a vector space, Finitely generated vector spaces. Existence theorem for basis. Invariance of the number of elements of the basis set. Dimension of sum of two subspaces. Quotient space and its dimension.

Unit-III

Linear transformation. Algebra of linear transformation. Rank-Nullity theorem, Isomorphism and Isomorphic spaces.

Unit-IV

Matrix of a linear transformation. Changes of basis, Linear operator.

Text Book:

C.W.Curtis, Linear Algebra, Springer, New York, 2017

Reference Books:

1.S. Singh, Linear Algebra, Vikas Publishing, sixth edition, 1983.

2.V. Krishnamurthy, V. P. Mainra and J. L. Arora, An Introduction to Linear Algebra, East West Press, 1976.

3.S. Narayan and P.K. Mittal, A Text Book of Matrices, S. Chand & Co, tenth edition, 1972.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)

Semester–VI

Session: 2023-24

Course Title: Mathematics (Numerical Analysis)

Course Code: BARM/BECEM/ BCSM/BSNM-6333(II)

After passing this course, the students will be able to:

CO 1. Know how to find the roots of transcendental and polynomial equations.

CO 2. Perform computation for solving a system of equations.

CO 3. Learn how to interpolate the given set of values.

CO 4. Learn numerical solution of differential equations & compute numerical integration and differentiation, numerical solution of ordinary differential equations.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)

Semester–VI

Session: 2023-24

Course Title: Mathematics (Numerical Analysis)

Course Code: BARM/BECEM/ BCSM/BSNM-6333(II)

Examination Time: 3 Hours

Max. Marks:50

Theory:40

CA:10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

The students can use only Non Programmable& Non Storage Type Calculator.

Unit-I

Error generation, propagation, error estimation and error bounds, Solution of non-linear equations, Bisection method, Iteration method, Newton's Method, Generalized Newton's Method, Method of false position, Muller's method, Rate of convergence of these methods.

Unit-II

Solution of linear system of equation; Direct method, Gauss elimination variant (Gauss Jordan and Crout reduction), Triangular Method, Iterative Method, Jacobi's Method, Gauss Seidel Method. Finite Differences: Forward, Backward, Central, Divided differences, shift operator, relationship between the operators and detection of errors by use of difference operator. Interpolation with divided difference, Newton's formula, Lagrangian Method.

Unit-III

Finite difference interpolation, Gauss formula, Stirling formula, Bessel's formula, Error Estimation Extrapolation. Numerical differentiation, Method based on interpolation. Numerical Integration, Trapezoidal rule, Simpson's rule, Weddle rule, Romberg Integration, Gaussian integration method, Gaussian legendre integration. Double numerical integration.

Unit-IV

Numerical solution of ordinary differential equations, Initial value problem, Taylor's method, Euler's methods, Picard's method, Milne's Method, Runge-Kutta Method. Predictor- Corrector's Method.

Text Book:

M K Jain, S R K Iyenger, R K Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Private Limited, Seventh edition, 2019.