FACULTY OF LIFE SCIENCES

SYLLABUS

Of

B. Sc. BIO-TECHNOLOGY (Semester: I, II, III & IV)
(Under Continuous Evaluation System)

Session: 2019-20

The Heritage Institution

KANYA MAHA VIDYALAYA
JALANDHAR
(Autonomous)

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science (Bio-Technology)
Session: 2019-20

Bachelor of Science (Bio-Technology) Semester I							
Course Code	**Course Name**	**Course Type**	**Marks**				**Examination time (in Hours)**
			Total	**Ext.**		**CA**	
				L	**P**		
BBTL -1421 BBTL -1031 BBTL -1431	Punjabi (Compulsory) [1]Basic Punjabi [2]Punjab History and Culture	C	50	40	-	10	3
BBTL-1102	Communication Skills in English	C	50	40	-	10	3
BBTM-1483	Zoology-A	C	60	30	18	12	3+3
BBTM-1074	Botany-A	C	60	30	18	12	3+3
BBTM-1085	Inorganic Chemistry-A	C	60	30	18	12	3+3
BBTM-1086	Organic Chemistry-A	C	60	30	18	12	3+3
BBTM-1137	Computer Fundamentals and Bioinformatics	C	60	30	18	12	3+3
BBTM-1348	General Microbiology –A	C	60	30	18	12	3+3
BBTM-1089	Biochemistry – A	C	60	30	18	12	3+3
AECD-1161	[3]Drug Abuse: Problem Management and Prevention (Compulsory)	AC	50	40	-	10	3
SECF-1492	[3]Foundation Programme	AC	25	-	-	-	
Total			**520**				

[1] Special Course in lieu of Punjabi (Compulsory)

[2] Special Course in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab

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

C-Compulsory AC- Audit course

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science (Bio-Technology)
Session: 2019-20

Bachelor of Science (Bio-Technology) Semester II							
Course Code	**Course Title**	**Course Type**	**Marks**				**Examination time (in Hours)**
			Total	**Ext.**		**CA**	
				L	**P**		
BBTL -2421 BBTL -2031 BBTL -2431	Punjabi (Compulsory) [1]Basic Punjabi [2]Punjab History and Culture	C	50	40	-	10	3
BBTM-2102	Communication Skills in English	C	50	25	15	10	3+3
BBTL-2333	Biostatistics	C	40	32	-	8	3
BBTM-2074	Botany-B	C	60	30	18	12	3+3
BBTM-2085	Inorganic Chemistry-B	C	60	30	18	12	3+3
BBTM-2086	Organic Chemistry-B	C	60	30	18	12	3+3
BBTM-2487	Zoology-B	C	60	30	18	12	3+3
BBTM-2348	General Microbiology –B	C	60	30	18	12	3+3
BBTM-2089	Biochemistry – B	C	60	30	18	12	3+3
AECD-2161	[3]Drug Abuse: Problem Management and Prevention (Compulsory)	AC	50	40	-	10	3
SECM-2502	[3]Moral Education Programme	AC	25	-	-	-	1
Total			**500**				

[1] Special Course in lieu of Punjabi (Compulsory)

[2] Special Course in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab

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

C-Compulsory
AC- Audit course

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME

Bachelor of Science (Bio-Technology)

Session: 2019-20

Bachelor of Science (Bio-Technology) Semester-III							
Course Code	**Course Name**	**Course Type**	**Marks**				**Examination Time (in Hours)**
			Total	**Ext.**		**CA**	
				L	**P**		
BBTM-3081	Physical Chemistry-A	C	60	30	18	12	3+3
BBTM-3482	Zoology-C	C	60	30	18	12	3+3
BBTM-3083	Biochemistry-C	C	60	30	18	12	3+3
BBTM-3484	Cell Biology	C	60	30	18	12	3+3
BBTM-3065	Immunology-A	C	60	30	18	12	3+3
BBTM-3066	Genetics	C	60	30	18	12	3+3
BBTM-3067	Agro and Industrial Applications of microbes-A	C	60	30	18	12	3+3
AECE-3221	[3]Environmental Studies (Compulsory Paper)	AC	50	-	-	-	
Total			**420**				

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

C-Compulsory

AC- Audit Course

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science (Bio-Technology)
Session: 2019-20

Bachelor of Science (Bio-Technology) Semester-IV							
Course Code	**Course Name**	**Course Type**	**Marks**				**Examination Time (in Hours)**
			Total	**Ext.**		**CA**	
				L	**P**		
BBTM-4081	Physical Chemistry-B	C	60	30	18	12	3+3
BBTM-4072	Botany-C	C	60	30	18	12	3+3
BBTM-4083	Biochemistry-D	C	60	30	18	12	3+3
BBTM-4064	Skill Development in Bio-Technology-A	C	60	30	18	12	3+3
BBTM-4065	Immunology-B	C	60	30	18	12	3+3
BBTM-4066	Molecular Biology	C	60	30	18	12	3+3
BBTM-4067	Agro and Industrial Applications of microbes-B	C	60	30	18	12	3+3
BBTM-4068	Enzymology	C	60	30	18	12	3+3
SECS-4522	[3]Social Outreach Programme	AC	25	-	25	-	-
Total			**480**				

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

C-Compulsory
AC- Audit course

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTL-1421
Punjabi Compulsory

Time: 3Hrs **Max. Marks: 50**

Theory: 40

CA-10

ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਆਤਮ ਅਨਾਤਮ (ਕਵਿਤਾ ਭਾਗ),(ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ) ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ, ਸਾਰ) 08 ਅੰਕ

ਯੂਨਿਟ-II

ਇਤਿਹਾਸਕ ਯਾਦਾਂ (ਇਤਿਹਾਸਕ ਲੇਖ ਸੰਗ੍ਰਹਿ) ਸੰਪਾ. ਸ.ਸ.ਅਮੋਲ,ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ,ਲੁਧਿਆਣਾ । (ਲੇਖ 1 ਤੋਂ 6)

(ਨਿਬੰਧ ਦਾ ਸਾਰ, ਲਿਖਣ-ਸ਼ੈਲੀ) 08 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ

(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ। 08 ਅੰਕ

ਯੂਨਿਟ-IV

(ੳ) ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ : ਉਚਾਰਨ ਅੰਗ, ਉਚਾਰਨ ਸਥਾਨ ਤੇ ਵਿਧੀਆਂ, ਸਵਰ, ਵਿਅੰਜਨ, ਸੁਰ-ਪ੍ਰਬੰਧ।

(ਅ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ੍ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ ਚਿੰਨ੍ਹ। 08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

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

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਯੂਨਿਟ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵਧ ਤੋਂ ਵਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

Bachelor of Science (Bio-Technology) Semester-I
Session 2019-20
Course Code: BBTL-1031
Basic Punjabi

Time: 3Hrs **Marks: 50**

Theory: 40

CA: 10

ਪਾਠ ਕ੍ਰਮ

ਸੈਕਸ਼ਨ ਏ

ਪੈਂਤੀ ਅਖਰੀ, ਅਖਰ ਕ੍ਰਮ, ਪੈਰ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਮਾਤ੍ਰਵਾਂ (ਮੁਢਲੀ ਜਾਣ ਪਛਾਣ) ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿਪੀ, ਅਧਕ) : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ । 08ਅੰਕ

ਸੈਕਸ਼ਨ ਬੀ

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਮੁਢਲੀ ਜਾਣ ਪਛਾਣ (ਸਾਧਾਰਨ ਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ, ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ) 08ਅੰਕ

ਸੈਕਸ਼ਨ ਸੀ

ਨਿਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਸ਼ਤੇਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਆਦਿ ਨਾਲ ਸੰਬੰਧਤ। 08 ਅੰਕ

ਸੈਕਸ਼ਨ ਡੀ

ਹਫ਼ਤੇ ਦੇ ਸਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰ੍ਹਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿਚ ।

08ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. **ਪ੍ਰਸ਼ਨ ਪਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁਛੇ ਜਾਣਗੇ।**

2. **ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।**

3. **ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਅੱਠ ਅੰਕ ਹਨ।**

4. ਪੇਪਰ ਸੈਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵਧ ਤੋਂ ਵਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

Bachelor of Science (Bio-Technology) Semester-I
Session 2019-20
Course Code: BACL-1431
Punjab History and Culture (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi compulsory)

Time: 3 Hours **Max.Marks: 50**

Theory: 40

CA: 10

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.

Unit I

1. Physical features of the Punjab and impact on history.
2. Sources of the ancient history of Punjab

Unit- II

3. Harappan Civilization: Town planning; social, economic and religious life of the India Valley People.
4. The Indo-Aryans: Original home and settlement in Punjab.

Unit- III

5. Social, Religious and Economic life during later *Rig* Vedic Age.
6. Social, Religious and Economic life during later Vedic Age.

Unit-IV

7. Teaching and impact of Buddhism
8. Jainism in the Punjab

Suggested Readings

1. Joshi, L (ed) (1989) History and Culture of the Punjab, Art-I, 3rd edition, Patiala.
2. Joshi, L.M and Singh, F (ed) (1977) History of Punjab, Vol.I, Patiala.
3. Parkash, B (1983) Glimpses of Ancient Punjab, Patiala.
4. Sharma, B.N (1966) Life in Northern India, Delhi.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course code: BBTL-1102
Communication Skills in English

Time: 3 Hours

Max. Marks: 50

Theory: 40

CA: 10

Instructions for the paper setter and distribution of marks:

The question paper will consist of four sections and distribution of marks will be as under:

Section-A: The question of theoretical nature will be set from Unit I of the syllabus with internal choice and it will consist of 8 marks.

Section-B: Two comprehension passages will be given to the students based on the Unit II and the candidates will have to attempt one carrying 8 marks.

Section-C: Two questions will be given based on the topics given in the Unit III and the candidates will have to attempt one carrying 8 marks.

Section-D: One out of the two questions will have to be attempted by the candidates based on the topics given in Unit IV of the syllabus. It will carry 8 marks.

Important Note:

The candidate will have to attempt five questions in all selecting one from each section of the question paper and the fifth question may be attempted from any of the four sections.

(8 x 5 = 40)

The syllabus is divided in four units as mentioned below:

Unit I

Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings.

Unit II

Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

- Comprehension questions in multiple choice format
- Short comprehension questions based on content and development of ideas

Unit III

Writing Skills: Guidelines for effective writing; writing styles for application, personal letter, official/ business letter.

Activities

- Formatting personal and business letters.
- Organising the details in a sequential order

Unit IV

Resume, memo, notices etc.; outline and revision.

Activities:

- Converting a biographical note into a sequenced resume or vice-versa
- Ordering and sub-dividing the contents while making notes.
- Writing notices for circulation/ boards

Recommended Books:

1. Seely, J (2005) Oxford Guide to Effective Writing and Speaking.

2. Sinha, K.K (2003) Business Communication, Galgotia Publishers.

3. Sethi, A and Adhikari, B (2009) Business Communication by McGraw Hill Education.

4. Raman, M. & Sharma, S (2011) Communication Skills by OUP, New Delhi, India.

5. Murphy, R. (2013) English Grammar in Use: A Self Study Reference and Practice Book Intermediate Learners Book, Cambridge University Press.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1483
Zoology–A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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

Unit – I

Digestive System: The alimentary canal and associated glands of Man. Teeth: types, dental formula and function. Glands: Pancreas, Liver, Gastric glands. Digestion of dietary constituents, regulation of digestive processes and absorption, Types of nutrition, feeding mechanisms, extra and intracellular digestion, enzymatic digestion, symbiotic digestion.

Unit – II

Circulatory System: General plan of circulation in Man, structure of human heart. Origin and regulation of heart beat, cardiac cycle, electrocardiogram, Cardiac output and fluid pressure, Composition and functions of blood and lymph, Molecular structure and function of haemoglobin, Blood clotting, blood groups including Rh-factor, Homeostasis, Haemopoiesis.

Unit – III

Respiratory System: Respiratory system of man. Transport of O_2 and CO_2, Oxygen dissociation of haemoglobin, Bohr effect, chloride shift, Haldane effect, control of breathing.

Unit – IV

Integumentary System: Introduction. Histology of Skin: Different layers of skin (Epidermis, Dermis). Derivatives of skin: Hair, Cutaneous glands, Nails. Functions of skin.

Books Recommended:

1.Guyton, A.C. & Hall, J.E. (2006). Textbook of Medical Physiology. XI Edition. Hercourt Asia PTE Ltd. /W.B. Saunders Company.

2. Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XI Edition. John wiley & sons,Inc.

3. Sobti, R.C. & Nigam, S.K. (2002). Structural & function biology of chordates, Vishal Publishers, Jalandhar.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1483(P)
Zoology–A
(Practical)

Time:3 Hrs **Practical Marks: 18**

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

Experiments:

1. Demonstration of osmosis and diffusion.
2. Analysis of food stuff for the presence of starch, protein and fats.
3. Determination of blood groups of human blood samples.
4. Recording of blood pressure of man.
5. Estimation of hemoglobin content.
6. Study of the following prepared slides: histology of man (compound tissues).
7. Visit to clinical laboratory / hospital for demonstration of ECG, ECHO, X-ray, ultrasound, CT-scan and MRI.

Books:

1. Sobti, R.C. & Sharma, V.L. (2005). Basics of Bio-Technology: Introduction of Life Sciences. Vishal Publishers, Jalandhar.
2. Sobti, R.C. (2005). Introduction to Bio-Technology, Part-2, Concepts Tools and Application, Vishal Publishers.

Bachelor of Science (Bio-Technology) Semester-I

Session: 2019-20

Course Code: BBTM-1074

Botany–A

(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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

Unit – I

Apical Meristem: Tunica corpus and Histogen theories, reproductive apex and development of flower. Secondary growth in stem and root of *Helianthus*. Study of anomalous structure in *Boerhavia, Nyctanthes, Mirabilis and Dracena.*

Unit – II

Structure and development of anther and male gametophyte. Structure and development of ovule and female gametophyte; different types of ovules and embryo sacs

Unit – III

Pollination and fertilization; structure, development and function of endosperm and embryo (dicot and monocot), polyembryony, Self-pollination, cross -pollination, male sterility, selfincompatibility.

Unit – IV

Terminology pertaining to floral description, taxonomic importance of floral parts of the following families: Solanaceae: Solanum, Petunia Liliaceae: Asphodelus/Asparagus, Rutaceae: Citrus, Murraya

Books Recommended:

1.Bhojwani, S.S. and Bhatnagar, S.P. (2000). The Embryology of Angiosperms, 4th revised and enlarged edition. Vikas Publishing House, Delhi.

2. Peau, K. (1977). Anatomy of Seed Plants, 3rd edition. John Wiley & Sons, New York.

3.Pegeri, K. And Vander Pijl (1979). The Principles of Pollination Biology, Pergamon Press, Oxford.

4.Dickinson, W.C. (2000). Integrative Plant Anatomy. Harcourt Academic Press, USA.

6. Fahn, A. (1974). Plant Anatomy. Pergmon Press, USA and UK.

7. Hopkins, W.G. and Huner, P.A. (2008). Introduction to Plant Physiology. John Wiley and Sons.

8. Taiz, L. and Zeiger, E. (2006). Plant Physiology, 4 th edition, Sinauer Associates Inc .MA, USA

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1074(P)
Botany–A
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

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

Experiments:

Plant Anatomy:

Anatomical studies of normal and abnormal secondary growth in general as mentioned in syllabus.

Embryology:

Study of the permanent slides pertaining to micro and megasporogenesis and female gametophytes and endosperms.

Taxonomy:

a) Description of flowers including floral diagram, floral formula, V.S. of flower of the representative genera of families mentioned in syllabus.
b) Identification and short morphological economic note on the specimens included in Units IV & V of the theory paper A.
c) Each student is required to submit a family wise herbarium consisting of atleast 20 properly pressed and mounted plants.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1085
Inorganic Chemistry –A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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

UNIT – I

Introduction, Wemer's coordination theory, naming of co-ordinate complexes. Co-ordination numbers 1-12 and their stereo-chemistries. Co-ordination numbers and stereo chemistries of the common transition metal : Ti,V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Mo, & W. Factors affecting co-ordination numbers and stereo-chemistry Isomerism in coordination compounds. (Books Consulted-Number 1,3,8).

Unit – II

Valence bond theory for co-ordinate complexes, inner and outer orbital complexes, electro-neutrality and back bonding, limitations of V.B. theory.

Unit – III

Crystal field theory-Spliting of d-orbitals in octahedral, tetrahedral, cubic and square planer fields of ligands, calculation of C.F.S.E. in high spin and low spin octahedral and high spin tetrahedral complexes, factors affecting the 10 Dq value, structure effects of crystal field splitting (Jahn-Teller distortion). Paramagnetism, diamagnetism, ferro and anti ferromagnetism, Microstates and spectroscopic terms, a calculation of spectroscopic terms for d^1 –d^2 electronic configurations using LS coupling, Hunds rule for finding the ground state term, limitations of C.F.T.

Unit – IV

Molecular Orbital Theory- Evidence for covalent character in bonding, MOEL diagram for octahedral and tetrahedral complexes involving σ as well as π bonding, charge transfer transitions.

Books Recommended:

1. G.L. Eichorn (1975), Inorganic Biochemistry, Vol. I, Elsevier.
2. R.Hilgenfeld & W.Saengar (2013), Topics in Current Chemistry, Vol.101.page 38-65, Springer.
3. J.E. Huheey (2006), Inorganic Chemistry, 4th ed, Pearson.
4. F.A. Cotton & G. Wilkinson (1999), Advanced Inorganic Chemistry, 6th edition, Interscience Publishers.
5. B.E. Douglas & D.H. McDaniel (2017), Concepts & Models of Inorganic Chemistry, 3rd edition , John Wiley & Sons.
6. A. Earnshaw(2013), Introduction of Magnetochemistry, ,1st edition, Academic press London & New York.
7. R.S.Drago (2012), Physical Methods Inorganic Chemistry, 2nd edition , Chapman and Hall.
8. Cowan, J.A., (1997), Inorganic Biochemistry – An Introduction, 2nd edition, Wiley-VCH.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1085(P)
Inorganic Chemistry –A
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

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

Experiments:

Volumetric Analysis:

Iodimetry, Iodometry, Redox titrations using $K_2Cr_2O_7$ and $KMnO_4$.

Complexometric titration using EDTA Ca^{++},Mg^{++}: in context with study of hardness of water.

References:

G. Svehla, B. Sivasankar(2012), Vogel's Qualitative Inorganic Analysis

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1086
Organic Chemistry -A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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.

Unit-I

Conformations of alkanes and cycloalkanes; conformational analysis of ethane, Butane, cyclohexane, monosubstituted and disubstituted cyclohexane, conformation of small, medium and large ring cycloalkanes and of polycyclic ring systems. Factors that affect reaction rates of these reactions, structure and relative stabilities of free radicals, halogenation, mechanism of chlorination of methane, selectivity in chlorination and bromination of higher alkanes.

Alcohols as Bornsted bases and acids, reactions of alcohols with hydrogen halides with detailed mechanism structure and bonding in carbocations and their relative stabilities, potential energy diagrams for chemical reactions.

Unit-II

Stereochemistry of alkenes, naming stero isomeric alkenes by E-Z system, mechanism of hydrogenation of alkenes, stereochemistry of hydrogenation of cycloalkenes, Dehydration of alcohols and regioselectivity of these reactions, Acid catalysed dehydrohalogenation of alcohols with complete mechanistic discussion, Mechanism of dehydrohalogenation of alkylhalides (E_1 mechanism), stereoselective and antielimination in E_2 reactions, the E_1 Mechanism, electrophilic addition of hydrogen halides to alkenes its regioselectivity explained on the basis of mechanism , free radical addition of hydrogen bromide to alkenes,

acid catalysed hydration of alkene with mechanism stereochemistry of halogen addition to alkenes and its mechanistic explanation. Hypohalous acid addition to alkenes, epoxidation of alkenes.

Unit-III

Stereochemistry: Molecular chirality, enantiomers/symmetry in achiaral structures, chiral centres in chiral molecules, properties of chiral molecules-optical activity, absolute and relative configuration, the Cahn-Ingold Prelog R-S notional system physical properties of enantiomers. Stereochemistry of chemical reactions that produce chiral centres, chemical reactions that produce stereoisomers, Resolution of enantionmers, chiral centres other than carbon, prochirality.

Unit-IV

Functional group transformation by nucleophilic substitution, the biomolecular (SN^2), mechanism of nucleophilic substitution , stereochemistry of SN^2 reactions, how SN^2 reactions occur, steric effect in SN^2 reactions, nucleophiles and nucleophilicity, the unimolecular (SN^1) mechanism of nucleophilies substitution, carbocation stability and the rate of substitution, by the SN^1 mechanism sterochemistry of SN^1 reactions, carbocation real arrangements in SN^1 reactions, solvent effects, subtitution and elimination as competing reactions. SN^1 -SN^2 continum.

Books Recommended:

1. R.T. Morison and R.N. Boyd, K. Bhattacharjee (2010), Organic Chemistry,7th edition, Pearson.
2. I. L. Finar (2002), Organic Chemistry, Vol.I, 6th Ed, Pearson.
3. J. March, Advanced Organic Chemistry (2015), Reactions Mechanisms and Structure, 7th edition,. Wiley-Blackwell
4. Schaum's Outlines Series (2009), Theory and Problems of Organic Chemistry, 4th edition, Tata McGraw - Hill.
5. I.L. Finar (2002), Problems and their Solution in Organic Chemistry, 1st edition, Prentice Hall Press.
6. J. D. Robert and M. C. Caserio (1977), Basic principles of Organic Chemistry, 2nd edition, Benjamin-Cummings.

7. D. J. Cram and G. S. Hammond, G.S. Hendrickson (1970), Organic Chemistry, 3rd edition,. McGraw-Hill
8. E.L. Eliel (2001), Stereochemistry of Carbon Compounds, 1th edition, Tata McGraw-Hill
9. W. Camp, (1975), Organic Spectroscopy, 1st edition, Macmillan.
10. Robert M. Giuliano and F. A. Carey (2016), Organic Chemistry, 10th edition, McGraw-Hill.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1086(P)
Organic Chemistry -A
(Practical)

Time: 3 Hrs **Practical Marks: 18**

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

Experiments:

Complete identification including derivation of following organic compounds:

- Amides
- Amines
- Carboxylic acids and phenols.

Books Recommended:

Arthur Vogel (1978). Vogel's Textbook of practical organic chemistry, including qualitative organic analysis, 4th ed., Longman Scientific and Technical.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1137
Computer Fundamentals and Bioinformatics
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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

UNIT-I

Computers: General introduction to computers, organization of computers, Computer hardware and software. Data Storage Devices: Primary and secondary Storage devices.

UNIT-II

Input/Output Devices: Key-tape/diskette devices, light pen mouse and joystick. Printed Output: Serial, line, page, printers; plotters, visual output; voice response units.

UNIT-III

Introduction to bioinformatics: **Primary and Secondary databases.** History, Objectives, Applications of Bioinformatics, NCBI, EBI, DDBJ, Expasy, PDB, NDB, swissprot, BLAST (Basic Local Alignment Search Tool)

UNIT-IV

Sequence alignment: Local and Global alignment, Dynamic programming (Needleman wunsch algorithm, Smith waterman algorithm), Multiple sequence alignment (clustal omega), significance of sequence alignment.

Books Recommended:

1. Norton's P. (2001). Introduction to Computing Fundamental. McGraw Hill Education, New Delhi.
2. Sinha P.K. (2001). Fundamental of Computers. BPB Publication, New Delhi.
3. Xiong, J. (2006). Essential Bioinformatics. Cambridge University Press.

4. Baxevanis B.F. and Quellette F. (2004). Bioinformatics a Practical Guide to the Analysis of Genes and Proteins. Wiley-Interscience.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1137(P)
Computers & Bioinformatics Fundamentals
(Practical)

Time: 3Hrs. **Practical Marks: 18**

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

Experiments

1. Ms-Office: word, Excel, Power-point
2. Introduction about Various Databases at NCBI, EMBL, DDBJ.
3. GenBank Format, FASTA format etc
4. Basic Local Alignment Search tools (BLAST)
5. Multiple alignment uing clustal omega.
6. Understanding graphical output and result of Blastn & Blastp

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1348
General Microbiology–A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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

Unit - I

Principles of Microbiology- Principles and application of bright field, dark field phase contrast, fluorescence & immunofluorescence, electron microscopy, bacterial nutrition-Introduction, Nutritional forms of bacteria, Transport mechanisms, Microbial culture media, Sterilization-Basic concept, physical and chemical methods of sterilization.

Unit - II

General Features-Bacteria, fungi, Neurospora, yeast and viruses. Microbes in extreme environments- the thermophiles and alkalophiles, culture collection, Methods of purification and preservation.

Unit-III

Nature of the Microbial Cell Surface. Gram positive and gram negative bacteria with type of flagella. Introduction of antibiotics and their effect on microbes, Serotypes, Structure and anatomy of bacterial cell walls, Different types of bacterial staining.

Unit - IV

Bacterial Classification: Bacterial classification and taxonomy based on Bergey's Manual of Determinative bacteriology.

Books Recommended:

1. Tortora, G.J., Funke, B.R. and Case, C.L. (2015). Microbiology: An introduction, 12th Edition, Pearson College Div.
2. Madigan, M. T., Martinko, J. M., Bender, K.S., Buckly, D. H., Stahl, D. A. And Brock, T. (2017). Brock's Biology of microorganisms, 14th Edition, Pearson Education.
3. Willey, J., Sherwood, L. And Wooverton, C. J. (2017). Prescott's Microbiology, 10th Edition, McGraw-Hill Education/ Asia
4. Harvey, R.A. and Cornelissen, C. N. (2012). Lippincott's Illustrated Reviews: Microbiology, 3rd Edition, Lippincott Williams and Wilkins.
5. Pelczar, M.J., Chan, E.C.S. and Krieg, N.R. (2009). Microbiology: An application based approach, Tata McGraw Hill
6. Talaro, K.P. and Chess, B. (2008). Foundations in Microbiology, 8th Edition, Tata McGraw-Hill Higher Education.
7. Black, J.G. and Black, L.J. (2008). Microbiology: Principles and Explorations, 7th Edition, John Wiley & sons.
8. Purohit, S.S. (2006). Microbiology: Fundamentals and Applications, 7th Edition, Agrobios (India).

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1348(P)
General Microbiology–A
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

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

Experiments:

1. To study functions and operations of various instruments required in microbiology laboratory (pH meter, autoclave, Laminar air flow, incubator, oven, distillation unit).
2. Aseptic techniques.
3. Cleaning of glassware.
4. Preparation of media, cotton plugging and sterilization
5. Isolation of micro-organism from air, water and soil samples. Dilution and pour plating, Colony purification.
6. Preservation of microorganisms.
7. Identification of bacteria by simple staining, negative staining and Gram staining.
8. To perform Wet mount preparation method.
9. To study the motility of microorganisms by Hanging drop method.

Books Recommended:

1. Cappuccino, J.G. and Sherman, N. (2014). Microbiology: A Laboratory Manual 10th Edition, Pearson Education India.
2. Dubey R.C. and Maheshwari (2012). Practical Microbiology 5th edition: S. Chand and company ltd. New Delhi.
3. Leooffee, M.J. and Pierce, B.E. (2015). Microbiology: Laboratory Theory and Application, 3rd Edition, Morton Pub. Co.
4. Sastry, A.S. and Bhat, S. (2018). Essentials of Practical microbiology. Jaypee Brothers Medical Publishers.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1089
Biochemistry-A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical:18

CA:12

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

Unit - I

Introduction of Biochemistry, Water and its Properties: Role of water in life, Structure of water molecules, Physico-chemical properties of water, Dissociation and association constants, pH and buffers. pI, pka, Hasselbach Hendersson equation and its implications.

Unit - II

Carbohydrates: Introduction, Monosaccharides: Families of monosaccharides: aldoses and ketoses, trioses, tetroses, pentoses, and hexoses, epimers, and anomers of glucose. Furanose and pyranose forms of glucose and fructose, Mutarotation, Structure and functions of Sugar derivatives, Disaccharides; concept of reducing and non-reducing sugars, Haworth projections of maltose, lactose, and sucrose, Structural and functional properties of Polysaccharides: storage polysaccharides - starch and glycogen; Structural Polysaccharides - cellulose, peptidoglycan and chitin

Unit - III

Structure and role of proteoglycans, glycoproteins and glycolipids (gangliosides and lipopolysaccharides). Carbohydrates as informational molecules

Unit - IV

Structure of nucleosides and nucleotides. Nucleic acid structure –Watson-Crick model of DNA, Structural features of different types of DNA, Structure of major species of RNA - mRNA, tRNA and rRNA. Nucleic acid chemistry - UV absorption, effect of temperature, acid and alkali on DNA. Structure and functions of biologically important nucleotides as - source of energy, component of coenzymes, second messengers.

Books Recommended:

1. Voet, D.,Voet, J.G. and Prait, C.W. (2013). Principles of Biochemistry, 4th Edition, Wiley.

2. Stryer, L. (2015). Biochemistry, 8th Edition, W.H. Freeman and Company, New York

3. Berg, J.M., Tymoczko, J. L. And Stryer, L. (2011). Biochemistry, 7th Edition, Freeman.

4. Nelson, D.L. And Cox, M.M. (2013). Principles of Biochemistry, 7th Edition, Freeman

5. Mathew, C.K., Van, K.E. and Anthern, K.G. (2012). Biochemistry 4th Edition, Addison Wesley.

6. Lehninger, A.L., Nelson, D.L. and Lox, M.M. (2017). Principles of Biochemistry, 7th Edition, CBS Publishers and Distributors, New Delhi.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: BBTM-1089(P)
Biochemistry-A
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

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

Experiments:

1. Preparation of physiological buffers.
2. Verification of Beer Lamberts Law for p-nitrophenol or cobalt chloride.
3. Determination of pKa value of p-nitrophenol
4. Estimation of carbohydrate in given solution by anthrone method.
5. Estimation of sugar in biological samples by Dubois method.
6. Estimation of DNA/RNA

Books Recommended:

1. Plummer D.T. (2017) An Introduction to Practical Biochemistry. 3rd Edition Tata McGraw Hill Education.
2. Sawhney, S.K. and Singh, R. (2001). Introductory Practical Biochemistry. Narosa Publishing House.
3. Wilson, K. And Walker, J. (2010).Principles and Techniques of Biochemistry, 3rd Edition, McGraw Hill Education.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Drug Abuse: Problem, Management and Prevention (Compulsory)
Course Code: AECD-1161
Problem of Drug Abuse
(Theory)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 40

CA:10

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.

1) Meaning of Drug Abuse: Concept and Overview, Historical Perspective of Drug Abuse, Drug Dependence, Drug Addiction, Physical and Psychological Dependence: Drug Tolerance and withdrawal symptoms.

2) Types of Abused Drugs and their Effects.

1) Stimulants: Amphetamines – Benzedrine, Dexedrine, Cocaine.

2) Depressants: Alcohol Barbiturates: Nembutal, Seconal, Phenobarbital and Rohypnol.

3) Narcotics: Heroin, Morphine, Oxycodone.

4) Hallucinogens: Cannabis, Marijuana, Hashish, Hash Oil, MDMA, LSD.

5) Steroids.

3) Nature and Extent of the Problem: Magnitude or prevalence of the menace of Drug Abuse in India and Punjab, Vulnerable groups by age, gender and economic status, Signs and Symptoms of Drug Abuse: Physical, Academic, Behavioural and Psychological Indicators.

References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.

2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, (2004).

3. Inciardi, J.A. (1981) The Drug Crime Connection. Beverly Hills: Sage Publications.

4. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.

5. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.

6. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.

7. Sain, Bhim (1991), Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.

8. Sandhu, R S (2009) Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.

9. Singh, C P (2000) Alcohol and Dependence among Industrial Workers: Delhi: Shipra.

10. Sussman, S and Ames, S.L. (2008) Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2019-20
Course Code: SECF-1492
Foundation programme
(Theory)

Time: 3 Hrs. **Max. Marks: 25**

PURPOSE & AIM

This course has been designed to strengthen the intellectual foundation of all the new entrants in the college. One of the most common factor found in the students seeking admission in college after high school is the lack of an overall view of human history, knowledge of global issues, peaks of human intellect, social/political benchmarks and inventors & discoverers who have impacted human life. The Foundation Programme intends to bridge the gap between high school and college education and develop an intellectual readiness and base for acquiring higher education.

INSTRUCTIONAL OBJECTIVES

- to enable the students to realise their position in the whole saga of time and space
- to inculcate in them an appreciation of life, cultures and people across the globe
- to promote, in the students, an awareness of human intellectual history
- to make them responsible and humane world citizens so that they can carry forward the rich legacy of humanity

CURRICULUM

Course Code: V1 Course Credits: 1 Total Contact Hours: 20

MODULE	TITLE	HOURS
1	Introduction & Initial Assessment	1
2	The Human Story: A Panoramic View from Primitive to the Present Times	2.5
3	*The Vedas*, *The Gita* & Eastern Philosophy	1.5
4	*The Holy Bible* & Genesis	1.5
5	Woman: A Journey through the Ages	1.5
6	Changing Paradigms in Society, Religion & Literature	1.5
7	Indian Freedom Struggle & Makers of Modern India	1.5
8	Racism & Martin Luther King Jr.	1.5
9	Modern India at a Glance: Geographical, Political, Economic & Cultural Perspective	1.5
10	Modern World at a Glance: Political & Economic Perspective	1.5
11	Technology & Human Life	1.5
12	The KMV Experience	1.5
13	Final Assessment, Feedback & Closure	1.5

EXAMINATION

- Final multiple choice quiz**. Marks: 20; Time: 1 hour**
- Comparative assessment questions (medium length) in the beginning and close of the programme. **Marks: 5; Time: 0.5 hour** each at the beginning and end.
- Total marks: 25 converted to grade for final result

SYLLABUS

Module1: Being a Human: Introduction & Initial Assessment

- Introduction to the programme
- Initial Assessment of the students through written answers to a couple of questions

Module 2: The Human Story

- Comprehensive overview of human intellectual growth right from the birth of human history
- The wisdom of the Ancients
- Dark Middle Ages
- Revolutionary Renaissance
- Progressive Modern Times
- Most momentous turning points, inventions and discoveries

Module 3: *The Vedas, The Gita* & The Indian Philosophy

- Origin, teachings and significance of *The Vedas*
- Upnishads and Puranas
- Karma Theory of *The Bhagwad Gita*
- Main tenets of Buddhism & Jainism
- Teachings of Guru Granth Sahib

Module 4: *The Holy Bible* & Genesis

- Book of Genesis: Creation and Fall
- Noah's Ark
- Moses & The Ten Commandments
- Christ and His teachings
- Christianity and the world

Module 5: Changing Paradigms in Society, Religion & Literature

- Renaissance: The Age of Rebirth
- Transformation in human thought
- Importance of humanism
- Geocentricism to heliocentricism
- Copernicus, Galileo, Columbus, Darwin and Saint Joan
- Empathy and Compassion

Module 6: Woman: A Journey through the Ages

- Status of women in pre-vedic times
- Women in ancient Greek and Roman civilizations
- Women in vedic and ancient India
- Status of women in the Muslim world
- Women in the modern world
- Crimes against women
- Women labour workforce participation
- Women in politics
- Status of women- our dream

Module 7: Makers of Modern India

- Early engagement of foreigners with India
- Education: The first step to modernization
- Railways: The lifeline of India
- Raja Ram Mohan Roy, Gandhi, Nehru, Vivekanand, Sardar Patel etc.
- Indira Gandhi, Mother Teresa, Homai Vyarawala etc.
- The Way Ahead

Module 8: Racism: Story of the West

- European beginnings of racism
- Racism in the USA - Jim Crow Laws
- Martin Luther King Jr. and the battle against racism
- Apartheid and Nelson Mandela
- Changing face of racism in the modern world

Module 9: Modern India at a Glance: Geographical, Political, Economic & Cultural Perspective

- Geographical and physical features of India
- States, Union Territories and their governance
- India and its neighbours
- India in the global economy
- Cultural diversity of India

Module 10: Modern World at A Glance: Political & Economic Perspective

- Changing world order
- World War I & II
- UNO and The Commonwealth
- Nuclear Powers; Terrorism
- Economic Scenario: IMF, World Bank
- International Regional Economic Integration

Module 11: Technology and Human Life

- Impact of technology on modern life
- Technological gadgets and their role in our lives
- Technology and environment
- Consumerism and materialism
- Psychological and emotional consequences of technology
- Harmonising technology with ethics and humaneness

Module 12: The KMV Experience

- Historical Legacy of KMV
- Pioneering role in women emancipation and empowerment
- KMV Contribution in the Indian Freedom Struggle
- Moral, cultural and intellectual heritage of KMV
- Landmark achievements
- Innovative initiatives; international endeavours
- Vision, mission and focus
- Conduct guidelines for students

Module 13: Final Assessment, Feedback & Closure

- Final multiple choice quiz
- Assessment through the same questions asked in the beginning
- Feedback about the programme from the students
- Closure of the programme

Prescribed Reading

- *The Human Story* published by Dawn Publications

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTL-2421
Punjabi (Compulsory)
(Theory)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 40

CA: 10

ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਆਤਮ ਅਨਾਤਮ (ਕਹਾਣੀ ਭਾਗ),(ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਵਿਸ਼ਾ-ਵਸਤੂ, ਪਾਤਰ ਚਿਤਰਨ) 08 ਅੰਕ

ਯੂਨਿਟ-II

ਇਤਿਹਾਸਕ ਯਾਦਾਂ (ਇਤਿਹਾਸਕ ਲੇਖ ਸੰਗ੍ਰਹਿ) ਸੰਪਾ. ਸ.ਸ.ਅਮੋਲ,ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ। (ਲੇਖ 7 ਤੋਂ 12)(ਸਾਰ, ਲਿਖਣ ਸ਼ੈਲੀ) 08 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ : ਪਰਿਭਾਸ਼ਾ, ਮੁੱਢਲੇ ਸੰਕਲਪ

(ਅ) ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ 08 ਅੰਕ

ਯੂਨਿਟ-IV

(ੳ) ਸੰਖੇਪ ਰਚਨਾ

(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ 08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵਧ ਤੋਂ ਵਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTL-2031
Basic Punjabi
(In lieu of Compulsory Punjabi)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 40

CA: 10

ਪਾਠ ਕ੍ਰਮ

ਸੈਕਸ਼ਨ ਏ

ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ (ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ, ਯੋਜਕ ਅਤੇ ਵਿਸਮਿਕ)

08 ਅੰਕ

ਸੈਕਸ਼ਨ ਬੀ

ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ : ਮੁਢਲੀ ਜਾਣ ਪਛਾਣ

(ੳ) ਸਾਧਾਰਨ ਵਾਕ, ਸੰਯੁਕਤ ਵਾਕ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

(ਅ) ਬਿਆਨੀਆ ਵਾਕ, ਪ੍ਰਸ਼ਨਵਾਚਕ ਵਾਕ ਅਤੇ ਹੁਕਮੀ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

08 ਅੰਕ

ਸੈਕਸ਼ਨ ਸੀ

ਪੈਰ੍ਹਾ ਰਚਨਾ

ਸੰਖੇਪ ਰਚਨਾ 08 ਅੰਕ

ਸੈਕਸ਼ਨ ਡੀ

ਚਿਠੀ ਪਤਰ (ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ)

ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ 08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

4. ਪੇਪਰ ਸੈਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵਧ ਤੋਂ ਵਧ ਚਾਰ ਉਪ੍ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTL -2431
Punjab History and Culture (C 321 to 1000 A.D.)
(Special paper in lieu of Punjabi Compulsory)

(Theory)

Time: 3 Hours **Max. Marks: 50**

Theory: 40

CA: 10

Instructions for the Paper Setters

Question paper shall consist of four Units. 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 sections. Each question will carry 8 marks.

Unit-I

1. Punjab under Chandragupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

Unit -II

3. The Panjab under the Gurpta Emperor.
4. The Punjab under the Vardhana Emperors

Unit-III

5. Political Developments 17th Century to 1000 A.D. (Survey of Political)
6. Socio-cultural History of Punjab from 7th to 1000 A.D.

Unit -IV

7. Development of languages and Literature.
8. Development of art & Architecture

Suggested Readings

1. Joshi L (ed) (1989) History and Culture of the Punjab, Art-I, 3rd edition Patiala.
2. Joshi L.M and Singh F (ed) (1977) History of Punjab, Vol.I, Patiala.
3. Parkash B (1983) Glimpses of Ancient Punjab, Patiala.

4. Sharma B.N (1966) *Life in Northern India*, Delhi.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2102
Communication Skills in English

Time: 3 hours (Theory) **Max. Marks: 50**

3 hours (Practical) **Theory: 25**

Practical: 15

CA: 10

Instructions for the paper setters and distribution of marks:

The question paper will consist of four sections and distribution of marks will be as under:

Section-A: Two questions with internal choice will be set from Unit I of the syllabus and these questions will be theoretical in nature corresponding to the syllabus of Section-I. Each will carry 5 marks.

Section-B: Two questions with internal choice will be set from Unit II of the syllabus. One will be theoretical and the second will be practical in nature. Each will carry 5 marks.

Section-C: Two questions with internal choice will be set from Unit III of the syllabus and these will be theoretical in nature. Each will carry 5 marks.

Section-D: Two questions with internal choice will be set from Unit IV of the syllabus. One question will be theoretical in nature and the other will be practical in nature (based on phonetic transcription and stress). Each will carry 5 marks.

Important Note:

The candidate will have to attempt five questions in all selecting one from each section of the question paper and the fifth question may be attempted from any of the four sections. (5 x 5 = 25)

Course Contents:

Unit I

Listening Skills: Barriers to listening; effective listening skills; feedback skills.

Activities: Listening exercises – Listening to conversation, News and TV reports

Unit II

Attending telephone calls; note taking and note making.

Activities: Taking notes on a speech/lecture

Unit III

Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.

Activities: 1) Making conversation and taking turns

2) Oral description or explanation of a common object, situation or concept

Unit IV

The study of sounds of English, stress

Situation based Conversation in English

Essentials of Spoken English

Activities: Giving Interviews

Recommended Books:

1. Seely, J (2005) Oxford Guide to Effective Writing and Speaking, 2nd edition, OUP Oxford.

2.Sethi, A and Adhikari, B (2009) Business Communication, 1st edition, McGraw Hill Education.

3. Raman, M. & S. Sharma (2011) Communication Skills, OUP, New Delhi, India.

4. Sethi J and Dhamija P.V (1999) A Course in Phonetics and Spoken English, Phi Learning Pvt. Ltd.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2102 (P)
Communication Skills in English
PRACTICAL / ORAL TESTING

Time: 3 hours **Marks: 15**

Course Contents:

1. Oral Presentation with/without audio visual aids.

2. Group Discussion.

3. Listening to any recorded or live material and asking oral questions for listening comprehension.

Questions:

1. Oral Presentation will be of 5 to 7 minutes duration. (Topic can be given in advance or it can be of student's own choice). Use of audio visual aids is desirable.

2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

Note: Oral test will be conducted by external examiner with the help of internal examiner.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Name: Biostatistics
Course Code: BBTL-2333

Max. Marks: 40

Time: 3 Hours **Theory: 32**

CA:8

Instructions for the Paper Setter:

There will be five sections, namely A, B, C, D, E.

Section –A: The examiner shall set 10 short answer type questions covering entire syllabus and the candidates will have to attempt 8 questions of 1 mark each. Answer to each question shallbe approximately of 50 words. The total weight age of this section shall be 8 marks. Section-B, C, D, and E: Eight questions of equal marks are to be set, two in each of the four sections (B-E). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt four questions, selecting at least one question from each section. Each question shall carry 6 marks. The total weightage of these sections shall be 24 marks.

Unit-I

Elementary Statistics: Collection of data. Frequency distribution and its graphical representation. The mean, median, mode, standard deviation, variance, covariance of data.

Unit-II

Probability: Basic concepts, sample space and events, use of counting method in probability, addition law, sample problems involving the estimation of probabilities, Conditional Probability and Independent Events, Bayes theorem with application (without proof)**.**

Unit-III

Introduction to Correlation & Regression: Scatter diagram, Linear correlation, linear regression lines.

Unit-IV

Hypothesis Testing: Concept of Null and Alternate Hypothesis, Normal test for single mean (Z-test), Chi-square test (Goodness of fit and association of attributes).

Recommended Books:

1. Elhance D.N. (1984). Fundamentals of Statistics. Kitab Mahal, Allahabad.

2. Mendenhall W. and Sincich T. (1995). Statistics for engineering and sciences (IVth edition). PrenticeHall. And sciences (IVth edition). Prentice Hall.

3. Gupta S.P. (2000). B.A./B.Sc Part-I (12+3 System of Education) 225, Statistical methods. SultanChand and Company, New Delhi.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2074
Botany-B
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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.

Unit-I

Systems of classification: Artificial, Natural and Phylogenetic; Salient features of Bentham & Hooker's, Hutchinson and Engler & Prantl's system of classification, (Details of Bentham & Hooker's system only). Angiosperms, Gymnosperms, Bryophytes and Lichens- their general characteristics.

Unit-II

General characteristics (excluding economic importance) of following families of angiosperms; giving examples of few important genera:

Ranunculaceae Ranunculus, Delphinium

Cruciferae Brassica

Apiaceae (Umbelliferae) Coriander

Asteraceae (Compositae) Helianthus, Sonchus, Ageratum

Lamiaceae (Labiatae) Ocimum/Salvia

Unit-III

General characteristics (excluding economic importance) of following families of angiosperms; giving examples of few important genera:

Leguminosae Lathyrus, Cassia and Acacia

Orchidaceae Zeuxine

Poaceae (graminae) Triticum

Criteria for primitive and advanced nature of families and flower. Evolutionary status of Ranunculaceae, Compositae, Orchidaceae.

Unit-IV

Introduction to seed biology, differences between seed and grain. Classification of seed-breeder, foundation, certified and truthfully labeled seeds (TFLs). Brief introduction to methods of seed production, seed testing (seed germination and seed viability test) and seed certification.

Books Recommended:

2. Radford, A.E (1986). Fundamental of Plant Systematics, Harper and Row, New York

3. Peau, K. (1977). Anatomy of Seed Plants, 3rd edition. John Wiley & Sons, New York.

4. Dickinson, W.C. (2000) Integrative Plant Anatomy. Harcourt Academic Press, USA.

6. Fahn, A.(1974) Plant Anatomy. Pergmon Press, USA and UK.

7. Hopkins, W.G. and Huner, P.A. (2008) Introduction to Plant Physiology. John Wiley and Sons.

8. Taiz, L. and Zeiger, E.(2006) Plant Physiology, 4th edition, Sinauer Associates Inc .MA, USA

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2074(P)
Botany–B
(Practical)

Time: 3 Hrs **Max. Marks: 18**

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

Experiments:

a) Description of flowers including floral diagram, floral formula, V.S. of flower of the representative genera of families mentioned in syllabus.
b) Identification and short morphological economic note on the specimens included in Units III, IV & V of the theory paper B.
c) Each student is required to submit a family wise herbarium consisting of at least 20 properly pressed and mounted plants.

Books Recommended:

1. Bendre, A. (2007). Practical Botany, Rastogi Publications, Meerut.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course code: BBTM-2085
Inorganic Chemistry-B
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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.

Unit-I

л- Acid ligands

Carbon monooxide complexes, Two methods of preparation, structural and bonding in (linear MCO groups, polynuclear metal carbonyls carbonyl hydrides and halides). Complexes of N_2, with Ru and NO with Fe.

Unit-II

Alkali metal and alkaline earth metal chelators

Definition and few examples of macrocyclic ligands, macrocyclic effect, crown ethers & podands, coronauds, cryptands, structure of 18 crown -6 complex with KNCS, ion cavity complex, effect of anion on phase transfer catalysis, sandwich formation, cryptands and their cation complexes.

Unit-III

Stability of co-ordination compounds

Introduction Factors affecting the stability of metal ion complexes with general ligands and some biochemical ligands like amino acids, peptides, nucleotides and Nucleic acids and porphyrin

Unit-IV

Metal ions in biological system

Fe: Haemoglobin, structure and functions, oxygen transport, Bohr Effect.

Mg: Chlorophyll structure and function in photosysthesis.

Zn: Carboxypeptidase enzyme functions.

Books Recommended:

1. G.L. Eichorn (1975), Inorganic Biochemistry, Vol. I, Elsevier
2. R.Hilgenfeld & W.Saengar (2013), Topics in Current Chemistry, Vol.101.page 38-65, Springer.
3. J.E. Huheey (2006), Inorganic Chemistry, 4th ed, Pearson.
4. F.A. Cotton & G. Wilkinson (1999), Advanced Inorganic Chemistry, 6th edition, Interscience Publishers.
5. B.E. Douglas & D.H. McDaniel (2017), Concepts & Models of Inorganic Chemistry, 3rd edition , John Wiley & Sons.
6. A. Earnshaw (2013), Introduction of Magnetochemistry, ,1st edition, Academic press London & New York.
7. R.S.Drago (2012), Physical Methods Inorganic Chemistry, 2nd edition , Chapman and Hall.
8. Cowan, J.A., (1997), Inorganic Biochemistry – An Introduction, 2nd edition, Wiley-VCH.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course code: BBTM-2085(P)
Inorganic Chemistry-B
(Practical)

Time: 3 Hrs. **Max. Marks: 18**

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

Experiments

- Inorganic qualitative analysis:

Four ions (Two cations two anions).

A. Preliminary tests: Physical examination, Dryheating test, charcoal cavity test,

$Co(NO_3)_2$ test, flame test, borax bead test.

B. Acid radical analysis:

Dil H_2SO_4 gp: CO^{2-}_3, NO_2^-, S^{2-}, SO_3^{2-}

Conc, H_2SO_4 gp: Cl^-, Br^-, I^-, NO_3^-, CH_3Coo^-

Individual gp: SO_4^{2-}, PO_4^{3-}, BO_3^{3-}

C. Basic radical analysis:

NH_4^+ Pb^{2+}, Cu^{2+}, Cd^{2+}, Fe^{2+} or Fe^{3+}, Al^{3+} , Co^{2+} , Ni^{2+}, Mn^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+} Mg^{2+}, Na^+, K^+ and their confirmation.

Books Recommended:

G. Svehla, B. Sivasankar (2012), Vogel's Qualitative Inorganic Analysis 7th Edition , Pearson.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2086
Organic Chemistry–B
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA:12

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.

Unit-I

Acidity of acetylene and terminal alkenes, metal ammonia reduction of alkyne, addition of hydrogen halides and water to alkyne, with detailed discussion of mechanism of these reaction, the Diels Alder reaction, orbital symmetry and the Diels alder reaction.

Unit-II

Conversion of alcohol to ether and ester with full dicussion of the reaction, crown ethers, conversion of vicinal halohydrin to epoxides, nucleophillic ring opening reaction of epoxides, acid catalysed ring opening of epoxides.

Unit-III

Principles of nucleophillic additon to carbonyl groups: Hydration ,acetal formation , cyanohydrin formation ; reaction with primary and secondary amines, Wittig reaction, steroselective addition to carbonyl groups mechanism of halogenation, acid and base catalysed cholization, haloform reaction ,aldol condensaton, conjugate nucleophillic additon to unsaturated carbonyl compounds.

Unit –IV

Mechanism of acid- catalysed esterification, intramolecular ester formation lactone), Hell-Volerid-Zelinsky reaction, decarboxylation of malonic acid and related compounds.

Mechanism of hydrolysis of acid chlorides, acid anhydrides, acid and base catalysed hydrolysis of esters, acid assisted hydrolysis of amides. Hoffman rearrangement of N-bromoamides. Hydrolysis of nitriles, claisen condensation, the Deckmann condensation, acetic ester synthesis, malonic ester synthesis, Michael reaction Reformatsky reaction.

Books Recommended:

1. R.T. Morison and R.N. Boyd, K. Bhattacharjee (2010), Organic Chemistry,7th edition, Pearson.
2. I. L. Finar (2002), Organic Chemistry, Vol.I, 6th Ed, Pearson.
3. J. March, Advanced Organic Chemistry (2015), Reactions Mechanisms and Structure, 7th edition,. Wiley-Blackwell
4. Schaum's Outlines Series (2009), Theory and Problems of Organic Chemistry, 4th edition, Tata McGraw - Hill .
5. I.L. Finar (2002), Problems and their Solution in Organic Chemistry, 1st edition, Prentice Hall Press.
6. J. D. Robert and M. C. Caserio, (1977), Basic principles of Organic Chemistry,2nd edition, Benjamin-Cummings .
7. D. J. Cram and G. S. Hammond, G.S. Hendrickson (1970), Organic Chemistry ,3rd edition,. McGraw-Hill
8. E.L. Eliel (2001), Stereochemistry of Carbon Compounds, 1th edition,. Tata McGraw-Hill
9. W. Camp, (1975), Organic Spectroscopy, 1st edition, Macmillan .
10. Robert M. Giuliano and F. A. Carey (2016), Organic Chemistry, 10th edition, McGraw-Hill.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2086(P)
Organic Chemistry–B
(Practical)

Time: 3 Hrs **Practical Marks: 18**

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

Complete identification including derivation of following organic compounds:

- Aromatic hydrocarbons
- Aldehydes
- Ketones
- Carbohydrates

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2487
Zoology–B
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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.

Unit-I

Urinogenital System: Structure of kidney and nephron, strcuture of gonads and urinogenital ducts, Menstural cycle, Urine formation, osmoregulation.

Unit-II

Endocrine System: Structure and physiology of thyroid, parathyroid, adrenal, hypothalamus, pituitary, pancreas and gonads of mammals.

Unit-III

Nervous System: Anatomy of brain and cranial nerves of man, Nature, origin and propagation of impulse along the axon, synapse and myoneural junctions. Sense Organs

Unit-IV

Skeletal System: Red & White muscle fibre, striped, unstriped and cardiac muscle fibre in man. Ultrastructure, physiological and biochemical basis of skeletal muscle contraction.

Books Recommended:

1. Sobti, R.C. & Nigam, S.K. (2002). Structural & functional biology of chordates, Vishal Publishers, Jalandhar.

2. Guyton, A.C. & Hall, J.E. (2006). Textbook of Medical Physiology. XI Edition. Hercourt Asia PTE Ltd. /W.B. Saunders Company.

2. Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XI Edition. John wiley & sons, Inc.

3. Sobti, R.C. & Nigam, S.K. (2002). Structural & function biology of chordates, Vishal Publishers, Jalandhar.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2487(P)
Zoology–B
(Practical)

Time: 3 Hrs. **Max. Marks: 18**

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

Experiments:

1. Study the following system of white rat with the help of charts / models /

   videos :

   Digestive, arterial, venous and urinogenital systems.

2. Make a temporary preparation of the following:

   Blood smear of mammals.

3. Study of the skeleton system of human.

4. Analysis of urine for urea, chloride, glucose and uric acid

5. Estimation of urea, uric acid, creatinine and bilirubin from serum.

6. Estimation of protein and bile pigment in urine.

Books:

1. Sobti, R.C. & Sharma, V.L. (2005). Basics of Bio-Technology: Introduction of Life Sciences. Vishal Publishers, Jalandhar.

3. Sobti, R.C. (2005). Introduction to Bio-Technology, Part-2, Concepts Tools and Application, Vishal Publishers.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
General Microbiology–B
Course Code: BBTM-2348
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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.

Unit -I

Microbial Growth: Bacterial generation, doubling time and specific growth rate. Monoauxic, diauxic and synchronised growth curve. Sporulation and regeneration of bacteria

Unit -II

Viruses-Introduction, Plant and animal viruses-structure and composition, Classification based on diffences in their transcription process. Cultivation of plant and animal viruses, Life cycle-Tobacco Mosaic Virus, Herpes simplex and Bacteriophages (Lysogenic and Lytic cycle)

Unit -III

Pathogenic micro-organisms- Factors contributing microbial pathogenicity (Adhesion, Invasiveness and toxigenicity), Natural resistance and Non specific defense mechanism against microorganisms. Introduction, mechanism of action, diagnosis and treatment for viral diseases-Influenza, AIDS and Hepatitis.

Unit -IV

Introduction, mechanism of action, diagnosis and treatment for bacterial diseases-Diphtheria, Tuberculosis, Typhoid. Fungal diseases-Aspergillosis and Candidiasis.

Books Recommended:

1.Tortora, G.J., Funke, B.R. and Case, C.L. (2015). Microbiology: An introduction, 12th Edition, Pearson College Div.

2.Madigan, M. T., Martinko, J. M., Bender, K.S., Buckly, D. H., Stahl, D. A. And Brock, T. (2017). Brock's Biology of microorganisms, 14th Edition, Pearson Education.

3.Willey, J., Sherwood, L. And Wooverton, C. J. (2017). Prescott's Microbiology, 10th Edition, McGraw-Hill Education/ Asia

4.Harvey, R.A. and Cornelissen, C. N. (2012). Lippincott's Illustrated Reviews: Microbiology, 3rd Edition, Lippincott Williams and Wilkins.

5.Pelczar, M.J., Chan, E.C.S. and Krieg, N.R. (2009). Microbiology: An application based approach, Tata McGraw Hill

6.Talaro, K.P. and Chess, B. (2008). Foundations in Microbiology, 8th Edition, Tata McGraw-Hill Higher Education.

7.Black, J.G. and Black, L.J. (2008). Microbiology: Principles and Explorations, 7th Edition, John Wiley & sons.

8.Purohit, S.S. (2006). Microbiology: Fundamentals and Applications, 7th Edition, Agrobios (India).

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2348(P)
General Microbiology–B
(Practicals)

Time: 3 Hrs. **Practical Marks: 18**

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

Experiments:

1. Enumeration of microorganism. Total vs viable counts.
2. Personal Hygiene-Microbes from hands, tooth-scum and other body parts.
3. Growth curve of micro-organisms.
4. Identification of fungus by and lactophenol staining.
5. Identification of formation of germ tube by *Candida albicans.*

Books Recommended:

1.Cappuccino, J.G. and Sherman, N. (2014). Microbiology: A Laboratory Manual 10th Edition, Pearson Education India.

2.Dubey R.C. and Maheshwari (2012). Practical Microbiology 5th edition: S. Chand and company Ltd. New Delhi.

3.Leooffee, M.J. and Pierce, B.E. (2015). Microbiology: Laboratory Theory and Application, 3rd Edition, Morton Pub. Co.

4.Sastry, A.S. and Bhat, S. (2018). Essentials of Practical microbiology. Jaypee Brothers Medical Publishers

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: BBTM-2089
Biochemistry - B
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

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.

Unit -I

Lipids: Classification of lipids and fatty acids. General structure and function of major lipid subclasses, acylglycerols, phosphoglycerides, Sphingolipids, glycosphingolipids and terpenes, sterols, steroids.

Unit -II

Proteins: Structure of amino acids, non-protein and rare amino acids and their chemical reactions. Structural organization of proteins (Primary, Secondary, Quaternary and domain structure, protein classification and function. Forces stabilizing Primary, Secondary and Tertiary

Unit -III

Vitamins: Occurrence, Biomedical importance, Deficiency, of Fat soluble vitamins (A,D,E,K) and water soluble vitamins (Vitamin B complex and Vitamin C), vitamins as cofactor

Unit-IV

Hormones: Secretory glands, **Introduction and Classification of Hormones,** Biomedical importance and disorders related with Steroid hormones (Ovarian, Testicular, Adrenal Cortical and Corpus luteal) and peptide hormones (Hormones of pancreas, hypophysis, parathyroid, GIT), Amino acid Hormones (Thyroidal, Adrenal medullary)

Books Recommended:

1. Voet, D.,Voet, J.G. and Prait, C.W. (2013). Principles of Biochemistry, 4th Edition, Wiley.

2. Stryer, L. (2015). Biochemistry, 8th Edition, W.H. Freeman and Company, New York

3. Berg, J.M., Tymoczko, J. L. And Stryer, L. (2011). Biochemistry, 7th Edition, Freeman.

4. Nelson, D.L. And Cox, M.M. (2013). Principles of Biochemistry, 7th Edition, Freeman

5. Mathew, C.K., Van, K.E. and Anthern, K.G. (2012). Biochemistry 4th Edition, Addison Wesley.

6. Lehninger, A.L., Nelson, D.L. and Lox, M.M. (2017). Principles of Biochemistry, 7th Edition, CBS Publishers and Distributors, New Delhi.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: AECD-2161
Drug Abuse: Problem, Management and Prevention (Compulsory)
(Theory)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 40

CA: 10

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.

1) Consequences of Drug Abuse for:

1) Individual – Education, employment and income issues.

2) Family – Violence

3) Society – Crime.

4) Nation – Law and order problem.

2) Management of Drug abuse:

1) Medical Management: Medication for treatment and to reduce withdrawal effects, Drug De-addiction clinics, Relapse management.

2) Psycho-Social Management: Counselling, family and group therapy, behavioural and cognitive therapy, Environmental Intervention.

3) Prevention of Drug Abuse:

1) Role of family: Parent child relationship, Family support, Supervision,
Shaping values, Active Scrutiny.

2) School
Counselling, Teacher as role-model. Parent-Teacher-Health Professional
Coordination, Random testing on students.

3) Media:
Restraint on advertisements of drugs, advertisements on bad effects of drugs,
Publicity and media, Campaigns against drug abuse,

Educational and awareness program

4) Legisltaion: NDPs act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

Books Recommended:

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.

2. Inciardi, J.A. (1981). *The Drug Crime Connection*. Beverly Hills: Sage Publications.

3. Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.

4. Sain, Bhim (1991), *Drug Addiction Alcoholism*, Smoking obscenity New Delhi: Mittal Publications.

5. Sandhu, Ranvinder Singh, (2009), *Drug Addiction in Punjab*: *A Sociological Study. Amritsar*: Guru Nanak Dev University.

6. Singh, Chandra Paul (2000). *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.

7. World Drug Report (2011), United Nations office of Drug and Crime.

8. World Drug Report (2010), United Nations office of Drug and Crime.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2019-20
Course Code: SECM-2502
Moral Education Programme

Time: 1 Hr. **Max. Marks: 25**

This course is intended to provide a much needed orientational input in moral education to the young inquiring minds.

Module I:

Introduction to Moral Education

- Understanding the need, content and process for moral education.
- Need of character building
- To learn to listen to inner voice
- Value of Sanskaras.
- Introducing the current scenario, examining the present era of globalization, technology and IT boom, invasion of virtual life, cyber crime, lack of privacy.
- Growing materialism and the value of restraint (Sanyam).
- Role of peer pressure
- Understanding changes in society vis-à-vis changes in family structure/ relationships.
- Individual differences and expectations/ desires.

Module II:

- Understanding social responsibility. Our rights and duties, civic sense.
- Understanding responsibility towards the self awareness.
- Understanding harmony in the family- the basic unit of human interaction.
- Understanding and achieving harmony between the self and body.
- Visualizing a mutually enriching role in society as socially, morally, ecologically, politically responsible doctors, engineers, teachers, technologists and managers etc.
- Opposite- sex relations, feminine gullibility.
- Self defence.

Module III:

- Continuous happiness and prosperity – a look at basic human aspiration.

- Understanding happiness and prosperity correctly- a critical appraisal of the current scenario.
- Understanding of human capacities and limitations- areal change.
- Aspiration v/s ambition.
- The need to silence the Satan within.
- Understanding the difference between the satisfaction within, what one has and the ambition to hold more than one grasp.
- Patience.
- Intolerance.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3081
Physical Chemistry – A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

Chemical Thermodynamics: State of a system, state variables, thermodynamic equilibrium, thermodynamic properties, Intensive and Extensive properties, various types of processes. First Law of Thermodynamics, internal energy and enthaply, change in internal energy and change in enthalpy for expansion of real and ideal gases under isothermal and adiabatic conditions for reversible and irreversible processes. Relation between Cp and Cv. Internal energy change and enthaply change in a chemical process. Hess's law of heat summation. Enthaply of formation, enthaply of ionisation and calculation of bond dissociation energies from thermochemical data.

Unit-II

Second law of thermodynamics, entropy and Gibb's free energy, Carnot's cycle, Calculation of entropy change for reversible and irreversible processes under isothermal and non-isothermal conditions. Gibbs Hemholtz equation. Third law of thermodynamics, Nernst heat theorem, calculation of absolute entropies of substances. Meaning of chemical equilibrium, homogeneous and heterogeneous equilibria. Thermodynamic derivation of law of chemical equilibrium, Van't Hoff relation, Relation between free energy change and equilibrium constants Kp, Kc and Kf. Temperature and pressure dependence of equilibrium constant.

Unit-III

Solutions: Definition, types of solutions, vapour pressure of solution and Raoult's law. Factors influencing the solubility of gas in liquids, Henry's law. Ideal solutions, Duhem Margules equation. Distillation of ideal solutions, Lever rule, vapour pressure of ideal solutions and non ideal solutions. Distillation of non ideal solutions. Azeotropes, colligative properties, lowering of vapour pressure, depression in freezing point, elevation in boiling point, osmotic pressure. Their common features and applications. Thermodynamic derivation of elevation in boiling point, depression in freezing point and osmotic pressure. Van't Hoff factor and its application to calculate degree of association and degree of dissociation.

Unit-IV

Phase Equilibria: Definition of phase, component and degree of freedom, Phase rule and its thermodynamic derivation. Derivation of Clausius-Clapeyron equation and its importance in phase equilibria, phase diagrams of water system, KI water system and lead-silver system.

Books recommended:

1. Atkins, P., Paula, J.de Keeler, J (2017) Atkins Physical Chemistry; 11th Edition, Oxford University Press.
2. Puri, B.R., Sharma, L.R., Pathania, M.S(2017)Principles of Physical Chemistry; 43rd Edition, Vishal Publishing Co.
3. Barrow, G.M (1996) Physical Chemistry; 6th Edition, McGraw Hill Inc.
4. Rao, C.N (2009) University General Chemistry; Laxmi Publications,India.
5. Albert, R.A., Silbey, R.J (2004) Physical Chemistry; 4th Edition , John Wiley & Sons Inc.
6. Dogra, S.K., Dogra, S. (1991) Physical Chemistry Through Problems; Wiley Eastern Limited.
7. Moore, W. J (1983) Basic Physical Chemistry; Prentice Hall of India Pvt. Ltd.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3081 (P)
Physical Chemistry – A
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Surface tension: Determination of surface tension of a given liquid by Stalgometer. Using number of drops and weight of drops methods
2. Determination of coefficient of viscosity of a pure liquid (Acetone, Ethanol, Propanol, Butanol, Glycol) (Effect of hydrogen bonding on viscosity)
3. Photometry verification of Lambert beer's law for solution of $CoCl_2H_2o$ (in water) and $K_2Cr_2O_7$ (in water)
4. a) pH of buffer solution
   b) Acid base titration HCl vs. NaOH.
   c) Determination of ionization constant of a weak acid (CH_3COOH)
5. Study of distribution law of Benzoic acid between benzene and water.
6. Study of distribution law by iodine distribution between water and CCl_4. Given standar solution $Na_2S_2O_3$.
7. Determine composition of HCl and CH_3COOH in the given solution pH metrically.

Books recommended:

1. Rao, C.N.R and Agarwala, U.C (1973) Experiments in General Chemistry, East-West Press, New Delhi

2. Yadav, J.B (2015) Advanced Practical Physical Chemistry, Krishna Prakashan Media (P) Ltd.

3. Gurtu, J.N. and Kapoor, R (1974) Advanced Experimental Chemistry, Vol. I, Physical, S. Chand & Co. Ltd.

4. Mukherjee N.G (1988) Selected Experiments in Physical Chemistry, J.N. Ghose & Sons, Calcutta.

5. Ghosh, J.C. Experiments in Physical Chemistry, Bharati Bhavan.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3482
Zoology-C
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

Introduction to parasitology (pertaining to various terminologies in use). Brief account of Life history, mode of infection and pathogenicity of the following pathogens with reference to man, prophylaxis and treatment, Entamaeba, Trypanosoma, Leishmania, Giardia, Trichomonas and Plasmodium.

Unit-II

Histopathological changes in organs in relation to diseases such as livers, cirrhosis, nephrosis, tumors, cancer, AIDS.

Unit-III

Arthropod vectors of human diseases: Malaria, Yellow fever, Dengue haemorragic fever, Filariasis, Plague and Epidemic typhus. Distribution and control of the above mentioned vectors.

Unit-IV

General account of diseases such as AIDS, Hepatitis, typhoid and cholera, their occurence and eradication programmes. General account of drug therapy and drug resistance.

Books Recommended:

1. Shah, V.C., Bhatavdekar, J., Chinoy, N.J. and Murthy, S.K. (1988). Essential techniques in Cell Biology. Anand Book Depot, Ahemadabad.

2. Celis, J.E. (1998) Cell Biology: A Laboratory handbook. Vol. 1-3. Academic Press, UK.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3482 (P)
Zoology-C
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Preparation of blood smear showing different stages of plasmodium
2. Study of permanent slides and specimens of parasitic protozoans, helminth and arthropods: Entamoeba, Giardia, Plasmodium, Trypanosoma, Leishmania, Trichomonae,
3. Anopheles, culex (mouth parts), lice, rat flea, Aedes Agypti, Tapeworm, Ascaris, Wuchereria, Trichinella, Ancylostoma, Oxyuris.
4. Pathological examination of blood and urine.
5. Blood Tests:

(a) Erythrocyte sedimentation rate

(b) Bleeding time

(c) Clotting time

(d) Prothrombin time

Books Recommended:

1. Sobti, R.C. (1992) Medical Zoology, Shoban Lal Nagin Chand & Co.
2. Chatterjee K.D. (2009) Parasitology (Protozoology and Helminthology) 13th Edition, CBS publishers.
3. Longo D.L., Kasper D.L., Jameson, J.L, Fauci, A.S, Hauser, S.L., Loscalzo, J.L. (2011) Harrison's Principles of Internal Medicine, McGrawHill Professional.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3083
Biochemistry-C
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

Metabolism: - Basic principles of metabolism, metabolic pathways, catabolism, anabolism, basic principles of bioenergetics, biological oxidation reduction reaction, energy rich metabolites.

Unit-II

Carbohydrate metabolism: - Biosynthesis and degradation of carbohydrates, Glycolysis, gluconeogenesis, feeders pathways for glycolysis, regulation of carbohydrates metabolism.

Unit-III

Kreb's cycle: - Amphibolic nature of kreb's cycle, regulation and enzymes of kreb's cycle, glyoxylate pathway.

Unit-IV

Electron transport chain: - Mitochondrial electron chain, oxidative phosphorylation, chemiosmotic hypothesis, ATP synthase and regulation of ATP synthesis.

Books Recommended:

1. Jain, J. L., Jain, S. and Jain. N. (2016). Fundamentals of Biochemistry, S. Chand & Company Ltd., New Delhi.

2. Rawn, J.D. (1989), Biochemistry, Niel Patterson Publications, North Carolina.

3. Berg, J.M., Tymoczko, J.L., Gatto, G.L., Stryer, L. (2015), Biochemistry, 4th Ed., W.H. Freeman & Co., San Francisco.

4. Voet, D., Voet, J.G. (2012). Fundamentals of Biochemistry, John Wiley and Sons, New York.

5. Nelson, D.L. and Cox, M.M. (2017), Lehninger Principles of Biochemistry, 7th Ed.,WH Freeman, New York

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3083 (P)
Biochemistry-C
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. The absorbance curve of two dyes.
2. Determination of reducing sugar using 3,5 dinitrosalicylic acid.
3. Determination of Vitamin C Concentration by Titration.
4.Quantitative estimation of triglycerides and cholesterol.
5. CMC of detergent and phospholipids.

Books Recommended:

1. Plummer D.T. (2017). An Introduction of Practical Biochemistry, 3rd Ed. Tata McGraw Hill Publishers Co. Ltd., New Delhi.
2. Bansal, D.D., Khardori, R. & Gupta, M.M. (1985). Practical Biochemistry. Standard Publication, Chandigarh.
3. Sawhney, S.K. and Singh, R. (2005). Introductory Practical Biochemistry. Narosa Publishing House, New Delhi.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3484
Cell Biology
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit - I

Cell as a basic unit of living systems. The cell theory Broad Classification of Cell Types: PPLO's, bacteria, eukaryotic microbes, plant and animal cells. A detailed classification of cell types within an organism. Cell, tissue, organ and organism as different levels of organizations of otherwise genetically similar cells.

Unit - II

Structure and function of cell organelles, ultrastructure of cell membrane, cytosol, Golgi bodies, endoplasmic reticulum (rough and smooth), ribosomes, cytoskeletal structures (actin, microtubules etc.), Mitochondria, chloroplasts, lysosomes, peroxysomes, nucleus (nuclear membrane, nucleoplasm, nucleolus, chromatin).

Unit – III

Cell Division and Cell Cycle: mitosis, meiosis, stages of cell cycle, binary fission, amitosis and its regulation. Cell-cell interaction, Cell locomotion (amoeboid, flagellar and ciliar).

Unit-IV

Biological Membranes: Supramolecular architecture of membranes; Solute transport across membranes; Model membranes and Liposome

Books Recommended:

1. De-Robertis, F.D.P. and De-Robertis Jr. E.M.F. (2017) Cell and Molecular Biology, Saunders, Philadelphia.

2. Lodish, Berk, Kaiser, Krieger, Scott, Bretscher, Ploegh and Matsudaira (2007) Molecular Cell Biology 6th Edition, W.H.Freemen & Co Ltd.

4. Geoffrey, M. Cooper & Robert E. Hausman (2013) The Cell: A molecular approach 6th Edition, Sinauer Associates.

5. Alberts, Johnson, Lewis, Raff, Roberts and Walter (2008) Molecular Biology of the Cell, 5th Edition, Garland Science.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3484 (P)
Cell Biology
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

Study of Cells: (a) Prokaryotic cells: *Lactobacillus, E. coli*. Blue green algae.

(b) Eukaryotic cells: Testicular material (for studies of spermatogenesis)

-Study of electron micrographs of various cell organelles-plasma membrane, Mitochondria, Golgi complex, Lysosomes, Endoplasmic Reticulum (smooth and granular), Cilia, Centrioles, inclusions like glycogen, lipids, etc.

-Preparation of Permanent Slides: Principles and procedures- Section cutting of tissues and staining of tissues with Haematoxylin/eosin method.

-Microtomy: Introduction of the instrument- its use, care, section cutting and stretching.

-Study of permanent slides of various tissues (gut region, liver, lung, spleen, kidney, pancreas, testis, ovary, tongue, skin etc.).

Books Recommended:

1. Shah, V.C., Bhatavdekar, J., Chinoy, N.J. and Murthy, S.K. (1988) Essential techniques in Cell Biology. Anand Book Depot, Ahemadabad.

2. Celis, J.E. (1998) Cell Biology: A Laboratory handbook. Vol. 1-3. Academic Press, UK.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3065
Immunology-A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

Types of immunity-innate and adaptive; Features of immune response-memory; Specificity and recognition of self and non-self; Terminology used in the study of immune system. Active and Passive immunization

Unit-II

Lymphoid cells, heterogeneity of lymphoid cells; T-cells, B-cells, Null cells; Monocytes, Polymorphs, primary and secondary lymphoid organs-thymus, Bursa of fabricius, spleen, lymph nodes, lymphatic system, Mucosa Associated Lymphoid Tissue (MALT), Lymphocyte traffic.

Unit-III

Introduction of Antigen and Antibody, Epitope (B cell & T Cell epitope), Immunogen, Factors influencing immunogenicity, Immunoglobulins, classes and structure; affinity and avidity; Complement fixing antibodies and complement cascade.

Unit-IV

MHC class I and class II molecules, structure of T & B Cells and their response, Structure and function of class I and class II MHC molecules, structure of T-cell antigen receptors.\

Books Recommended:

1. Austyn, J.M. and Wood K.J. (1993). Principles of Cellular and molecular Immunology, Oxford University Press Inc. New York

2. Paul, W.E. (2012). Fundamental Immunology, 7th Edition, LWW Publishers

3. Birch, J.R. and Lennox, E.S. (1995). Monoclonal Antibodies Principles and Application,Wiley Liss.

4. Roitt, I.M. Brostoff, J. and Male, D.K. (2001). Immunology, 6th Edition, Mosby publishers.

5. Delves, P. J., Martin, S. J., Burton, D. R. and Roitt, I.M. (2017). Roitt's Esssential Immunology, Wiley Blackwell Publishers.

5. Parslow T.G Stites D.P., Terr. A.I.,and Imboden, J. B.. (2001). Medical Immunology, 10th Edition, Mc Graw Hill/ Appleton and Lange., Cambridge.

6. Kanfmann, S.H.E., Sher A. andAhmed, R. (2002). Immunology of Infectiouss Diseases, ASM Press, Washington, D.C.

7. Punt, J., Stranford, S., Johns, P. And Owen, J.A (2018). Kuby Immunology, 8th Edition. W.H. Freeman and Company, New York.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3065 (P)
Immunology-A
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Differential leucocytes count.
2. Total Leucocytes count.
3. Total RBC count.
4. Blood Group testing.
5. Separation of serum & Plasma from blood and elution of IgG with protein column A.
6. Isolation of mononuclear cells from peripheral blood viability test by dye exclusion method.
7. Collection of blood sample by different method.

Books Recommended:

1. Stevans, C.D. (2003). Clinical Immunology and Serology : A Laboratory Perspective 2nd Edition, F.A Davis Company, Philadelphia

2. Celis, J.E., Hunter, T. and Carter, N (2005). Cell Biology: A laboratory handbook. 3rd Edition,Vol-III, Academic Press, U.K.

3. Hay, F.C. and Westwood O.M.R. (2002). Practical Immunology, 4th Edition, Wiley Blackwell.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3066
Genetics
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit - I

Organization of Chromosomes: The structure of prokaryotic and eukaryotic chromosome, centromere and telomere structure, euchromatin and heterochromatin, Special chromosomes: Polytene chromosomes and Lampbrush chromosomes, satellite DNA, the supercoiling of DNA.

Unit – II

Mendel's Laws of Inheritance: Principle of segregation and Independent assortment, Monohybrid, dihybrid and trihybrid crosses, Back cross and test cross.

Interaction of Genes: Incomplete inheritance and co-dominance, pleotropism, modification of **F2** ratios: epistasis, complementary genes, supplementary genes, inhibitory genes, duplicate genes, lethality and collaborators genes. Multiple allelism.

Unit – III

Linkage: Coupling and repulsion hypothesis, chromosomal theory of linkage, complete and incomplete linkage, linkage groups and significance of linkage.

Crossing Over: Introduction, mechanism of meiotic crossing over, types of crossing over, factors affecting it and its significance.

Unit – IV

Mutation: Spontaneous versus induced mutations, types of mutations, mutations rate and frequency, Mutagens: Physical and Chemical, the molecular basis of mutations. Significance & Practical applications of Mutation

Basic Microbial Genetics: Conjugation, transduction, transformation

Books Recommended:

1. Maloy, S.R., Crown, J.E. and Freifelder, D. (2004). Microbial Genetics: 2nd Edition, Jones & Bartlett Publishers, Inc.
2. Hartl, D.L. (2011). Genetics: 8thEdition, Jones & Bartlett Learning.
3. Brooker, R.J. (2017). Genetics: Analysis and Principles, McGraw-Hill Education.
4. Antherly A.G., Girton. J.R., MC Donald J.F (1999). The Science of Genetics. Harcourt college Publishers
5. Maloy, S.R., Crown, J.E., Freifelder, D. (2009). Microbial Genetics, Narosa Publishing House.
6. Hartl. D.L., Cochrane B., (2017). Genetics: Analysis of Genes & Genomes 9th Edition. Jones & Bartlett Publishers.
7. Gupta PK (2018). Genetics, 5th Revised edition, Rastogi Publications
8. Snustad and Simmons (2015). Principles of Genetics: 7th Edition, John Wiley & sons
9. Pierce, B. (2016). Genetics: A conceptual approach, 6th Edition,WH Freeman.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3066 (P)
Genetics
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Demonstration of Law of segregation and Independent assortment (use of coloured beads, capsules etc.).
2. Numerical problems on Mendelism and on modified F2 ratios.
3. Numerical problems on Paternity disputes (Blood groups)
4. Segregation demonstration in preserved material
5. Study of polytene chromosomes from permanent slides.
6. Dermatographics: Palm print taking and finger tip patterns.
7. Preparation and study of mitosis slides from onion root tips by squash method.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3067
Agro and Industrial Applications of Microbes-A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

Introduction: Basic concept of agriculture and food processing as industry. Differences between microbial industrial processes and chemical industrial processes.

Unit-II

Industrially important microbes, its screening, selection and identification. Maintenance and preservation of industrially important microbial cultures.

Unit-III

Improvement of Industrial Microbes: Improvement programme of industrial microbes, mutational programme of penicillin producing microorganisms, selection pressure in maintaining the hyper producing microbes, revertant back of higher yielding microbes into lower production, media formulation and process optimisation of industrial and agro industrial microbes.

Unit-IV

Microbial association their interaction with plants, Asymbiotic and symbiotic nitrogen fixation (*Rhizobium, Azospirillum, Azobacter, Anabena),* nitrogen cycle and role of agro bacteria in agriculture or plants.

Books Recommended:

1. Singh B.D. (2016). Bio-Technology:Expanding horizons, Kalyani Publishers / Lyall Bk Depot
2. Chakraborty, P.K. (2013). Agro and Industrial Bio-Technology, , Black Prints
3. Wittmann, C. and Liao, J. (2017). Industrial Bio-Technology:Products and Processes (Advanced Bio-Technology), Vol. 4 Wiley-VCH.
4. Casida, L.E.J.R. (2007). Industrial Microbiology, , New Age International Publishers
5. Tyagi, N. (2012). Industrial Microbiology and Bio-Technology,Agrotech Press.
6. Okafor, N. (2007). Modern Industrial Microbiology and Bio-Technology,CRC Press.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: BBTM-3067 (P)
Agro and Industrial Applications of Microbes – A
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Isolation of microbial cells by serial dilution-spread plate method, pour plate.
2. Measurement of bacterial size.
3. Metabolic Characterization by IMVIC test
4. Alcoholic and Mixed–Acid Fermentation.
5. Starter culture preparation, evaluation and application.
6. Determination of nitrate reduction by bacteria.

Books Recommended:

1. Dubey, R.C., Maheshwari, D.K. (2010). Practical Microbiology, S Chand & Company
2. Kumar, M. (2018). Practical Manual for Undergraduates Microbiology,3rd Edition, Jain Brothers
3. Taormina, P.J. (2016). Microbiological Research and Development for the Food Industry, 1st edition, CRC Press

Bachelor of Science (Bio-Technology) Semester-III
Session: 2019-20
Course Code: AECE-3221
Environmental Studies (Compulsory Paper)

Time: 3 Hrs. **Max. Marks: 40**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

The multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness

Unit-II

Natural Resources: Renewable and non-renewable resources:

Natural resources and associated problems.

(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit-III

Ecosystems

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Unit-IV

Biodiversity and its conservation

- Introduction – Definition: genetic, species and ecosystem diversity
- Biogeographical classification of India
- Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
- Biodiversity at global, national and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit-V

Environmental Pollution

Definition

- Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution

- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

Unit-VI

Social Issues and the Environment

- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Protection Act, 1986
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and control of Pollution) Act, 1974
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

Unit-VII

Human Population and the Environment

- Population growth, variation among nations
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights
- Value Education
- HIV / AIDS

- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

Unit-VIII

Field Work

- Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-pond, river, hill slopes, etc

Books Recommended:

1. Bharucha, E. (2005) Textbook of Environmental Studies, Universities Press, Hyderabad.

2. Down to Earth (2017) Centre for Science and Environment, New Delhi.

3. Heywood, V.H. & Waston, R.T. (1995) Global Biodiversity Assessment, Cambridge House, Delhi.

4. Joseph, K. & Nagendran, R. (2004) Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.

5. Kaushik, A. & Kaushik, C.P. (2004) Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.

6. Rajagopalan, R. (2011) Environmental Studies from Crisis to Cure. Oxford University Press, New Delhi.

7. Sharma, J. P., Sharma. N.K. & Yadav, N.S. (2005) Comprehensive Environmental Studies, Laxmi Publications, New Delhi.

8. Sharma, P. D. (2009) Ecology and Environment, Rastogi Publications, Meerut.

9. State of India's Environment 2018 by Centre for Sciences and Environment, New Delhi

10. Subramanian, V. (2002) A Text Book in Environmental Sciences, Narosa Publishing House, New Delhi

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4081
Physical Chemistry-B
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

Electrochemical Cells:

Electrode potential, Electromotive force (EMF). Reversible and irreversible cells, measurement of EMF of a cell. Nernst equation. Reference electrodes and other electrodes, standard electrode potential. Activity and activity coefficient determination from EMF results. Concentration cells with transference and without transference, liquid function potential, pH, glass electrode, quinone-hydroquinone electrode, Potentiometric titrations.

Unit-II

Chemical Kinetics:

Rate of reaction, rate constant, factors influencing rate of reaction, order, molecularity. Rate equations for Ist order, IInd order & IIIrd order reactions. Methods for determining order of reaction. Half Life, Complex reactions, consecutive reactions, parallel reactions, chain reactions and opposing reactions. Activation energy and calculation from Arrhenius equation. Theories of reaction rates collision theory and transition state theory of biomolecular

processes. Catalysis, acid base catalysis, enzyme catalysis including their mechanisms, Michaelis Menten equation for enzyme catalysis. Heterogeneous catalysis and its mechanism. Surface reactions with special reference to Unimolecular surface reaction.

Unit-III

Ionic Equilibria and Conductance: Conductivity, equivalent and molar conductance. Variation of equivalent conductance with dilution of weak and strong electrolytes. Arrhenius and Debye Huckel theory. Kohlraush law of independent migration of ions. Transference number and their experimental determination using Hittorf and moving boundary methods. Ionic Velocity, ionic mobility. Applications of conductance measurements. Determination of degree of ionisation of weak electrolyte, solubility, solubility product of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt, conductometric titrations.

Unit-IV

Ionic strength. Debye Huckel theory of activity coefficients. Mathematical treatment of multistage equilibria of acids and bases. Salt hydrolysis, calculation of hydrolysis constant, Buffer solutions, Buffer index, Buffer capacity universal buffer preparation. Acid base indicators. Theory of acid base indicators. pH change and selection of indicators in different acid base titrations.

Books recommended:

1. Atkins, P., Paula, J.de Keeler, J (2017) Atkins Physical Chemistry; 11th Edition, Oxford University Press.
2. Puri, B.R., Sharma, L.R., Pathania, M.S. (2017) Principles of Physical Chemistry; 43rd Edition, Vishal Publishing Co.
3. Barrow, G.M. (1996) Physical Chemistry; 6th Edition, McGraw Hill Inc.
4. Rao, C.N. (2009) University General Chemistry; Laxmi Publications, India.
5. Berry, R.S., Rice, S.A., Ross, J. (2000) Physical Chemistry; 2nd Edition, Oxford University Press.
6. Albert, R.A., Silbey, R.J (2004) Physical Chemistry; 4th Edition, John Wiley & Sons Inc.
7. Levine, I.N. (2002) Physical Chemistry; 5th edition, Tata McGraw Hill Publishing Co. Ltd.
8. Moore, W. J (1983) Basic Physical Chemistry; Prentice Hall of India Pvt. Ltd.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4081 (P)
Physical Chemistry-B
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Refractometry: Determine refractive index of a given liquid as a criterion for its purity. (Benzene i.e. commercial) benzene + A.R. acetone).
2. Polarimetry: Determine the %age composition of an optically active solution.
3. Calorimetry:
   a) Determination of Heat of neutralization
      (i) Strong acid-strong base
      (ii) Weak acid-strong base.
   b) Determination of Heat of solution of KCl, NH_4Cl, KNO_3
4. Conductometry:
   a) Determination of cell constant.
   b) Determination of specific and equivalent conductance of electrolyte (NaCl and HCl).
   c) Precipitation titration of Na_2SO_4 vs. $BaCl_2$.
   d) Neutralization titrations NaOH vs. HCl and NaOH vs. CH_3COOH.
5. Determination of adsorption isotherm of oxalic acid on charcoal.

Books recommended:

1. Rao, C.N.R and Agarwala, U.C (1973) Experiments in General Chemistry, East-West Press, New Delhi
2. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill.
3. Yadav, J.B (2015) Advanced Practical Physical Chemistry, Krishna Prakashan Media (P) Ltd .
4. Gurtu, J.N. and Kapoor, R (1974) Advanced Experimental Chemistry, Vol. I, Physical, S. Chand & Co. Ltd.
5. Mukherjee N.G (1988) Selected Experiments in Physical Chemistry, J.N. Ghose & Sons, Calcutta.
6. Ghosh, J.C. Experiments in Physical Chemistry, Bharati Bhavan.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4072
Botany-C
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

Water relations, osmosis, transpiration, water potentials, its components, physiological & molecular adaptations in plants with respect to cold-heat-drought and salt stress.

Unit-II

Heat shock proteins, dehydrins, late embryogenesis abundant proteins, role of different osmolytes in stress tolerance.

Unit-III

Plant Pathology & epidemiology: Definition, classification, mode of transmission & control measures of plant diseases. Disease resistance host pathogen interaction. Phytoalexins, PR proteins.

Unit-IV

A detailed account of the following plant diseases with respect to casual agents, symptoms, epidemology, disease cycle & their control measures. Black stem rust of wheat, Loose smut of wheat, Late and early blight of potato, False smut of rice, Bacterial blight of rice, Red rot of sugarcane, TMV of potato, Yellow vein mosaic of bhindi, Bunchy top of banana, Downy mildew of bajra.

Books Recommended:

1. Salisbury, F.B. and Ross C.W. (1992), Plant Physiology, Wadsworth Publication Company

2. Taiz, L. and Zeiger, E. (2002), Plant Physiology, 3rd Ed., Sinauer Associates

3. Srivastava, H.N. (2005) Plant Physiology, Pardeep Publications.

4. Pandey, B.P. (2014) Plant Pathology, S Chand.

5. Carlile, M.J., Watkinson, S.C & Gooday, G.W. (2001), The Fungi, 2nd Ed. Academic Press.

6. Agrios, G.N. (2008), Plant Pathology 5th Ed., Academic Press.

7. Mehrotra R.S and Aggarwal A (2003) Plant Pathology, Tata McGraw Hill, New Delhi.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4072(P)
Botany-C
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Estimation of relative water content of leaf.
2. Measurement of osmotic potential of different tissues by Chardokov method.
3. Study of Plant pathogens

(a) Symptoms of the diseases

(b) Morbid anatomy of the plants infected with following diseases.

Black stem rust of wheat, Loose smut of wheat, Late and early blight of potato, False smut of rice, Bacterial blight of rice, Red rot of sugarcane, TMV of potato, Yellow vein mosaic of bhindi, Bunchy top of banana, Downy mildew of bajra.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4083
Biochemistry-D
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit – I

Lipid Catabolism: Oxidation of fatty acids, degradation of triacylglycerol, phosphoglycerides, sphingolipids, regulation of lipid metabolism.

Unit-II

Lipid Anabolism: Synthesis of fatty acids, triacylglycerol, phosphoglycerides, sphingolipids, cholesterol.

Unit-III

Amino Acid Metabolism: Transamination reactions of amino acids, urea cycle, overview of biosynthesis and degradation of essential amino acids, regulation of amino acid biosynthesis.

Unit-IV

Nucleic Acid Metabolism: Biosynthesis of purines and pyrimidines nucleotides, regulation of nucleotide biosynthesis. Degradation of purines and pyrimidines, nucleotides, salvage pathway.

Books Recommended:

1. Jain, J. L., Jain, S. and Jain. N. (2016). Fundamentals of Biochemistry, S. Chand & Company Ltd., New Delhi.

2. Rawn, J.D. (1989). Biochemistry, Niel Patterson Publications, North Carolnia.

3. Berg, J.M., Tymoczko, J.L., Gatto, G.L., Stryer, L. (2015). Biochemistry, 4th Ed., W.H. Freeman & Co., San Francisco.

4. Voet, D., Voet, J.G. (2012). Fundamentals of Biochemistry, John Wiley and Sons, New York.

5. Nelson, D.L. and Cox, M.M. (2017). Lehninger Principles of Biochemistry, 7th Ed.,WH Freeman, New York

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4083 (P)
Biochemistry-D
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Quantitative estimation of amino acids using the ninhydrin reaction.
2. Purification of protein using salt precipitation.
3. Isolation of Casein from milk and Isoelectric pH of casein.
4. Determination of fat content in milk.
5. Estimation of blood cholesterol.

Books Recommended:

1. Plummer D.T. (2017). An Introduction of Practical Biochemistry, 3rd Ed. Tata McGraw Hill Publishers Co. Ltd., New Delhi.
2. Bansal, D.D., Khardori, R. & Gupta, M.M. (1985). Practical Biochemistry. Standard Publication, Chandigarh.
3. Sawhney, S.K. and Randhir Singh (2005). Introductory Practical Biochemistry. Narosa Publishing House, New Delhi.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4064
Skill Development in Bio-Technology-A
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Food Bio-Technology

Unit-I

Commercial potential of food fermentation industry; Novel food ingredients: Low calorie sweetner, Plant tissue culture and naturally produced flavor modifiers, natural food coloring agents; Neutracuticals: Probiotics, Food spoilage: Detection and mechanism of food borne infections (*Clostridium, Salmonella, Staphylococcus, Aspergillus* sp.)

Unit-II

Introduction to HACCP plan, Preservation: thermal processing, cold preservation, chemical preservatives, food dehydration, food irradiation, biological control; Quality assurance: Biochemical/ microbial testing of food adulterants: milk, butter, oil, jams, jellies, Government regulatory practices and policies (FSSAI, FDA etc.), Food packaging: need and ways (glass, metal, plastics, moulded pulp and aluminium foil).

Dietics and Nutrition Management

Unit III

Energy value of biomolecules: carbohydrates, fats and proteins, basal metabolic rate definition and its measurement, factors affecting BMR, energy requirements of human beings, Energy

requirements in different age groups and special conditions (pregnant ladies and lactating mothers), different dietary types, requirements, utilization and functions.

Unit-IV

Methods of protein determination, amino acid imbalance, protein requirements, utilization and functions, nutritional aspects of vitamins and minerals, food processing and loss of nutrients during processing and cooking, naturally occurring antinutrients, balanced diet, recommended dietary allowances for different categories of human beings, disorders related to nutrition-protein energy malnutrition, starvation and obesity.

Books Recommended:

1. Frazier, W.C. and Westhoff, D.C. (2013). Food microbiology (Tata McGraw-Hill publishing Co. Ltd).

2. Admas, M.R. and Moss, M.O. (2015). Food microbiology, 4th Edition, Royal Society of Chemistry).

3. SriLakshmi B. (2018). Food science, 7th edition, New Age International Publishers, India.

4. Jay J.M., Loessner M.J. and Golden D.A. (2006). Modern Food Microbiology, 7th Edition, Springer India.

5. Sivasankar B. (2004). Food processing and preservation, 1st edition, Prentice-Hall of India Pvt.Ltd, New Delhi).

6. Michael P. Doyle, Larry R. Beuchat (2007). Food Microbiology: Fundamentals and Frontiers, 3rd edition, ASM Press.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4064(P)
Skill Development in Bio-Technology-A
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Detection of Adulteration in food (oil, butter).
2. Determination of crude fibre content in wheat and chickpea.
3. Determination of Gluten content in wheat flour.
4. Isolation of protein concentrates.
5. Determination of fat content in different food products.
6. Determine the BMR

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4065
Immunology-B
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

T-cell subsets and surface markers, T-dependent and T-independent antigens, Adjuvants, Monoclonal antibodies: its production and uses.

Unit-II

Various types of immunodiffusion and immunoelectrophoretic procedures. Immunoblot, ELISA, RIA, Agglutination of pathogenic bacteria, Haemagglutination and haemagglutination inhibition.

Unit-III

Immune invasion: mechanism used by parasites, regulation of immune invasion, Immunity to viruses, intracellular and extracellular bacteria, immunopathological consequences of parasitic infections.

Unit-IV

Whole organism vaccine, Types of vaccines: purified macromolecules as vaccine, recombinant antigen vaccine, recombinant vector vaccine, synthetic peptide vaccine, multivalent subunit vaccine, DNA Vaccine.

Books Recommended:

1. Abbas, A.K. Litchman, A.H. and Pillai, S. (2017). Cellular and Molecular Immunology, 9th ed., Elsevier.

2. Benjamni, E., Coico, R. and Sunshine, G. (2015). Immunology: A short course, 7th Edition, New York, Wiley- Wiley-Blackwell.

3. Delves, P. J., Martin, S. J., Burton, D. R. and Roitt, I.M. (2017). Roitt's Esssential Immunology, Wiley Blackwell Publishers.

4. Roitt, I., Brostoff, J. and Male, D. (2001). Immunology, 6th Edition, Mosby.

5. Kanfmann S.H.E., Sher, A., Ahmed, R. (2002). Immunology of infectious Diseases, ASM Press, Washington D.C.

6. Butler, M. (2004). Animal Cell culture and Technology, 2nd Edition, Garland Science.

7. Punt, J., Stranford, S., Johns, P. And Owen, J.A (2018). Kuby Immunology, 8th Edition. W.H. Freeman and Company, New York.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4065(P)
Immunology-B
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Preparation of vaccine chart of child, highlighting optional vaccines
2. Haemagglutination assay
3. Haemagglutination inhibition assay
4. Double immunodiffusion test using specific antibody and antigen Line of identity, partial identity and non identity
5. Single immunodiffusion test using specific antibody and antigen
6. Direct and indirect ELISA
7. To perform Immunoelectrophoresis.

Books Recommended:

1. Stevans, C.D. (2003). Clinical Immunology and Serology: A Laboratory Perspective 2nd Edition, F.A Davis Company, Philadelphia.
2. Celis, J.E., Hunter, T. and Carter, N. (2005). Cell Biology: A laboratory handbook. 3rd Edition,Vol-III, Academic Press, U.K.
3. Hay, F.C. and Westwood O.M.R. (2002). Practical Immunology, 4th Ed., Wiley Blackwell.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4066
Molecular Biology
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

DNA as genetic material, Structure of DNA, Types of DNA, Modes of Replication of DNA in prokaryotes and eukaryotes, DNA polymerases, the replication complex: Pre-priming proteins, Fidelity of replication. Mechanism of replication.

Unit - II

DNA recombinationin prokaryotes and eukaryotes: molecular mechanisms, Holiday Junction model, DNA damage and repair: causes and types of DNA damage, mechanism of DNA repair, Insertion elements and transposons: Bacterial and eukaryotic transposons.

Unit-III

Transcription and RNA processing

RNA structure and types of RNA, Transcription in prokaryotes: Prokaryotic RNA polymerase, role of sigma factor, promoter, Initiation, elongation and termination of RNA chains, Transcription in eukaryotes: Eukaryotic RNA polymerases, transcription factors, promoters, enhancers, mechanism of transcription initiation, promoter clearance and elongation; RNA splicing and processing: processing of pre-mRNA: 5’ cap formation, polyadenylation, splicing, rRNA and tRNA splicing.

UNIT IV

Regulation of gene expression and translation

Regulation of gene expression in prokaryotes: Operon con

cept (inducible and repressible system): lac, his, trp operons, Genetic code and its characteristics, Prokaryotic and eukaryotic translation:ribosome structure and assembly, Charging of tRNA, aminoacyl tRNA synthetases, Mechanism of initiation, elongation and termination of polypeptides, Fidelity of translation, Inhibitors of translation, Regulation, Posttranslational modifications of proteins

Books Recommended:

1. Adams, R. L. P., Knowler, J. T., and Leader, D. P. (1992). The Biochemistry of Nucleic acids, 11th ed., Champman and Hall, The New York/London/Tokyo/Melbourne/Madras.

2. Bolsover, S. R., Hyams, J. S., S. Shephard, E. A. and White H. A. (1997). From Genes to Cells., John Wiley and Sons.

3. Krebs, J E, Goldstein, ES, Kilpatrick, ST (2017). Lewin's Gene XII, Jones and Bartlett publishers, Inc.

4. Maulik, S. and Patel, S. D. (1997). Molecular Bio-Technology Therapeutic Application and Strategies, John Wiley & Sons.

5. Primrose, SB and Twyman, R. (2010). Principles of Gene Manipulation and genomics, 8th Edition, Wiley Blackwell.

6. Strachan, T. and Read, A. (2010). Human Molecular Genetics, Garland Science6. Pierce, B. (2016). Genetics: A conceptual approach, 6th Edition,WH Freeman.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4066(P)
Molecular Biology
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Preparation of stock solutions for DNA isolation.
2. Isolation of genomic DNA from plants by CTAB method.
3. To perform agarose gel electrophoresis.
4. Quantification and determination of purity of DNA with spectrophotometer.
5. Quantification of DNA with Ethidium Bromide.

Books Recommended:

1. Primrose, SB and Twyman, R. (2010). Principles of Gene Manipulation and genomics, 8th Edition, Wiley Blackwell

2. Sambrook J. and Green M. R. (2013). Molecular Cloning: A Laboratory Manual,4th edition, CSHL.

3. Brown T.A (2017). Genomes, 3rd Edition, Garland Science.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4067
Agro and Industrial Applications of Microbes – B
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit-I

Industrial and Agro-industrial Microbes:

Microbes involved in antibiotics, pharmaceutical drugs, enzymes production, solvent production, surfactants, aq. culture, vermiculture, composting, Production of herbicides and biopesticides, Microbial pesticides and mycoherbicides: Introduction, advantages and disadvantages.

Unit-II

Biotransformation, Production of organic acids, vitamins, aminoacids, biofertilizers, alcohols, wine, beers.

Unit-III

Microbial Processes in AgroBio-Technology:

Introduction, BT gene in BT cotton, SCP: Spirulina production. Probiotics, Prebiotics and synbiotics. Soil treatment with microbes. Mycorrhizal fungi. Mycotxins.

Unit-IV

Microbial Process in Industrial Bio-Technology:

Industrial production of metabolites: Primary and secondary metabolites production, cheese, bread, citric acid, penicillins, glutamic acid, cellulases, proteases in leather industries, Biochips.

Books Recommended:

1. Singh B.D. (2016). Bio-Technology: Expanding horizons, Kalyani Publishers / Lyall Bk Depot.
2. Chakraborty, P.K. (2013). Agro and Industrial Bio-Technology, Black Prints.
3. Wittmann, C. and Liao, J. (2017). Industrial Bio-Technology:Products and Processes (Advanced Bio-Technology), Vol. 4 Wiley-VCH.
4. Casida, L.E.J.R. (2007). Industrial Microbiology,New Age International Publishers.
5. Tyagi, N. (2012). Industrial Microbiology and Bio-Technology, Agrotech Press.
6. Okafor, N. (2007). Modern Industrial Microbiology and Bio-Technology, CRC Press.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4067(P)
Agro and Industrial Applications of Microbes – B
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Screening of cellulase producing microorganism from wood degrading soil.
2. Additive and Synergistic effect of two antibiotics on the above microorganism.
3. Minimum inhibitory concentration of a antibiotics for the above microorganism.
4. Plating the milk samples for microbial contamination.
5. MBRT Test for determination of milk quality.
6. Isolation and identification of microbes from spoiled food sample.
7. Determination of Antimicrobial activity of essential oils.

Books Recommended:

1. Dubey, R.C., Maheshwari, D.K. (2010). Practical Microbiology, S Chand & Company.
2. Kumar M (2018). Practical Manual for Undergraduates Microbiology, 3rd Edition, Jain Brothers.
3. Taormina, P.J. (2016). Microbiological Research and Development for the Food Industry, 1st Edition, CRC Press.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4068
Enzymology
(Theory)

Time: 3 Hrs. **Max. Marks: 60**

Theory: 30

Practical: 18

CA: 12

Instructions for the Paper Setter

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 atleast one question from each section. The fifth question may be attempted from any section.

Unit I

Introduction to Enzymes: Nomenclature, Classification and Characteristics of enzymes, Enzyme specificity, Cofactors, Co-enzyme and Prosthetic group.

Unit II

Mechanism of Enzyme Action: Nature of active site, identification of functional groups at active site, enzyme substrate complex, Factors responsible for catalytic efficiency of enzymes. Covalent catalysis, Acid base catalysis, Strain and distortion theory, Induced fit hypothesis.

Unit-III

Enzyme Kinetics:

A brief concept of bioenergetics and kinetics, Kinetics of single and bi-substrate enzyme catalyzed reactions, Michaelis Menten equation. Derivation of Michaelis Menten equation and determination of Km and Vmax values, Lineweaver-Burk plot, Hanes Plot.

Unit-IV

Enzyme inhibition: reversible and irreversible inhibition, Kinetics of competitive, uncompetitive and non-competitive inhibition. Effect of pH and temperature on rate of enzyme catalyzed reactions. Reversible covalent modification and zymogen activation, Isozymes and their importance.

Books Recommended:

1. Devsena, T. (2010). Enzymology, Oxford University Press.
2. Palmer, T and Bonner, P. (2008). Enzymes (Biochemistry, Bio-Technology, Clinical Biochemistry, 2nd Edition, Woodhead Publishing.
3. Price N and Stevens L, (2000). Fundamentals of Enzymology, 3rd Revised edition, Oxford university press-New Delhi.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2019-20
Course Code: BBTM-4068(P)
Enzymology
(Practical)

Time: 3 Hrs. **Practical Marks: 18**

Instructions for the practical Examiner:

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

Experiments:

1. Estimation of α-amylase activity from saliva.
2. Assay of acid phosphatase activity.
3. Effect of temperature on enzyme activity.
4. Effect of pH on enzyme activity
5. Determination of Vmax and Km for acid phosphatase.

Books Recommended:

1. Plummer D.T. (2017). An Introduction of Practical Biochemistry, 3rd Ed. Tata McGraw Hill Publishers Co. Ltd., New Delhi.

2. Bansal, D.D., Khardori, R. & Gupta, M.M. (1985). Practical Biochemistry. Standard Publication, Chandigarh.

3. Sawhney, S.K. and Randhir Singh (2005). Introductory Practical Biochemistry. Narosa Publishing House, New Delhi.