Exam. Code : 107402
Subject Code : 2211

B.Sc. Bio-Technology Semester—II

ZOOLOGY–B

Paper–BT-1

Time Allowed—3 Hours] [Maximum Marks—40

Note : All questions of Section A are compulsory. Attempt any **five** questions from Section B and **two** questions from Section C.

SECTION—A

1. Give short answers. Each question carries 1 mark.

   (a) What is opisthonephric kidney ?

   (b) How do tropic hormones influence endocrine system ?

   (c) What is the function of corpus luteum ?

   (d) Differentiate between sacculus and utriculus.

   (e) Write the function of epinephrine.

   (f) What is hyoid apparatus ?

   (g) Write the similarities and differences between skeletal and cardiac muscles.

   (h) Glial cells are important component of nervous system. Justify the statement. 8×8

SECTION—B

2. Write a note on different type of jaw suspensoria. 4
3. Explain the role of calcium in muscle contraction. 4
4. Write a note on structure and function of inner ear. 4
5. Explain the synaptic transmission at neuromuscular junction. 4
6. Give an account of various hormones secreted by thyroid gland along with their functions. 4
7. Write a note on structure of adrenal gland. 4
8. Explain the evolution of genital ducts in females. 4
9. Discuss the role of kidney in regulation of acid base balance. 4

SECTION—C

10. Discuss in detail the structure and function of pituitary gland. 6
11. Write notes on : 6
    (a) Transmission of nerve along axon
    (b) Photoreceptors.
12. Explain how the countercurrent mechanism of nephron makes it possible for the kidney to form concentrated urine. 6
13. Give a detailed account of structure of skeletal muscle. Explain the sliding filament model of muscle contraction. 6

Exam. Code : 107402
Subject Code : 2212

B.Sc. Bio-Technology Semester—II

BOTANY–B

Paper–BT-2

Time Allowed—3 Hours] [Maximum Marks—40

Note : Attempt **ALL** questions from Section A, **FIVE** questions from Section B and **TWO** questions from Section C. Draw neatly labeled diagrams wherever required. Marks for each question are indicated in the paper.

SECTION—A

1. Write about a paragraph (upto **1/3** of a page) on each of the following :

   (i) Calyptra

   (ii) Soredia

   (iii) Syncarpous

   (iv) Compound leaves

   (v) Zygomorphic

   (vi) Caryopsis

   (vii) Nucleus seed

   (viii) Seed viability. 1×8=8

SECTION—B

Note : Attempt **FIVE** of the following questions each in about **2** pages of the answer book.

2. Write in detail on Bentham and Hooker's system of classification.
3. Describe general characters of Lichens.
4. Explain morphological features of *Brassica campestris* L. with diagrams.
5. Write general character of family Lamiaceae with example from your syllabus.
6. Discuss evolutionary status of family Orchidaceae.
7. Discuss morphological characters of *Cassia fistula* L. with diagrams.
8. What is seed biology ? Differentiate between seed and grain.
9. Briefly explain various operations followed during seed processing.
10. Describe the procedure of seed production in India.

4×5=20

SECTION—C

Note : Attempt **TWO** questions from this Section, limiting your answer to about **5** pages.

11. Differentiate between Hutchinson's and Engler and Prantl's system of classification.
12. Elucidate taxonomic description of family Asteraceae with *Helianthus* as a typical example.
13. Give the general characters and diagnostic features of the family Orchidaceae with reference to the genus *Zeuxine*.
14. Define seed quality. Explain different tests designed to determine quality of seed. 6×2=12

Exam. Code : 107402
Subject Code : 2213

B.Sc. Bio-Technology 2nd Semester

INORGANIC CHEMISTRY–B

Paper—BT–3

Time Allowed—3 Hours] [Maximum Marks—40

SECTION—A

All questions are compulsory. Each question carries **1** marks.

1. Give two examples of metal carbonyls which do not obey 18-electron rule.
2. How many bridging carbonyls are present in $Fe_2(CO)_9$ and $Ir_4(CO)_{12}$?
3. Draw the structure of dicyclohexano[18] crown-6 and cryptand [3.3.3].
4. Write a short note on ion-cavity concept.
5. Draw the structure of porphyrin.
6. Define tridentate ligands. Give one example.
7. Write chemical equations involved in photosynthesis.
8. What is Hill constant ? What is the significance of this parameter ?

SECTION—B

Attempt any **five** questions. Each question carries **4** marks.

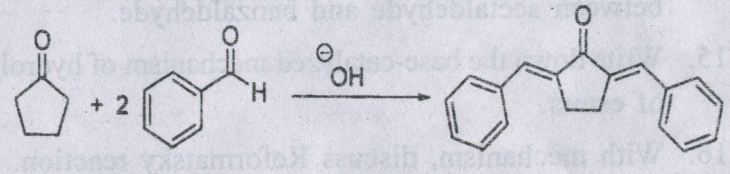
1. How does infrared spectroscopy help in explaining bonding in metal carbonyls ? Can this technique distinguish between the terminal and bridging CO groups in metal carbonyls ? Explain.
2. Give two methods to prepare dinitrogen metal complexes. What is the nature of bonding in linear M-N-N group ? Also compare the bonding of M-N-N with M-C-O group.
3. What do you understand by phase transfer catalysis ? Also discuss its applications.
4. Define cryptand. Give two examples. Also give two methods to prepare cryptands.
5. Derive relationship between stepwise and commulative stability constants.
6. Explain the following :
   (a) $[Ni(en)_3]^{2+}$ (aq) is more stable than $[Ni(NH_3)_6]^{2+}$(aq).
   (b) $[Fe(CN)_6]^{3-}$ is more stable than $[Fe(CN)_6]^{4-}$.
7. Briefly describe the role of zinc containing enzymes in the biological systems.
8. Explain the terms cooperativity effect and Bohr's effect. What explanation is offered for cooperativity effect in hemoglobin ?

SECTION—C

Attempt any **two** questions. Each question carries **6** marks.

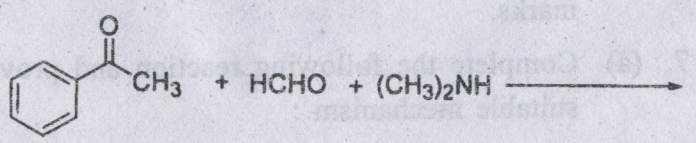
1. (a) How will you prepare $Fe(CO)_5$? Write the possible products obtained when $Fe(CO)_5$ reacts with :
   (i) OH^- and (ii) PPh_3. 3
   (b) Discuss the 18-e rule. Apply 18-e rule to predict the stability of each of the following complexes :
   (i) $[Mn(CO)_5(C_2H_4)]^+$
   (ii) $[(\pi\text{–}C_5H_5)Fe(CO)_3]$. 3
2. Discuss two methods to prepare crown ethers. Also discuss the factors affecting the selectivity of crown ethers. 6
3. (a) What do you understand by the kinetic and thermodynamic stability of co-ordination metal complexes ? 4
   (b) Chelation increases the stability of the complex. Explain. 2
4. Draw and discuss the structure of chlorophyll. Describe the important role played by this biomolecule in biological systems. 6

19. (a) Provide a suitable mechanism for the following conversion :



3

(b) Complete the following reaction and provide a suitable mechanism :



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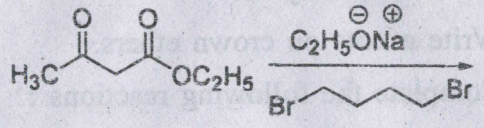
20. (a) Complete the following reaction and provide a suitable mechanism :



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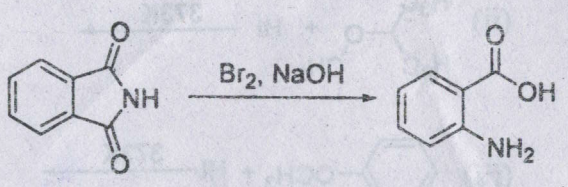
(b) Provide a suitable mechanism for the following conversion :



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Exam. Code : 107402
Subject Code : 2214

B.Sc. Bio-Technology 2nd Semester

ORGANIC CHEMISTRY—B

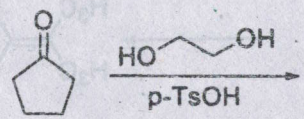
Paper—BT-4

Time Allowed—Three Hours] [Maximum Marks—40

SECTION—A

Note :— ALL questions are compulsory.

1. Alkynes react with ammonical solution of $AgNO_3$ to give a white precipitate but alkenes do not give this reaction. Explain.
2. How will you convert acetylene to 3-octyne ?
3. What are the limitations of Williamson's ether synthesis ?
4. How will you convert ethylene oxide in to 1-Hexanol ?
5. Complete the following reaction with suitable mechanism :

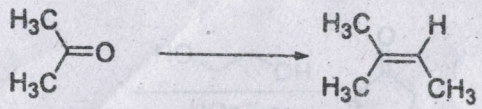


6. What combination of carbonyl compound and ylide would you use to prepare styrene ?
7. Amides are weaker bases than amines, why ?
8. Why acyl chlorides are easily hydrolysed than amides ? 1×8=8

SECTION—B

Note :— Attempt any ***five*** questions. All questions carry equal marks.

9. Alkynes are less reactive than alkenes towards electrophilic addition reactions. Explain.
10. Write down the reaction of but-2-yne with alkali metal in liquid ammonia ? Give its mechanism.
11. Anisole is prepared by the reaction between sodium phenoxide and methyl bromide and not by the reaction between sodium methoxide and bromobenzene.
12. Discuss regioselectivity of ring opening of unsymmetrical oxirane under acidic and basic conditions.
13. Provide suitable conditions for the following conversion and provide a suitable mechanism for it :

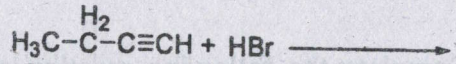


14. With mechanism, discuss how will you distinguish between acetaldehyde and benzaldehyde.
15. Write down the base-catalyzed mechanism of hydrolysis of esters.
16. With mechanism, discuss Reformatsky reaction. 5×4=20

SECTION—C

Note :— Attempt any ***two*** questions. All questions carry equal marks.

17. (a) Complete the following reaction and provide a suitable mechanism :

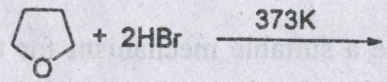


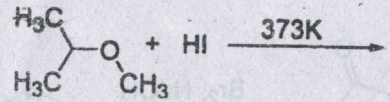
3

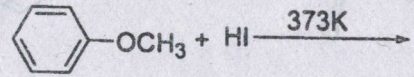
(b) Discuss various factors responsible for the acidity of terminal alkynes. 3

18. (a) Write a note on crown ethers. 3

(b) Complete the following reactions :

(i) 

(ii) 

(iii) 

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Exam. Code : 107402

Subject Code : 2215

B.Sc. Bio-Technology 2nd Semester

BIOSTATISTICS

Paper—BT-5

Time Allowed—3 Hours] [Maximum Marks—40

Note :— The question paper consists of three Sections—A, B and C. The candidates are required to attempt all questions of Section-A, and five questions from Section—B and any two questions from Section—C.

SECTION—A

1. Write short notes around 50 words :

   (i) Representation of Data

   (ii) Discrete Data

   (iii) Sample Space

   (iv) Events

   (v) Scatter diagram

   (vi) Linear Correlation

   (vii) Bernoulli distribution

   (viii) Poisson distribution. 8×1=8

SECTION—B

2. What is goodness of fit ? How will you determine it ?
3. What is T test ? How will you determine it by comparison of sample mean with population mean ?
4. What is scattered diagram ? Explain .
5. What is Linear correlation ? Explain.
6. Explain the Bayes theorem.
7. How will you find linear regression line ?
8. What is normal distribution ? Explain.
9. What is chi-square test ? 5×4=20

SECTION—C

10. The arithmetic mean of 5 observations is 4.4 and the variance is 8.24. If three of the five observations are 1, 2 and 6 find the values of the other two.
11. (a) Explain in detail the use of counting method in probability.

    (b) Define conditional probability.
12. From the following table calculate the coefficient of correlation by Karl Pearson's method :

X :	6	2	10	4	8
Y :	9	11	?	8	7

The arithmetic means of X and Y series are 6 and 8 respectively.

13. The following figures show the distribution of digits in numbers chosen at random from a telephone directory :

Digit :	0	1	2	3	4	5
Frequency :	1026	1107	997	996	1075	933

Digit :	6	7	8	9	Total
Frequency :	1107	972	964	853	10,000

Test whether the digits may be taken to occur equally frequently in the directory (The table values of χ^2 for 9 d.f. at 5% level of significance is 16.92) 2×6=12

Exam. Code : 107402
Subject Code : 2216

B.Sc. Bio-Technology Semester—II

PUNJABI COMPULSORY

Paper–BT-6(i)

Time Allowed—3 Hours] [Maximum Marks—50

ਨੋਟ : ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਜ਼ਰੂਰੀ ਹਨ।

1. ਹੇਠ ਲਿਖੇ ਨਿਬੰਧਾਂ ਵਿੱਚੋਂ ਕਿਸੇ **ਇੱਕ** ਨਿਬੰਧ ਦਾ ਸਾਰ ਆਪਣੇ ਸ਼ਬਦਾਂ ਵਿੱਚ ਲਿਖੋ :

   (ੳ) ਅਚੇਤਨ ਦਾ ਗੁਣ ਤੇ ਸੁਭਾਅ

   (ਅ) ਕੰਪਿਊਟਰ ਅਤੇ ਇੰਟਰਨੈੱਟ 10

2. ਪ੍ਰਿੰਸੀਪਲ ਸੁਜਾਨ ਸਿੰਘ ਦੀ ਕਹਾਣੀ 'ਪਠਾਣ ਦੀ ਧੀ' ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ ਵਰਣਨ ਕਰੋ। 10

3. ਧਾਤੂ ਅਤੇ ਵਧੇਤਰ ਤੋਂ ਕੀ ਭਾਵ ਹੈ ? ਪੰਜਾਬੀ ਵਿੱਚ ਵਧੇਤਰਾਂ ਦੀ ਵਰਤੋਂ ਤੇ ਨੋਟ ਲਿਖੋ। 10

4. ਹੇਠ ਲਿਖੇ ਵਿਸ਼ਿਆਂ ਵਿੱਚੋਂ ਕਿਸੇ **ਇੱਕ** ਵਿਸ਼ੇ ਤੇ ਪੈਰ੍ਹਾ ਰਚੋ :

   (ੳ) ਜਲ ਪ੍ਰਦੂਸ਼ਣ

   (ਅ) ਭਰੂਣ ਹੱਤਿਆ

   (ਏ) ਪੰਜਾਬ ਦੇ ਮੇਲੇ 5

5. ਹੇਠ ਲਿਖਿਆ ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਅੰਤ ਵਿੱਚ ਦਿੱਤੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਢੁਕਵੇ ਉੱਤਰ ਲਿਖੋ :

ਘਰ-ਪਰਿਵਾਰ ਤੋਂ ਇਲਾਵਾ ਸਮਾਜ ਵਿੱਚ ਵਿਚਰਦਿਆਂ ਸਾਡੇ ਕੋਲੋਂ ਅਨੇਕਾਂ ਗ਼ਲਤੀਆਂ ਹੋ ਜਾਂਦੀਆਂ ਹਨ। ਕਈ ਵਾਰ ਛੋਟੀਆਂ-ਛੋਟੀਆਂ ਤਕਰਾਰਾਂ ਵੀ ਹੋ ਜਾਂਦੀਆਂ ਹਨ। ਕੋਈ ਅਜਿਹੀ ਗੱਲ ਜਾਂ ਤਕਰਾਰ ਕਿਸੇ ਦਾ ਦਿਲ ਵੀ ਦੁਖਾ ਦਿੰਦੀ ਹੈ ਅਜਿਹੀ ਗੱਲ ਜਾਂ ਤਕਰਾਰ ਵਰ੍ਹਿਆ ਤੱਕ ਅਣ-ਬਣ ਦਾ ਕਾਰਨ ਬਣੀ ਰਹਿੰਦੀ ਹੈ। ਮੰਨ ਲਓ ਜੇਕਰ ਸਾਡੇ ਕੋਲੋਂ ਅਜਿਹਾ ਕੁਝ ਹੋ ਵੀ ਜਾਂਦਾ ਹੈ ਤਾਂ ਸਾਨੂੰ ਆਪਣੀ ਗ਼ਲਤੀ ਸਵੀਕਾਰ ਕਰ ਲੈਣ ਵਿੱਚ ਕਿਸੇ ਵੀ ਕਿਸਮ ਦੀ ਝਿਜਕ ਨਹੀਂ ਹੋਣੀ ਚਾਹੀਦੀ ਤੇ ਸਾਨੂੰ ਉਸ ਦੀ ਮਾਫ਼ੀ ਮੰਗ ਲੈਣੀ ਚਾਹੀਦੀ ਹੈ। ਗ਼ਲਤੀ ਨੂੰ ਮੰਨਣਾ ਸ਼ਿਸ਼ਟਾਚਾਰ ਦਾ ਇੱਕ ਹਿੱਸਾ ਹੈ। ਕਈ ਵਾਰ ਅਸੀਂ ਗ਼ਲਤੀ ਕਰਨ ਤੋਂ ਬਾਅਦ ਮਾਫ਼ੀ ਮੰਗਣ ਤੋਂ ਇਨਕਾਰੀ ਹੋ ਜਾਂਦੇ ਹਾਂ ਕਿਉਂਕਿ ਅਸੀਂ ਇਸ ਨੂੰ ਆਪਣੀ ਅਣਖ ਨਾਲ ਜੋੜ ਲੈਦੇ ਹਾਂ ਦੇਖਿਆ ਜਾਵੇ ਤਾਂ ਮਾਫ਼ੀ ਮੰਗਣ ਨਾਲ ਸਾਡੀ ਅਣਖ ਨਹੀਂ ਘਟਦੀ ਸਗੋਂ ਸਾਡਾ ਵਿਅਕਤਿਤਵ ਉਜਾਗਰ ਹੁੰਦਾ ਹੈ ਅਤੇ ਕਈ ਵਾਰ ਆਉਣ ਵਾਲੀਆਂ ਮੁਸੀਬਤਾਂ ਤੋਂ ਸਾਡਾ ਬਚਾਅ ਵੀ ਹੋ ਸਕਦਾ ਹੈ। ਛੋਟੇ ਮਸਲੇ ਵੱਡੇ ਨਹੀਂ ਬਣਦੇ ਤੇ ਅਸੀਂ ਤਣਾਅ-ਮੁਕਤ ਰਹਿੰਦੇ ਹਾਂ।

1. ਸਮਾਜ ਵਿੱਚ ਵਿਚਰਦਿਆਂ ਕਈ ਵਾਰ ਸਾਡੇ ਕੋਲੋਂ ਕੀ ਹੋ ਜਾਂਦਾ ਹੈ ?
2. ਸਾਨੂੰ ਕਿਸ ਕਿਸਮ ਦੀ ਝਿਜਕ ਨਹੀਂ ਹੋਣੀ ਚਾਹੀਦੀ ?
3. ਕਈ ਵਾਰ ਅਸੀਂ ਗ਼ਲਤੀ ਮੰਨਣ ਤੋਂ ਇਨਕਾਰੀ ਕਿਉਂ ਹੋ ਜਾਂਦੇ ਹਾਂ ?
4. ਗ਼ਲਤੀ ਦੀ ਮਾਫ਼ੀ ਮੰਗਣ ਨਾਲ ਕੀ ਹੁੰਦਾ ਹੈ ?
5. ਆਉਣ ਵਾਲੀਆਂ ਮੁਸੀਬਤਾਂ ਤੋਂ ਸਾਡਾ ਬਚਾਅ ਕਿਵੇਂ ਹੋ ਸਕਦਾ ਹੈ ? 5

6. ਹੇਠ ਲਿਖੇ ਮੁਹਾਵਰਿਆਂ ਅਤੇ ਅਖਾਣਾਂ ਵਿਚੋਂ ਕੋਈ **ਪੰਜ** ਮੁਹਾਵਰੇ ਅਤੇ **ਪੰਜ** ਅਖਾਣਾਂ ਨੂੰ ਵਾਕਾਂ ਵਿੱਚ ਇਸ ਤਰ੍ਹਾਂ ਵਰਤੋਂ ਕਿ ਇਹਨਾਂ ਦੇ ਅਰਥ ਸਪੱਸ਼ਟ ਹੋ ਜਾਣ :

(ੳ) ਅੱਖਾਂ ਫੇਰ ਲੈਣਾ, ਅਲਖ ਮੁਕਾਉਣਾ, ਈਨ ਮੰਨਣਾ, ਸੁੱਕਣੇ ਪਾ ਛੱਡਣਾ, ਹੱਥ-ਪੈਰ ਮਾਰਨਾ, ਕੱਚਾ ਕਰਨਾ, ਚਿੱਕੜ ਸੁਟਣਾ, ਡੰਡੇ ਵਜਾਉਣਾ।

(ਅ) ਆਪਣਾ ਨੀਂਗਰ ਪਰਾਇਆ ਢੀਂਗਰ, ਕੰਮ ਪਿਆਰਾ ਹੈ ਚੰਮ ਨਹੀਂ, ਗਊ ਪੁੰਨ ਦੀ ਦੰਦ ਕੌਣ ਗਿਣੇ, ਚੋਰ ਨੂੰ ਨਾ ਮਾਰੋ ਚੋਰ ਦੀ ਮਾਂ ਨੂੰ ਮਾਰੋ, ਜਿਥੇ ਪਈ ਫੂੱਟ ਉੱਥੇ ਪਈ ਲੁੱਟ, ਠੂਹ ਮਾਸੀ ਸਲਾਮ, ਡੁੱਬੀ ਤਾਂ ਜੇ ਸਾਹ ਨਾ ਆਇਆ, ਮਨ ਹਰਾਮੀ ਹੁੱਜਤਾਂ ਢੇਰ। 5+5=10

Exam. Code : 107402
Subject Code : 2218

B.Sc. Bio-Technology Semester—II

COMMUNICATION SKILLS IN ENGLISH

Paper–BT-7

Time Allowed—3 Hours] [Maximum Marks—35

Note : Attempt **all** questions. Each question carries **5** marks.

1. What is Feedback ? What are the advantages of Feedback ?
2. What is Note Taking ? Explain the techniques used for Note Taking.
3. Suppose you are talking to a tele-marketing service. Find out these details about a travel iron :
   (a) Make
   (b) Size
   (c) Weight
   (d) Suitability for ironing heavy clothes
   (e) Delivery time
   (f) Price
   (g) Payment mode.
4. Complete the following dialogue :
   (Mrs. Prasad invites a neighbour to her house-warming)
   Mrs. Prasad : We are having a house-warming party at eight o'clock on Sunday morning. We'd.....

Neighbour : .....

.....(accept)

.....

.....(decline)

5. Suppose you are Anita. You would like to leave college by 12 noon because you have to participate in a painting competition at 2 p.m. Write a dialogue asking your principal for permission to leave.

6. Mark stress (Do any **Five**) :
Character, Delay, Agenda, Defend, Asthma, Princess, Assure.

7. Transcribe the following words (Do any **Five**) :
Tea, Car, About, Told, Special, Dance, Always.

Exam. Code : 107402
Subject Code : 2219

B.Sc. (Bio-Technology) Semester—II

GENERAL MICROBIOLOGY–B

Paper–BT-8

Time Allowed—3 Hours] [Maximum Marks—40

SECTION–A

(Answer **ALL** questions)

1. Write short notes in about 50 words each :

   (i) Doubling time

   (ii) Specific growth rate

   (iii) Bacteriophage

   (iv) Plant viruses

   (v) Pathogenic microorganisms

   (vi) Industrial Microorganisms

   (vii) Fermentation products

   (viii) Heterologous proteins. 1×8=8

SECTION–B

(Attempt any **FIVE** questions)

2. Define syntrophism and discuss an example of the phenomenon.

3. Explain the typical growth curve.

4. Describe the structure of bacteriophage.

5. Describe the bacterial endospore.

6. What are the Nitrogen fixing microbes ?

7. What is Symbiosis ?

8. Discuss the metabolite production through bioprocess engineering.

9. Discuss the vectors used for production of heterologous protein.

5×4=20

SECTION–C

(Attempt any **TWO** questions)

10. Describe the lysogenic cycle of bacteriophage.

11. Discuss the biphasic growth curve.

12. Describe the sporulation of bacteria.

13. Describe the defence mechanism against pathogenic micro-organism.

2×6=12