Roll No. .....

91048

B. Sc. Bio-Technology
1st Semester w.e.f. 2012-13
Examination – December, 2022

CELL BIOLOGY

Paper : BT-103

Time : Three hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

प्रश्नों के उत्तर देने से पहले परीक्षार्थी यह सुनिश्चित कर लें कि उनको पूर्ण एवं सही प्रश्न-पत्र मिला है। परीक्षा के उपरान्त इस संबंध में कोई भी शिकायत नहीं सुनी जायेगी।

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. 1 is ***compulsory***.

प्रत्येक इकाई से ***एक*** प्रश्न चुनते हुए, कुल ***पाँच*** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 ***अनिवार्य*** है।

1. Answer the following : $1 \times 10 = 10$

निम्नलिखित के उत्तर लिखिए :

(a) What is heterochromatin ?

हेट्रोक्रोमेटिन क्या है ?

(b) What do you mean by interkinesis ?

इंटरकाइनेसिस क्या है ?

(c) Name different parts of an oxysome.

ऑक्सीसोम के विभिन्न भाग कौन-से है ?

(d) Name the protein factories of the cell.

कोशिका का प्रोटीन कारखाना कौन है ?

(e) What is a Thylakoid ?

थायलाकोइड क्या है ?

(f) What is a Quantasome ?

क्वांटासोम क्या है ?

(g) What are Lysosomes ?

लाइसोसोम क्या है ?

(h) Define Karyokinesis.

कैरियोकाइनेसिस को परिभाषित करें।

(i) Define Carcinogen.

कार्सीनोजेन को परिभाषित करें।

(j) Name the cells that lack mitochondria.

किस कोशिका में माइटोकॉण्ड्रिया की कमी होती है ?

UNIT – I

इकाई – I

2. Explain structure of cell membrane. 7.5

कोशिका झिल्ली की संरचना की व्याख्या करें।

3. Describe the structure and function of cell wall. 7.5

कोशिका भित्ति की संरचना एवं कार्य का वर्णन करें।

UNIT – II

इकाई – II

4. Write note on : 3.5 + 4 = 7.5

टिप्पणी लिखें :

(a) Microtubules

सूक्ष्मनलिकाएँ

(b) Golgi apparatus

गॉल्जी उपकरण

5. Discuss in detail account of endoplasmic reticulum (ER). Write the functions of ER. 7.5

इन्डोप्लाज्मिक रेटिकुलम का विस्तारपूर्वक वर्णन कीजिए एवं इसके कार्य लिखें।

UNIT – III

इकाई – III

6. Why the mitochondria are called semiautonomous organelles ? Discuss in detail with diagram. 7.5

माइटोकॉण्ड्रिया को सेमीऑटोनॉमस ऑर्गनेल्स क्यों कहते हैं ? चित्र सहित विस्तार से बताएँ।

7. Explain the ultrastructure of choloroplast. 7.5

क्लोरोप्लास्ट की संरचना की व्याख्या करें।

UNIT – IV

इकाई – IV

8. Write note on : $4 + 3.5 = 7.5$

टिप्पणी लिखें :

(a) Extracellular Matrix

कोशिकी साँचा

(b) Cancer

कैंसर

9. What is Cancer ? Write down about its type, causes and characteristics of cancer cells. 7.5

कैंसर क्या है ? इसके प्रकार, कारण एवं कैंसर कोशिका की विशेषताएँ बताएँ।

Roll No. .....

91049

B. Sc. Bio-Technology 1st Semester w.e.f. 2012-13 Examination – December, 2022

BIOCHEMISTRY & METABOLISM

Paper : BT-104

Time : Three hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Write note on : $1 \times 8 = 8$

(a) Homopolysaccharides

(b) Renaturation of proteins

(c) Glycogenolysis

(d) Coenzymes

(e) Nucleotides

(f) Bacterial cell wall

(g) ETC

(h) Activation energy of enzymes

UNIT – I

2. What are Proteins ? Briefly explain their properties and classification. 8

3. Write a brief note on structure and functions of various types of Carbohydrates. 8

UNIT – II

4. (a) Classify different types of fatty acids. $4 \times 2 = 8$

   (b) Structure and function of lipids.

5. Write note on the following : $4 \times 2 = 8$

   (a) Denaturation and annealing of DNA

   (b) Types of DNA

UNIT – III

6. Write note on the following : $4 \times 2 = 8$

   (a) Apoenzymes

   (b) Prosthetic groups

7. What are Enzymes ? Give their essential properties and explain various theories associated with its action. 8

UNIT – IV

8. Write note on the following : $4 \times 2 = 8$

(a) Oxidative phosphorylation

(b) Glycolysis

9. Discuss β-oxidation of fatty acids. 8

Roll No. .....

91050

B. Sc. Bio-Technology
1st Sem. w.e.f. 2012-13
Examination – December, 2022

PHYSICAL CHEMISTRY

Paper : BT-105

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Why air is less dense at a hill station than at sea level ? $1 \times 8 = 8$

(b) State the term 'Critical pressure'.

(c) What is Collision frequency ?

(d) List various types of liquids crystals.

(e) Write the expression of heat capacity at constant volume (C_v) of a Non-linear molecule having 'N' number of atoms.

(f) Name the primitive unit cells in which a=b=c.

(g) Define space lattice.

(h) Which crystal system is isotropic and why ?

SECTION – A

2. (a) Define three different types of molecular velocities. How are they related with each other ? 4

(b) Define mean free path. Derive expression for it. Deduce the effect of pressure on the mean free path. 4

3. (a) Discuss the causes of deviation from ideal behavior. How they are accounted for in the vander Waals equation ? 4

(b) Explain the terms 'compressibility factor' and 'Boyle temperature'. 4

SECTION – B

4. (a) State and explain the principle of corresponding states. Deduce the equation 4

$$\left[\left(\pi + 3/\phi^2\right)\right](3\phi - 1) = 8\theta$$

(b) Discuss the Claude's method for liquefaction of gases. 4

5. (a) The critical temperature and critical pressure of CO_2 gas is 300 K and 50 atmosphere respectively (R = 0.082 litre atm degree^{-1} mol^{-1}). Calculate the van der Waals' constants of the gas. 4

(b) Derive an expression of the relation between critical pressure, critical volume and critical temperature. 4

SECTION – C

6. (a) Define the terms surface tension and surface energy. Discuss drop weight method for determination of surface tension in the laboratory. 4

(b) Write notes on the following : 4

(i) Vapour pressure

(ii) Optical exaltation

7. (a) What is meant by coefficient of viscosity of a liquid ? Explain the affect of temperature on viscosity. 4

(b) Write a note on Rheochor. How rheochor is useful in the determination of molecular masses of polymers ? 4

SECTION – D

8. (a) At what angles (θ) will x-rays of wavelength 154.2 pm will undergo first order and second order reflections by planes separated by 350 pm ? 4

(b) What are liquid crystals ? How would you account for turbidity observed in liquid crystals ? 4

9. (a) Calculate the Miller indices of crystal planes which cut through the crystal axes at (i) 2a, 3b, c (ii) 6a, 5b, 3c. 4

(b) Both NaCl and KCI have similar structures, yet their X-ray diffraction patterns are remarkably different. Why ? 4

Roll No. .....

91051

B. Sc. Bio-Technology 1st Semester w.e.f. 2012-13 Examination – December, 2022

INORGANIC CHEMISTRY

Paper : BT-106

Time : Three hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Section. Question No. 1 is ***compulsory***.

1. (a) What is $(n + l)$ rule ? $1 \times 8 = 8$

(b) How many nodes are present in 5d orbitals ?

(c) What is penetration effect ?

(d) What is electronegativity ?

(e) Why all the P-F bonds in PF_5 are not equivalent ?

(f) Explain the structure of SF_4 molecule.

(g) Why Silver halides have low solubility in water ?

(h) Why *LiCl* has higher boiling point than *HCl* ?

SECTION – A

2. (a) Calculate the kinetic energy of a moving electron which has a wavelength 4.8 pm. (Mass of electron $= 9.11 \times 10^{-31}$ kg, $h = 6.63 \times 10^{-34}$ kgm^2s^{-1}). 4

(b) Explain the dual nature of light and derive de Broglie equation. 4

3. (a) Write all sets of quantum numbers for the following : 3

(i) $n = 4, l = 3$

(ii) $n = 3, l = 2$

(iii) $n = 1, l = 0$

(b) What is the significance of uncertainty principle in our daily life ? 2

(c) Differentiate between orbit and orbital. 3

SECTION – B

4. (a) Describe : 4

(i) Hund's multiplicity rule

(ii) Pauli's exclusion principle

(b) What is electron affinity ? Describe the factors on which it depends. 4

5. (a) Using Slater's rule, calculate the effective nuclear charge of : 4

(i) 2p electron in nitrogen

(ii) 3p electron in phosphorus

(b) Give reason : 4

(i) Electron affinity of fluorine is less than chlorine.

(ii) The second ionization energy of Sodium is very high.

SECTION – C

6. (a) Draw the molecular orbital diagram of CO and calculate its bond order. 4

(b) On the basis of hybridization, explain the structure of IF_7. 4

7. (a) BF_3 is triagonal planar while NH_3 is pyramidal. Explain. 4

(b) Explain the hybridization and shape of ClF_3 molecule. 4

SECTION – D

8. (a) Describe the structure of CaF_2. 4

(b) Explain Fajan's rules with suitable examples. 4

9. (a) Describe Born-Haber cycle for the calculation of lattice energy for the formation of *NaCl*. 4

(b) Explain : 4

(i) Schottky defects

(ii) n- and p-type semiconductor
