



WEST BENGAL STATE UNIVERSITY
B.Sc. Major 2nd Semester Examination, 2024



ZOODSC202T-ZOOLOGY (MAJOR)

Time Allotted: 2 Hours

Full Marks: 50

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

1. Answer any **nine** questions from the following:

2×9 = 18

- What is pseudocoelom? Name one pseudocoelomate animal.
- What is radula? Write its function.
- Define torsion.
- What is clitellum? Where it can be found?
- Distinguish between Protostomes and Deuterostomes.
- What are malpighian tubules? State its function.
- State the significance of metameric segmentation in Annelida.
- What do you mean by stomochord?
- What is tubefeet? Mention its function.
- Differentiate between enteronephric and exonephric nephridia.
- What is mantle? In which phylum does it occur?
- What is chiastoneury?

2. Answer any **four** questions from the following:

3×4 = 12

- Write down the salient features of class Insecta. Give one example each of class Cirripedia and Copepoda. 2+1
- Classify phylum Mollusca upto class with one example of each. 3
- Explain functional significance of Water Vascular System in Asteroidea. 3
- Classify the following upto class and write down the scientific names— 3
 - Cuttle fish
 - Horseshoe crab
 - Sea urchin
- State the general characteristic features of Phylum Onychophora. 3

Turn Over



NEP/B.Sc./Major/2nd Sem./ZOODSC202T/2024

- (f) To which phylum does the following structures belong and mention one function of each 3
- (i) Madreporite
 - (ii) Coxal glands
 - (iii) Nephridia
- (g) Describe morphological features of Trochophore larva. 3
3. Answer any **four** questions from the following: 5×4 = 20
- (a) What is coelom? Discuss the development of different types of coelom with proper diagrams. 1+4
 - (b) Discuss the mechanism and effects of torsion in gastropod. What is detorsion? 2+2+1
 - (c) What are the basic components of water vascular system? Draw a labelled diagram of water vascular system of starfish. 2+3
 - (d) Comment on the different types of excretory structures found in Annelida. 5
 - (e) Describe the mechanism of vision in Arthropoda with the help of diagram. 5
 - (f) Briefly explain the process of filter feeding in Balanoglossus with diagram. 3+2
 - (g) Write short notes on (any **one**): 5
 - (i) Nuptial flight of honey bee
 - (ii) Respiratory pigments of insects



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2023
ZOOACOR03T-ZOOLOGY (CC3)



Time Allotted: 2 Hours

Full Marks: 40

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Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What is Parapodia?
 - (b) What do you mean by Ecdysis?
 - (c) State two differences between homonomous metamerism and heteronomous metamerism.
 - (d) What is haemocoel?
 - (e) What is nacreous layer?
 - (f) What is Royal jelly?
 - (g) What is Organ of Bojanus?
 - (h) What is Tiedemann's body?
 - (i) What is Polian Vesicle? Write its function.
 - (j) What is ommatidium?
 - (k) State the differences between Taenidia and Ctenidia.
 - (l) What is Solenocytes? Mention its function.

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) To which phylum does the following structures belong and mention one function of each
 - (i) Tube feet
 - (ii) Nephrostome
 - (iii) Proboscis
 - (b) Briefly illustrate the division of labour found in different castes in honey bee.
 - (c) Draw and describe the structure of a typical nephridia.
 - (d) Mention the annelid characters of *Peripatus* sp.
 - (e) State the general characteristic features of Trochophore larva.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Name the Phylum and Class of the following animals —
 - (i) Sea-Urchin
 - (ii) Sea-Mussel
 - (iii) Silver Fish
 - (iv) Sea Mouse
 - (v) *Buthus* sp.
 - (b) Write short notes on any **two** of the following: 2½ × 2 = 5
 - (i) Bee dance
 - (ii) Trachea of insect
 - (iii) Superposition Image.
 - (c) Classify Phylum Mollusca upto class with suitable examples.
 - (d) (i) What is the mechanism of natural pearl formation? 3+2
(ii) Explain the process of detorsion in gastropods.
 - (e) Briefly describe the structure of Auricularia larva with suitable diagram.

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2023

ZOOACOR04T-ZOOLOGY (CC4)

CELL BIOLOGY



Time Allotted: 2 Hours

Full Marks: 40

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GROUP-A

1. Answer any **eight** questions from the following: 2×8 = 16
- (a) What is Zellweger syndrome?
 - (b) What do you mean by PPLO?
 - (c) Distinguish between apoptosis and necrosis.
 - (d) Name any four types of enzymes that are found inside lysosomes.
 - (e) What is nuclear matrix?
 - (f) State the role of Troponin in muscle contraction.
 - (g) What is tumor suppressor gene? Give an example. 1+1
 - (h) What do you mean by ERGIC?
 - (i) Distinguish between G₂ and M check point.
 - (j) What is an example of a DNA virus and an example of a RNA virus? 1+1
 - (k) Briefly comment on receptor mediated endocytosis.
 - (l) What is prion? What is the most common form of prion disease that affects human? 1+1

GROUP-B

2. Answer any **three** questions from the following: 3×3 = 9
- (a) Why p53 is considered as the guardian of genome?
 - (b) Discuss Na⁺ / K⁺ ATPase activity with suitable diagram.
 - (c) State the functions of peroxisomes.
 - (d) What is GLUT? Name the factors that affect the rate of facilitated diffusion. 2+1
 - (e) Distinguish between protooncogene, oncogene and tumour suppressor gene.

GROUP-C

3. Answer any **three** questions from the following: 5×3 = 15
- (a) What is RB protein? How does it influence the eukaryotic cell cycle? 1+4
 - (b) Discuss the best fitted model of plasma membrane with proper diagram. 3+2
 - (c) What are second messengers? Explain the role of cAMP as second messenger. 2+3
 - (d) What is focal adhesion? Why does actively transcribing nucleus have more pores in nuclear membrane? 2+3
 - (e) Elaborate the functions of Lysosomes. Comment on Tay-Sachs disease. 3+2

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WEST BENGAL STATE UNIVERSITY
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ZOOACOR03T-ZOOLOGY (CC3)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What is chiastaneury?
 - (b) What is coelom? Name one pseudocoelomate animal.
 - (c) Write the functions of radula and osphradium.
 - (d) Mention two functions of worker bees in a honey comb.
 - (e) Write two similarities of Phylum Hemichordata with Phylum Annelida.
 - (f) Write two characters of Bipinnaria larva of Phylum Echinodermata.
 - (g) Mention the function and location of tubefeet.
 - (h) What is madreporite? State its function.
 - (i) What is Parapodia? Where is it found?
 - (j) What is ink gland? State its function.
 - (k) What is metamere? Name an animal which shows true metamerism.
 - (l) Define a metabolous metamorphosis in insects. Give example.

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) To which Phylum does the following structures belong and mention one function of each
 - (i) Clitellum (ii) Malpighian tubules (iii) Ctenidia
 - (b) State the general characteristic features of Phylum Onychophora.
 - (c) Compare between Schizocoelous and enterocoelous mode of coelom formation.
 - (d) Draw a labelled diagram and write the salient features of Pluteus larva. 1+2
 - (e) State the advantages and disadvantages of torsion in Gastropods.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Name the Phylum and class of the following animals—
 - (i) Sea cucumber (ii) King crab (iii) Devil fish (iv) *Saccoglossus* sp.
 - (v) *Hirudinaria* sp.



- (b) Write short notes on any *two* of the following:
- (i) Holometabolous metamorphosis of insects
 - (ii) Reproductive caste of termites
 - (iii) Protonephridia
- (c) Describe the structure associated with aquatic respiration in mollusca with suitable diagram. 3+2
- (d) Describe the structure of water vascular system of *Asterias* sp. with a suitable diagram. 3+2
- (e) Classify Phylum Annelida up to class with suitable examples.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2022

ZOOACOR04T-ZOOLOGY (CC4)

Time Allotted: 2 Hours

Full Marks: 40

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Candidates should answer in their own words and adhere to the word limit as practicable.

1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What is chromatosome?
 - (b) What do you mean by desmosome?
 - (c) What are aquaporins?
 - (d) What do you mean by MPF?
 - (e) What is linker histone?
 - (f) Distinguish between passive transport and facilitated diffusion?
 - (g) Describe ABC transporter.
 - (h) Name a few intermediate filament proteins. Which one is found in nucleus?
 - (i) What are functions of smooth endoplasmic reticulum?
 - (j) Distinguish between mitochondrial DNA and nuclear DNA.
 - (k) What is the function of peroxisome?
 - (l) What is F₁ particle?

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) Distinguish between SER and RER.
 - (b) Mention the functional significance of two faces of Golgi complex.
 - (c) What do you mean by capsomere?
 - (d) Distinguish between tight junction and gap junction.
 - (e) Write the intrinsic pathway of Apoptosis with suitable diagram.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Write the chemical composition of a Plasma membrane. How does the Fluid Mosaic model of Singer Nicholson differ from the unit membrane model of Robertson? 3+2
 - (b) Explain the role of nitric oxide as a cellular signalling molecule.
 - (c) Describe the structure of myosin filament with labelled diagram. State the role of caspase-8 in inducing cell apoptosis. 3+2
 - (d) Write the chemical structure of a bacterial cell wall. Distinguish between Gram positive and Gram negative bacteria.
 - (e) Explain, how the flow of electrons through the electron transport chain is translated into ATP synthesis.

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2021

ZOOACOR03T-ZOOLOGY (CC3)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

1. Answer any **eight** questions from the following: 2×8 = 16
- Distinguish between holometabolous and hemimetabolous.
 - Name two hormones that control metamorphosis in insects.
 - What is nuptial flight?
 - What is parapodia? Where do you find it?
 - Differentiate between true metamerism and pseudometamerism.
 - Mention functions of Tube feet.
 - What is monopectinate gill? Give example.
 - What is Tiedemann's body? Mention functions of it.
 - Differentiate between torsion and detorsion in gastropods.
 - In which animal 'Aristotle's Lantern' is found? What is its function?
 - Mention two functions of nephridia.
 - What do you mean by 'metamere'? Which two body parts are never be metameric?
 - Differentiate between schizocoely and enterocoely.
 - What is 'Organ of Bojanus'?
 - Define ametabolous metamorphosis in insects.
2. Answer any **three** questions from the following: 3×3 = 9
- In which phylum the following structures are found? Write one functional role from these following structures.
(i) Radula (ii) Malpighian tubules (iii) Tiedman's body
 - State briefly about the endocrine control of the metamorphosis in insects with suitable illustrations.
 - Write short note on any **one**:
(i) Bee dance
(ii) Hemimetabolous metamorphosis.



- (d) State briefly the significance of torsion in Gastropoda.
 (e) Briefly describe the various castes found in social life of bees.

3. Answer any **three** questions from the following: 5×3 = 15
- (a) Draw and describe components of a typical water vascular system in *Asterias* sp. 5
- (b) Name the phylum and class of the following animals: 1×5=5
- (i) Sea-Mouse (ii) Sea lily (iii) Barnacle
 (iv) Silverfish (v) Sea hare
- (c) Describe with a proper diagram the structure of Auricularia larva. 3+2
- (d) Write short notes on any **two** of the following: $2\frac{1}{2} \times 2 = 5$
- (i) Termitarium (ii) Metamerism in Annelida (iii) Detorsion in gastropods
- (e) What are the respiratory organs of mollusca? Discuss the mechanism of aquatic respiration of molluscan. 2+3

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 2nd Semester Examination, 2021

ZOOACOR04T-ZOOLOGY (CC4)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) Differentiate between active and passive transport.
 - (b) Define Gap Junctions.
 - (c) State the semi-autonomous nature of mitochondria.
 - (d) Differentiate between pinocytosis and phagocytosis.
 - (e) Define first messenger and second messenger in a cell signaling pathway.
 - (f) Define apoptosis. Differentiate it with necrosis.
 - (g) What is GPCR? Write down its subunits and their functional aspects.
 - (h) State the role of lysosome in cellular functioning.
 - (i) What do you know about linker histone.
 - (j) What do you mean by PLP model of plasma membrane?
 - (k) What are RTK and non-RTK receptors?
 - (l) What are caspase and anti-apoptotic factors?
 - (m) Write and draw the structure of myosin filaments.
 - (n) State the constituents of nucleosome core particle.
 - (o) What is Virion?

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) Differentiate between mitosis and meiosis. Why meiosis is called reductional division? 1+2
 - (b) What is rough ER? State its role in protein synthesis. What ER is closely positioned to nucleus? 1+1+1
 - (c) Name one nuclear receptor and membrane receptor in cellular signaling. Elaborate signaling pathway (any **one**). 1+2
 - (d) Portray an account of Na⁺/K⁺ pump or Na⁺/K⁺ ATPase activity with suitable diagram. 3



- (e) Describe the sliding filament mechanism for contraction- relaxation cycle of actin and myosin microfilaments with diagramme.
- (f) Describe the role of cyclin-cdks in cell cycle.

3. Answer any **three** questions from the following: 5×3 = 15
- (a) Why mitochondrion is called the power house of the cell? Elaborate the role of F₀-F₁ particle in mitochondrial respiratory chain. 1½ + 3½
- (b) Furnish an account on the ultrastructure of Golgi complex with suitable diagram. 5
- (c) Discuss the role of cAMP as a secondary messenger in signal transduction pathway. What are ionophores? 4+1
- (d) Explain the extrinsic pathway of the programmed cell death. Distinguish between constitutive and facultative heterochromatin. 3+2
- (e) What do you mean by negative regulator of cell cycle? State the role of Rb and p53 in cell cycle regulation. 1+4
- (f) Delineate the structure of nuclear lamina with suitable diagram. What is the major function of the nuclear envelope? 4+1

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2020

ZOOACOR03T-ZOOLOGY (CC3)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
- State two main characteristics of Phylum Annelida.
 - Define “Nacre”.
 - Name the hormones that control metamorphosis in insects.
 - Define rhabdomere.
 - Define stone canal. Write its functions.
 - What is coelomoducts?
 - What do you mean by mosaic vision?
 - Differentiate between haemolymph and haemocyanin.
 - State two characteristic features of Bipinnaria larva of Echinodermata.
 - What is the function of Drone bees?
 - Define chiastoneury.
 - State two examples (Scientific names) of subphylum Crustacea of Phylum Arthropoda.
 - Differentiate between torsion and detorsion.
 - How do you justify the name Echinodermata?
 - Name one acoelomate and one coelomate animal.
2. Answer any **three** questions from the following: 3×3 = 9
- Write short note on any **one**: 3×1
 - Nephridium
 - Ctenidia
 - State the general characteristics of Onychophora.
 - In which Phylum the following structures are found? 1+1+1
 - Osphradium
 - Rectal gills
 - Ambulacral groove



- (d) Briefly describe the various castes found in the social life of a termite.
 (e) Discuss the advantages of torsion.
 (f) Why are hemichordates not considered as chordates?
 (g) Describe Hemimetabolous metamorphosis in insects with suitable diagram.

2+1

3. Answer any *three* questions from the following:

5×3 = 15

(a) Briefly describe the structure of Auricularia larva with proper diagram.

3+2

(b) Name the Phylum and Class of the following animals:

(i) Sea Lily (ii) *Bombyx mori* (iii) *Hirudinaria sp.*

(iv) Cuttlefish (v) *Dolichoglossus sp.*

(c) Classify Phylum Echinodermata up to classes with examples.

(d) State briefly the significance of Trochophore larva.

(e) Describe the structures associated with terrestrial respiration process in Mollusca with suitable diagram.

3+2

(f) Write short notes on any *two* of the following:

2 $\frac{1}{2}$ × 2

(i) Superposition image

(ii) Arthrobranch gill

(iii) Nuptial flight of honey bee

(g) Describe briefly different types of metamerism found in different animals with suitable diagrams.

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2020

ZOOACOR04T-ZOOLOGY (CC4)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What is synaptonemal complex?
 - (b) What do you mean by GERL system?
 - (c) What is tumor suppressor gene? Give example.
 - (d) Write two differences between genomic DNA and mitochondrial DNA.
 - (e) Differentiate between desmosome and hemidesmosome.
 - (f) Differentiate between SER and RER.
 - (g) Differentiate between primary and secondary lysosome.
 - (h) What is “unit membrane” according to Robertson?
 - (i) What is chromatosome?
 - (j) Name the amino acids present in histone protein.
 - (k) How do viroids differ from viruses?
 - (l) What do you mean by polarization of Golgi body?
 - (m) What is restriction point in cell cycle?
 - (n) What is autocrine and juxtacrine signalling?
 - (o) Why plasma membrane is called amphipathic?

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) Why p53 is considered as the guardian of the genome?
 - (b) Differentiate between microtubules, microfilaments and intermediate filaments.
 - (c) Write the role of facilitated transport in taking up glucose into cell.
 - (d) State the chemical structure of bacterial cell wall.
 - (e) Why mitochondria are considered as semiautonomous organelles?
 - (f) Compare between desmosome, tight junction and gap junction.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) What is mitoribosome? Briefly describe the structure of ATP synthase. 1+4
 - (b) What do you mean by extra and intra cellular receptor? State the structure of G protein coupled receptor. 2+3



- (c) What is MPF? Schematically explain G2-M check point regulating mechanism.
- (d) What is oncogene? Describe how protooncogenes can be converted into oncogenes.
- (e) What is nuclear pore complex? State the nucleosome concept briefly.
- (f) Why mitochondrion is known as power house of cell? Explain the electron transport chain (ETC) with a diagram.

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2019

ZOOACOR03T-ZOOLOGY (CC3)

Time Allotted: 2 Hours

Full Marks: 40

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All symbols are of usual significance.*

1. Answer any **eight** questions from the following: 2×8 = 16
- Write two similarities of phylum Hemichordata with phylum Annelida.
 - What is ommatidium? Mention its function.
 - Name marine and fresh water oysters responsible for productions of pearl.
 - Define coelom. Name one pseudocoelomate animal.
 - Write two main characters of phylum Mollusca.
 - Name the phylum with (i) no fresh water animals and (ii) with largest number of animals.
 - How do you justify the name "Hemichordata"?
 - What is madreporite? Write its function.
 - Name the phylum to which *Peripatus* belongs. Write two characters of the phylum.
 - Write the functions of radula and osphradium.
 - What do you mean by "metamere"? Which two body-parts never be metameric?
 - What is the difference between open and closed types of blood circulation?
2. Answer any **three** questions from the following: 3×3 = 9
- Draw, label and describe the structure of Pluteus larva. 1+1+1
 - In which phylum following structures are found? 1+1+1
 - Cirri.
 - Ctenidia,
 - Tiedmann's body
 - Briefly illustrate the divisions of labour found in different castes of a honey bee. 3
 - State significance of torsion in gastropods. 3
 - Write short note on any one: (i) Schizocoelom, (ii) Book lung. 3×1 = 3



3. Answer any *three* questions from the following:

(a) Name the phylum and class of the following animals:

- (i) *Lepisma* sp., (ii) *Saccoglossus* sp., (iii) *Nereis* sp.,
(iv) Squids, (v) Sea cucumber

(b) Classify phylum Annelida up to classes with example.

5

(c) Discuss the different types of metamorphosis found in insects with suitable example.

5

(d) Write the scientific names of two pearl forming bivalves. What is the mechanism of natural pearl formation? What is blister pearl?

2+2+1

(e) Draw and label the component parts of a typical water vascular system of *Asterias* sp. and briefly describe the mechanism of water-flow through it.

3+2

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WEST BENGAL STATE UNIVERSITY
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ZOOACOR04T-ZOOLOGY (CC4)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What is flip-flop movement?
 - ~~(b)~~ Give an example of biomolecules synthesized in peroxisomes.
 - ~~(c)~~ What is Viroid? Name one disease caused by it.
 - ~~(d)~~ Name one RNA virus and one DNA virus.
 - ~~(e)~~ What are cell cycle check points?
 - (f) State the differences between nucleoid and nucleus.
 - (g) What is Zonula Occludens? State its function.
 - ~~(h)~~ Name one microfilament and one microtubule with their function.
 - ~~(i)~~ Name two components of extracellular matrix (ECM).
 - ~~(j)~~ What is MPF? State its function.
 - (k) What are MTOC and Kinetochore?
 - ~~(l)~~ Write two functions of Mitochondria.

2. Answer any **three** questions from the following: 3×3 = 9
 - ~~(a)~~ Differentiate between light and gap junctions with proper diagrams.
 - ~~(b)~~ How DNA is packed in a nucleosome? What is a linker DNA?
 - (c) Write a note on endosymbiotic theory of organelles.
 - ~~(d)~~ Explain in brief how prions cause diseases with suitable examples.
 - (e) Differentiate between protooncogene, oncogene and tumour suppressor gene.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Differentiate between lytic and lysogenic cycles of virus. Mention their importance as infections strategy. Give an example of viral oncogene. 3+1+1
 - ~~(b)~~ Differentiate between intrinsic and extrinsic pathways of apoptosis. Mention the functions of caspases in this process. 3+2
 - (c) Discuss briefly how proteins are synthesized, modified and secreted through GERL system. 5
 - ~~(d)~~ Discuss the role of cAMP as second messenger in cell signal transduction. 5
 - ~~(e)~~ Describe in brief the most accepted model of plasma membrane with a proper diagram. Name the scientist(s) who proposed the model. 2+2+1