

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1368

I

Unique Paper Code : 2232011101

Name of the Paper : Non Chordata-Protista to
Pseudocoelomates (DSC-1)

Name of the Course : B.Sc. (H) Zoology-UGCF

Semester : I

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
 2. Attempt any **four** questions including Question No. 1 which is compulsory.
 3. Draw well-labelled diagrams wherever necessary.
-
1. (i) Define the following terms (**any four**) : (4)
 - (a) Mehlis gland
 - (b) Bilateral Symmetry
 - (c) Plasmotomy
 - (d) Ootype
 - (e) Kinty

(ii) Differentiate between the following pairs
(any two) : (4)

(a) Schizogony and Sporogony —

(b) Primary host and Secondary host

(c) Cnidoblast and Trichocyst

(iii) Match the Columns: — (4)

(a) Pinacocytes 1) *Hydra*

(b) Amphids 2) *Ctenoplana*

(c) Comb Plates 3) Sponges —

(d) Gastrovascular cavity 4) Nematoda

(iv) Give the exact location and one function of each
of the following (any three) : (3)

(a) Pyrenoids —

(b) Acetabulum

(c) Colloblast cells

(d) Pneumatophore

2. (a) Give the illustrated account of life history of malarial parasite in man. (9)
- (b) Describe the process of conjugation in *Paramecium* and discuss its significance. (6)
3. (a) Give the general characteristics of Phylum Porifera. (5)
- (b) Give an account of different types of canal systems in Porifera and give its significance. (10)
4. (a) Describe Polymorphism in Cnidaria. Comment upon its significance. (9)
- (b) Give an outline classification of phylum Cnidaria with characters and examples of each class. (6)
5. (a) Give a detailed account of parasitic adaptations in Helminthes. (10)
- (b) Give graphic life cycle of *Taenia solium*. (5)

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6. Write short notes on any **three** of the following :

(15)

(a) Course of migration of *Ascaris* larva within its host body.

(b) Metagenesis.

(c) Asexual reproduction in protozoa.

(d) Compare and contrast flatworms with roundworms.

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1406

I

Unique Paper Code : 2232011103

Name of the Paper : DSC-3, Concepts of Ecology

Name of the Course : B.Sc. (Hon) Zoology

Semester : I, NEP-UGCF 2022

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions including.
3. Question No. 1 which is compulsory.
4. Draw well-labeled diagrams wherever necessary.

1. (a) Define the following :

(4)

(i) Migration

(ii) Natality

(iii) Fecundity

(iv) Sere

(b) Distinguish between the following : (6)

(i) Autecology and Synecology

(ii) Unitary and Modular population

(iii) Fundamental and Realized niche

(c) Name the scientists associated with the following terms : (3)

(i) Ecology

(ii) Hypervolume niche

(iii) Ecosystem

(d) State whether the following statements are True or False : (2)

(i) Maximum theoretical production of new individuals under ideal conditions is known as exponential growth.

(ii) Human population shows concave type of survivorship curve.

(iii) Complete competitors can coexist.

(iv) Commensalism describes a relationship between organisms where one benefits and the other is harmed.

2. (a) Describe various density-dependent factors that regulate the population size near carrying capacity level. (9)
- (b) What are life tables? Add a note on their significance. (3) —
- (c) Illustrate the sigmoid growth curve with the help of well-labeled diagram. (3)
3. (a) Describe Lotka-Volterra model for predator and prey interaction with the help of diagrams and equations. (8)
- (b) Explain Shelford's law of tolerance. (3)
- (c) Describe various types of ecological pyramids. (4)
4. (a) Define biogeochemical cycles. (1)

- (b) Explain Nitrogen cycle with the help of diagram. Explain the role of microorganisms in Nitrogen cycle. (9)
- (c) Explain ecotone and edge effect. Why is ecotone considered as zone of stress? (5)
5. (a) Explain different 'energy flow' models in an ecosystem. (8)
- (b) Define ecological succession. Explain the various theories of climax in succession. (5)
- (c) Differentiate between pioneer and climax community. (2)
6. Write short notes on any three of the following:
- (a) Protected areas
- (b) Gause's principle
- (c) Light as a limiting factor
- (d) Ecological efficiencies
- (e) Resource partitioning (3×5)

(1000)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1088

I

Unique Paper Code : 2232012301

Name of the Paper : Diversity of Chordates

Name of the Course : B.Sc. (H) Zoology NEP-UGCF

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer **four** questions in all.
3. Question No. 1 is compulsory.
4. Draw well labelled diagram wherever needed.

1. (a) Define the following terms (any three) : (3)

(i) Operculum

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(ii) Preen gland

(iii) Diastema

(iv) Stomochord

(v) Opisthoglyphous fangs

(b) Differentiate between the following terms (any two) : (4)

(i) Physostomous and Physoclistous swim bladder.

(ii) Tornaria and Tadpole larvae.

(iii) Altricious and precocious birds.

(c) Give the function of the following (any four) : (4)

(i) Nuptial pads

(ii) Buccal funnel

(iii) Jacobson organ

(iv) Keel

(v) Crop

(vi) Weberian ossicle

(d) Give the scientific names and classify upto order
(any two) : (4)

— (i) Australian Lung fish

(ii) Hagfish

(iii) Duck billed platypus

(iv) Flying lizard

2. (a) Compare and discuss the characteristics of
modern-day living agnathans. (8)

— (b) Describe osmoregulation by teleost fishes in sea
and freshwater? How does shark maintain their
osmoregulation? (7)

3. (a) Explain various characteristic features which help
bird to adapt to aerial mode of life. (8)

(b) A classic example of adaptive radiations can be
seen in mammalian locomotory appendages.
Explain with examples. (7)

4. (a) Give an elaborative account of parental care in
amphibians. (9)

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(b) Explain plate tectonic theory and comment on the fauna of Australian realm. (6)

5. (a) Write a detailed note on origin of Tetrapods. (7)

(b) Briefly explain the poison apparatus and biting mechanism in snakes. (8)

6. Write short notes on any **three** of the following: (15)

(i) Wallace and Weber line

(ii) Origin of chordates

(iii) Retrogressive metamorphosis

(iv) *Sphenodon*

(1000)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1145

I

Unique Paper Code : 2232012302

Name of the Paper : Biochemistry of Metabolic Processes

Name of the Course : B.Sc. (H) Zoology, NEP

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **FOUR QUESTIONS** in all, question no. 1 is **COMPULSORY**.

1. (a) Define the following (**Any Four**) : (1×4=4)

- (i) Anaplerotic reaction
- (ii) Shuttle system
- (iii) Ketosis

(iv) Fermentation

(v) Oxidative phosphorylation

(b) Differentiate between the following (Any **three**) :
(2×3=6)

(i) Substrate level phosphorylation and Oxidative Phosphorylation.

(ii) Transamination and Deamination.

(iii) Hexokinase and Glucokinase.

(iv) Acyl CoA and Acetyl CoA.

(c) Expand the following terms (Any **Four**) :

($\frac{1}{2} \times 4 = 2$)

(i) PFK

(ii) PLP

(iii) UDP Glucose

(iv) HMG CoA

(v) EMP

(vi) PEP

(d) Name the cofactor/coenzyme required for the following enzymes : (1×3=3)

(i) Pyruvate dehydrogenase Complex

(ii) Hexokinase

(ii) Cytochrome oxidase

2. (a) With the help of chemical structures describe Tricarboxylic Acid Cycle. And write its energetics involved per cycle. (10)

(b) What are ketone bodies? Add a note on it. (5)

3. (a) Explain the sequence of reactions involved when one molecule of C-16 fatty acid is to be oxidized. (10)

(b) Comment upon chemiosmotic hypothesis. (5)

4. (a) Explain the reactions and significance of the Pentose Phosphate Pathway. Describe its role in NADPH generation. (10)

(b) "Gluconeogenesis is not just the reversal of glycolysis", justify the statement. (5)

5. (a) Give a detailed explanation of the Urea cycle with structural formulae, highlighting the events that occur in the mitochondria and cytosol. (10)
- (b) Give a detailed account of oxidative deamination with examples. (5)
6. Write short notes on Any Three : (5×3=15)
- (i) Malate aspartate shuttle
 - (ii) Glycogenolysis
 - (iii) Cascade of metabolic events in fasting and starvation
 - (iv) Complexes of Electron Transport Chain
 - (v) ω -oxidation of fatty acid

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1165

I

Unique Paper Code : 2232012303

Name of the Paper : Human Physiology: Life
Sustaining Systems: DSC-9

Name of the Course : B.Sc. (H) Zoology, Theory
Examination Nov-Dec, 2024

Semester : III, NEP-UGCF

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **FOUR** questions in all.
3. Question No. 1 is compulsory.
4. Draw diagrams where ever required.

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1. (a) Define any **four** of the following terms : (4)

(i) Plasminolysis

(ii) Portal Triad

(iii) Haustral Churning

(iv) Lung compliance

(v) Herring Breuer Reflex

(b) Give the location and function of the following : (4)

(i) Bundle of His

(ii) Chief cells

(iii) Surfactant

(iv) Macula densa

(c) Differentiate between the following (Any **two**) : (4)

(i) Afferent arteriole and Efferent arteriole

(ii) External and Internal respiration

(iii) Bicuspid and Tricuspid valves

(d) Expand the following : (1)

(i) CCK

(ii) GFR

(e) Give reason for the following :

(i) Oxygen is more available to tissue cells when you have a fever.

(ii) Clot retraction requires an adequate number of platelets. (2)

2. (a) Elaborate the mechanism of oxygen transport in blood. (9)

(b) Describe the components of the Cardiac Conduction System. (6)

3. (a) Discuss the hormonal regulation of tubular reabsorption and secretion. (9)

(b) Draw the histological structure of detailed structure of renal corpuscle. (6)

4. (a) Describe the extrinsic and intrinsic pathway of blood clotting. (9)

- (b) Draw the detailed structure of haemoglobin and describe the different types of haemoglobin. (6)
5. (a) Give a detailed account of phases of digestion. (9)
- (b) Briefly explain absorption of fats in small intestine. (6)
6. (a) Explain the pressure and volume changes that occur during the cardiac cycle. (9)
- (b) Describe the hormonal regulation of gastric secretion. (6)
7. Write short notes on any **three** of the following : (3×5=15)
- (a) Regulation of respiration
- (b) Renal blood supply
- (c) Coronary circulation
- (d) Formation of Platelet plug

(1000)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1347

I

Unique Paper Code : 2233012003

Name of the Paper : Medical Zoology

Name of the Course : B.Sc. (H) Zoology (NEP)

Semester : III (DSE-3)

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

1. (a) Define the following : _____ (2×5=10)

(i) Density-dependent inhibition

(ii) Atherosclerosis

(iii) Virulence

(iv) Nyctalopia

(v) Merozoites

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(b) Distinguish between :

(2×4=8)

- (i) Rickets and Osteoporosis
- (ii) Coronavirus and Rhinovirus
- (iii) Niacin deficiency and Thiamine deficiency
- (iv) Parasitism and Commensalism

(c) State True or False :

(1×4=4)

- (i) Severe lymphedema of limbs and genitalia are common clinical manifestations of intestinal hookworm infection.
- (ii) Aphids feed on phloem of plant stems with their piercing mouthparts and excrete sugary fluid. Ants carry aphids to different food sources, and protect them from predation. This is an example of mutualism.
- (iii) *Tsetse* fly is a vector that causes schistosomiasis.
- (iv) Leptospirosis is a zoonotic disease.

(d) Fill in the blanks :

(1×4=4)

- (i) The agents that cause cancer are called _____.

(ii) The epidemiological triad model of infectious diseases causation includes _____ and, _____ besides environment.

(iii) _____ is the causative organism of typhoid.

(iv) Congenital hypothyroidism is also commonly called as _____.

— (e) Expand the following: (1×4=4)

(i) SARS

(ii) HIV

(iii) MMR —

(iv) IBD

2. (a) Describe the pathogenesis of *Mycobacterium tuberculosis*. (7)

(b) Explain how diabetes mellitus is different from diabetes insipidus. (8)

3. (a) Write a note on life history and pathogenicity of *Entamoeba histolytica*. (5)

(b) Describe the biology of tumor growth, invasion and metastasis. (10)

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4. (a) Explain transmission, prevention and control of malaria. (7)
- (b) What are the causes and symptoms of scurvy and anaemia? How is obesity linked with cardiovascular diseases? (8)
5. (a) Write a note on Vitamin D deficiency. (5)
- (b) Differentiate between marasmus and kwashiorkor. (5)
- (c) Explain symptoms, diagnosis and treatment of Lyme's disease. (5)
6. (a) Give a brief account on *Treponema* and mumps virus with suitable diagrams. (7)
- (b) Describe cause, symptoms and treatment of Cushing's syndrome. (8)
7. Write a short note on the following (any three): (5×3=15)
- (a) Rickettsia
- (b) Grading and staging of cancer
- (c) Measles
- (d) Crohn's disease
- (e) AIDS

(1000)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1069

I

Unique Paper Code : 2232013501

Name of the Paper : Principles of Immunology

Name of the Course : B.Sc. (H) Zoology (NEP)

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll. No. on the top immediately on receipt of this question paper.
2. Attempt four questions including Question No. 1 which is compulsory.
3. Draw well-labelled diagrams wherever necessary.

1. (i) Define the following terms (Any four): (1×4=4)

(a) Extravasation

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(b) Paratope.

(c) Avidity

(d) Opsonization

(e) Anaphylatoxin

(ii) Differentiate between the following: (Any three):

(2×3=6)

(a) Primary and Secondary Immune Response

(b) Innate and Adaptive Immunity

(c) Exogenous and Endogenous Antigens

(d) Salk and Sabin Vaccine

(iii) Expand the following: (Any six): (0.5×6=3)

(a) PAMPs

(b) MASP

(c) MAC

(d) CLIP

(e) DTH

(f) ADCC

(g) ISCOM

(iv) Write the contribution of the following: (1x2=2)

(a) Elie Metchnikoff

(b) Jules Bordet

2. (i) Draw the basic structure of Immunoglobulin. Compare the structure and functions of IgA and IgM. (8)

(ii) Explain the experiments on the basis of which Immunoglobulin structure was deduced. (7)

3. (i) Explain the cytosolic pathway for processing of endogenous antigens. (8)

(ii) What is complement system. Explain Classical pathway of complement activation. (7)

4. (i) Describe Gell and Coomb's classification of hypersensitivity. (8)

(ii) What are the cardinal features of adaptive immunity. (7)

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5. (i) Give an account of different kinds of vaccines. (8)
- (ii) Describe the structure and function of Class I and Class II MHC. (7)
6. Write short notes (Any three): (3x5=15)
- (i) Clonal Selection Theory
- (ii) Properties of Cytokines
- (iii) B cell and T Cell Epitopes
- (iv) Autoimmunity
- (v) Monoclonal Antibodies and their applications

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1107

I

Unique Paper Code : 32232013502

Name of the Paper : Cell and Molecular Biology

Name of the Course : B. Sc. (Hons) Zoology (NEP-UGCF 2022)

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **Four** Questions, including Question No. 1 which is compulsory.
3. Draw neat labelled diagrams wherever necessary.

1. (a) Define the following (Any Four) : (4×1=4)

(i) Yamanaka factors

(ii) Ribozyme

(iii) Silencer elements

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(iv) Central Dogma

(v) Split genes

(b) Differentiate between (Any Three) : (3×2=6)

(i) Euchromatin and Heterochromatin

(ii) Apoptosis and Necrosis

(iii) Activators and Repressors

(iv) Totipotent and Pluripotent Stem cells

(c) Expand the following : (0.5×6=3)

(i) CPSF

(ii) CREB

(iii) NELF

(iv) RNP

(v) ORF

(vi) CAP- cAMP

(d) State the reasons : (2×1=2)

(i) Why transcription occurs in 5' to 3' direction only?

- (ii) Why primase is required for DNA replication but not for transcription?
2. (a) Discuss the mechanism of DNA replication in a bacterial cell. (10)
- (b) Discuss the salient features of Genetic code. (5)
3. (a) Define Apoptosis and write down its hallmark features. Explain the intrinsic pathway in regulation of apoptosis with the help of suitable examples. (10)
- (b) Design an experiment to prove that DNA replication is semi-conservative. (5)
4. (a) With the help of suitable diagram describe the process of transcription in Eukaryotes. (10)
- (b) Write down the main differences between eukaryotic and prokaryotic translation. (5)
5. (a) What is cell signalling and importance of second messengers? Write the major differences of hormone signalling mechanism of nuclear receptor pathway and cell surface receptor pathway? (10)

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(b) What is end replication problem? Discuss the role of telomerase in replication of 5' end of linear chromosome. (5)

6. Write short notes (any three): (3×5=15)

(a) Alternative splicing

(b) Lac Operon

(c) Synthesis of rRNA

(d) RNA editing

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1126 I

Unique Paper Code : 2232013503

Name of the Paper : Fundamentals of Genetics

Name of the Course : B.Sc. (H) Zoology (NEP)

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any four questions, including Question No. 1, which is compulsory.

1. (a) Distinguish between the following (Any three) :
(2×3=6)

- (i) Co-dominance and Incomplete dominance
- (ii) Coupling and Repulsion
- (iii) Sex-influenced and sex-limited inheritance
- (iv) Conservative and replicative transposons

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(b) Define the following (Any three) (1×3=3)

- (i) Multiple alleles
- (ii) Episome
- (iii) Heterosis
- (iv) Pleiotropy

(c) Give the significant contribution of the following scientists (Any three) (1×3=3)

- (i) Alfred Sturtevant
- (ii) William Bateson
- (iii) C B Bridges
- (iv) Barbara McClintock

(d) Give reasons for the following (Any two)

(1.5×2=3)

- (i) Some XX humans were found to be males and XY humans were found to be females.
- (ii) A cross between pure line sinistrally-coiled shell female *Limnaea* and dextrally coiled shell male *Limnaea* yielded all sinistrally-coiled shell progeny.
- (iii) For a paracentric inversion, with rare exceptions, recombinant chromosomes are not stable and will not lead to viable offspring.

2. (a) What do you understand by gene interactions? Discuss any two types of gene interactions (with suitable examples) that cause deviation from the Mendel's dihybrid ratio. (10)

(b) Explain the sex-linked inheritance with any one example. (5)

3. (a) A female *Drosophila* heterozygous at three loci- cu/cu^+ (curved vs. straight wings), e/e^+ (ebony vs. gray bodies), st/st^+ (scarlet vs. red eyes) was test crossed with completely homozygous recessive males. The following progeny were observed.

cu	e	st^+	=	366
cu^+	e^+	st	=	380
cu	e	st	=	24
cu^+	e^+	st^+	=	30
cu^+	e	st	=	89
cu	e^+	st^+	=	105
cu	e^+	st	=	2
cu^+	e	st^+	=	4

(i) Are the three genes linked? Give reason for your answer.

(ii) What is the order of genes?

(iii) Determine the map distance and construct a linkage map.

- (iv) Calculate the coefficient of coincidence and interference. (2+2+3+2=9)
- (b) Explain the cytological basis of crossing over with the help of an experiment. (6)
4. (a) Discuss the molecular basis of spontaneous and induced mutations. Differentiate between aneuploidy and polyploidy with suitable examples. (5+4=9)
- (b) Describe the Ac-Ds elements in maize. Comment on the significance of P elements. (4+2=6)
5. (a) Compare the mechanisms of dosage compensation in humans and *Drosophila*. How many Barr bodies will be observed in the individuals with Klinefelter syndrome and with Patau syndrome? (7+2=9)
- (b) Compare the phenomena of nuclear and extranuclear inheritance. Explain the inheritance of pigmentation in *Ephesia*. (3+3=6)
6. Write short notes on any three of the following: (3×5=15)
- (a) CIB method of detection of mutations
- (b) Retrotransposons
- (c) Infective heredity in *Paramecium*
- (d) Penetrance and Expressivity

(1000)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5891

I

Unique Paper Code : 32231502

Name of the Paper : DSC – Principles of Genetics

**Name of the Course : B.Sc. (Hons.) Zoology
(CBCS-LOCF)**

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions including Question no. 1 which is compulsory.

1. (a) Define the following terms (any five) : (1×5=5)

(i) Transposon

(ii) Synteny

(iii) Phenocopy

(ii) HGPRT

(iii) ORF

(iv) PAR

(f) Predict the sex of the following individuals with given chromosome compositions (A= haploid set of autosomes) (1×2=2)

(i) 2X, 3A (*Drosophila*)

(ii) XXXY (Human)

2. (a) How do epistatic interactions modify Mendelian dihybrid ratios? Explain with suitable examples.

(7)

(b) What is Robertsonian translocation? With the help of a suitable example, explain its consequences in humans.

(5)

3. (a) Discuss an experiment that provided evidence for cytological basis of crossing over.

(4)

- (b) In *Drosophila melanogaster*, kidney shaped eye (k), cardinal eye (cd), and ebony body (e) are recessive traits. If the homozygous kidney, cardinal females are crossed with homozygous ebony males, the F₁ offsprings are all wild type. If heterozygous F₁ females are mated with homozygous recessive males, following F₂ progenies are obtained :
(2+3+3)

Phenotypes	Number
Kidney, cardinal	880
Ebony	887
Kidney, ebony	64
Cardinal	67
Kidney	49
Ebony, cardinal	46
Kidney, ebony, cardinal	3
Wild	4

- (i) Are the three genes linked? Explain your answer.

- (ii) Determine the order of genes and construct the genetic map.
- (iii) Calculate the coefficient of coincidence and interference. Comment on the significance of interference.
4. (a) What is interrupted mating technique? How is interrupted mating technique used in bacterial chromosomal mapping? (7)
- (b) With the help of a suitable example, explain the concept of penetrance and expressivity. (5)
5. (a) What is spontaneous mutation? Discuss molecular basis of spontaneous mutations. (7)
- (b) Three different Hff strains of *E. coli* transfer their genes in the order and with entry times as given below. Using these results, construct a genetic map of the donor cell. Show the distances between the adjacent marker pairs. (5)

Hfr strain A markers	Pro	Met	Xyl	Mal	Str
Entry time (in mins)	7	19	24	41	52
Hfr strain B markers	Ade	His	Gal	Pro	Met
Entry time (in mins)	9	23	48	56	68
Hfr strain C markers	Mal	Str	Ser	Ade	His
Entry time (in mins)	3	14	21	44	58

6. (a) Explain extranuclear inheritance of killer trait in *Paramoecium*. (5)

(b) Compare the mechanisms of dosage compensation in humans and *Drosophila*. How many Barr bodies will be observed in the individuals,

(i) with Klinefelter syndrome

(ii) with Patau syndrome? (6+1)

7. Write short notes on (any three): (4+4+4)

(a) Chemical mutagens

(b) Ty elements in yeast

- (c) Antibiotic resistance in *Chlamydomonas*
- (d) Generalized and specialized transduction
- (e) Gene mapping by somatic cell hybridization

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[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1263 I

Unique Paper Code : 2233010011

Name of the Paper : DSE-11 : Basics of Neuroscience

Name of the Course : B.Sc. (H) Zoology

Semester : Vth (NEP-UGCF-2022)

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any five questions in all.
3. Question No. 1 is compulsory.

1. (a) Define the following : (1×5=5)

(i) Neuron Doctrine theory

(ii) Action Potential

(iii) Hypothalamus

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(iv) Synaptic cleft

(v) Ventricles

(b) Differentiate between the following : (2×5=10)

(i) Absolute and Relative Refractory Period

(ii) Depolarisation and Hyperpolarisation

(iii) Long term Potentiation and Long Term Depression

(iv) Cerebrum and Cerebellum

(v) CT and PET

(c) Justify the following statement : (2×5=10)

(i) Glial cells contribute to brain function.

(ii) Inhibitory postsynaptic potential (IPSP) prevents the generation of action potential.

(iii) Norepinephrine (noradrenaline) is both a neurotransmitter and hormone.

(iv) Electrical synapses conduct nerve impulses faster than chemical synapses.

- (v) Modulatory neurons modify the sensitivity or responsiveness of neurons for generation of action potential.

(d) Fill in the blanks : (1×3=3)

(i) The frontal lobe can be distinguished from the temporal lobe by _____ fissure.

(ii) The pia along with the arachnoid are referred to _____.

(iii) Memory consolidation takes place in the _____.

(e) Give Contribution of following : (1×2=2)

(i) Camillo Golgi

(ii) Charles Sherrington

2. (a) Draw the well-labelled diagram of neuron highlighting the functional characteristics. (5)

(b) Give a detailed account of organization and classification of nervous system. (10)

3. (a) Explain the molecular basis of learning and memory formation. (7)

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- (b) What is synapse? Discuss the different types of synapses. (8)
4. (a) Discuss the molecular pathology associated with Alzheimer's disease. (7)
- (b) Describe the process of action potential generation and propagation along an EPSP. (8)
5. (a) What are neurotransmitters. Describe its role in synaptic plasticity. (8)
- (b) Give an account of development of neurological disorder Schizophrenia. (7)
6. (a) What is amnesia? Describe the different categories of memory. (6)
- (b) Define sleep. Explain the different stages of sleep. (9)
7. Write a short note on any **three** of the following (5×3=15)
- (a) EEG
- (b) fMRI
- (c) Blood brain barrier
- (d) Neural basis of visual perception
- (e) Post synaptic potentials

(1000)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1265 I

Unique Paper Code : 2233010013

**Name of the Paper : DSE-13, Reproductive Biology
and Assisted Reproductive
Techniques**

**Name of the Course : B.Sc. (H) Zoology, (NEP-
UGCF)**

Semester : V

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **five** questions in all including question No. 1, which is compulsory.

1. (a) Define (1×5=5)

- (i) Luteotrophic factors
- (ii) Vasectomy
- (iii) Azoospermia
- (iv) Capacitation Reaction
- (v) Ovulation

(b) Differentiate between any five : (2×5=10)

- (i) Secondary and Graffian follicle
- (ii) Mullerian duct and Wolffian duct
- (iii) Adenohypophysis and neurohypophysis
- (iv) Menopause and Menarche
- (v) Follicular phase and luteal phase
- (vi) Acrosome reaction and cortical reaction

(c) Expand the acronyms (1×5=5)

- (i) HRE
- (ii) MMP
- (iii) GPCRs
- (iv) ICSI
- (v) 3β HSD

(d) Give another name for : (1×5=5)

- (i) Chorionic or placental somatomammotropin
- (ii) Dark region around the nipple
- (iii) The white scar tissue formed in the ovary which replaces the corpus luteum
- (iv) Condition caused due to undescended testes
- (v) Hormones released from pituitary that cause the release of other hormones

(e) State whether the following statements are true or false : (1×5=5)

- (i) The GnRH release process is almost invariably pulsatile in all female and male mammals studied
 - (ii) Aromatisation of testosterone converts it into 17β -estradiol.
 - (iii) AMH produced by the fetal Leydig cells causes regression of the Fallopian tubes, uterus and upper portion of the vagina in the male fetus.
 - (iv) The SRY gene is located at the long arm of the Y chromosome (Yq53.3).
 - (v) Measurement of the fructose content in the semen can provide an index of the secretory activity of the prostate gland.
2. (a) Diagrammatically explain the structure of testis. Add a note on the functions of the various cellular components in the testis. (9)
- (b) Discuss sperm transport and maturation in the male genital tract. (6)

3. (a) Discuss the two cell hypothesis of estrogen biosynthesis in females. (9)

(b) What are the features of a good contraceptive? (6)

4. (a) Diagrammatically explain the changes in the mammary gland according to the reproductive stage of the females. Add a note on the hormonal regulation of mammogenesis. (8)

(b) The term "progesterone" means "for gestation (or pregnancy)". Describe how progesterone helps prepare the female body for pregnancy and helps maintain pregnancy. (7)

5. (a) What are the primary causes of infertility in women? Discuss any three. (7)

(b) Describe any two ART methods that help in the management of infertility in women. (8)

6. Write short notes on **any three** : (5×3=15)

(a) Composition of semen

(b) Diapause

(c) Negative Feedback system

(d) Hormonal regulation of menstrual cycle

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1387

I

Unique Paper Code : 2232011102

Name of the Paper : Biology of Cell : Structure
& Function

Name of the Course : B.Sc. (H) Zoology (NEP)

Semester : I (NEP-UGCF-2022)

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer any **FOUR** questions in all.
3. Question No. 1 is compulsory.

1. (a) Give the function of the following : (1×5=5)

- (i) Plasmodesmata
- (ii) Flippase
- (iii) Lamins
- (iv) Liposomes
- (v) Aquaporins

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(b) Give the contribution of **ANY FIVE** of the following scientists : (1×5=5)

- (i) Benda
- (ii) Peter Mitchell
- (iii) Blobel & Sabatini
- (iv) Christian de duve
- (v) Tim Hunt, Paul Nurse, Lee Hartwell
- (vi) Lynn Margulis

(c) Expand **ANY FIVE** of the following : (1×5=5)

- (i) GPCR
- (ii) MTOC
- (iii) GERL
- (iv) CFTR
- (v) cAMP
- (vi) ATP

2. Distinguish between **ANY FIVE** of the following :

(a) Microfilaments and Microtubules

(b) Mitosis and Meiosis

(c) Integral and Peripheral Proteins

(d) Euchromatin and Heterochromatin

(e) Tight junctions and Gap junctions

(f) Dyneins and Kinesins

(1×5=5)

3. With appropriate examples and well-labelled diagrams elaborate the ways in which molecules are passively and actively transported across the plasma membrane. (15)

OR

What is oxidative phosphorylation? Describe how the Electron Transport Chain and ATP Synthase in the mitochondria help generate ATP-the energy currency of the cell. (15)

4. (a) Illustrate the process of microtubule assembly with the help of suitable diagram. Add a note on their role in cellular mobility. (7+3=10)

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- (b) Discuss the role of secondary messengers in cell signaling. (5)
5. (a) What is Signal Hypothesis? How does vesicular transport take place from ER to Golgi apparatus? (5+5=10)
- (b) Which organelle in the cell is also called the "Suicidal Bag". Enumerate its functions. (5)
6. Write short notes on **ANY THREE** of the following : (5×3=15)
- (a) Receptor-mediated endocytosis
- (b) Endosymbiotic Hypothesis
- (c) Cell Cycle checkpoints
- (d) Protein modifications in ER
- (e) Nuclear Pore Complex

(1000)