



B.Sc. II Semester Degree Examination, Sept./Oct. - 2024

ZOOLOGY

DSC3 : Biochemistry and Physiology

(NEP)

Time : 2 Hours

Maximum Marks : 60

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- Note :** (i) Answer **all** sections.
(ii) Draw labelled diagrams wherever necessary.
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SECTION - A

Answer the following sub-questions.

10x1=10

1. (a) What is Disaccharide ?
(b) Expand DGL.
(c) How many ATP molecules are produced by the breakdown of one molecule of Glucose in Aerobic Respiration ?
(d) Name the deficiency diseases of Vitamin 'C'.
(e) Mention the dental formula of Human Beings.
(f) Define Hypertension.
(g) Expand ACTH.
(h) Mention the proteins present in Muscle fibre.
(i) What is Oogenesis ?
(j) Name any two Placental Hormones.

SECTION - B

Answer **any four** of the following questions.

4x5=20

2. List out the biological significance of proteins.
3. Briefly explain the sources, functions and deficiency diseases of Vitamin 'A'.
4. Describe the process of Protein digestion in Man.
5. Write a short note on :
 - (i) Antidiuretic Hormone
 - (ii) Oxytocin



P.T.O.

- 6.** Give brief account of Spermatogenesis with schematic representation.
- 7.** Write a short note on functions of Blood.

SECTION - C

Answer **any three** of the following questions.

3x10=30

- 8.** Define Carbohydrates. Briefly explain the classification of carbohydrates with examples.
- 9.** Explain the steps involved in Glycolysis.
- 10.** With a neat labelled diagram explain V.S. of Human Heart.
- 11.** Describe the ultrastructure of Multipolar Neuron with a neat labelled diagram.
- 12.** Distinguish between Sperm and Ovum.

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B.Sc. II Semester Degree Examination, Sept./Oct. - 2024

MATHEMATICS

DSC - 2 : Algebra and Calculus II

(NEP)

Time : 2 Hours

Maximum Marks : 60

Note : Answer **all** Parts.

PART - A

1. Answer **all** questions.

10x1=10

(a) Define Closed interval.

(b) State Bolzano-Weiestrass theorem.

(c) Define Sub-group.

(d) Every cyclic group is _____.

(e) If $x = r \cos \theta$, $y = r \sin \theta$, show that $\frac{\partial r}{\partial x} = \frac{x}{r}$

(f) Find the degree of homogeneous function $u = \sin^{-1} \left(\frac{x^3 + y^3}{x + y} \right)$.

(g) Evaluate $\int \tan^{-1}(\sin x) \cos x \cdot dx$

(h) Define line integral.

(i) Evaluate $\int_0^1 \int_0^2 dx \cdot dy$

(j) Evaluate $\int_0^2 \int_0^2 \int_0^2 dx \cdot dy \cdot dz$



PART - B

Answer **any four** of the following.

4x5=20

2. Determine whether the following sets are bounded or not. Also find their supremum and infimum if exist :

(i) $S = \left\{ \frac{1}{n} : n \in \mathbb{N} \right\}$

(ii) $S = \left\{ (-1)^n \cdot \frac{1}{n} : n \in \mathbb{N} \right\}$

3. Show that every cyclic group is abelian.

4. If $u = f(x, y)$ is a homogeneous function of degree n , then show that

$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = nu.$$

5. Evaluate $\int_C (2y + x^2) dx + (3x - y) dy$ along the curve $x = 2t$, $y = t^2 + 3$ where $0 \leq t \leq 1$.

6. Evaluate $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} dx \cdot dy \cdot dz$

7. If u and v are functions of two independent variable s and t and s and t themselves are functions of two independent variables x and y , then

show that $\frac{\partial(u, v)}{\partial(s, t)} \cdot \frac{\partial(s, t)}{\partial(x, y)} = \frac{\partial(u, v)}{\partial(x, y)}$

PART - C

Answer **any three** of the following questions.

3x10=30

8. (a) Show that supremum ($\sup$) of a non-empty set S of real numbers, whenever it exists is unique.
 (b) State and prove the Archimedean property of $\mathbb{R}$.
9. (a) State and prove Lagranges theorem.
 (b) Show that a non-empty set H of a group G is a sub-group of G if and only if $a, b \in H$ implies $ab^{-1} \in H$.



10. (a) Find the total derivative of u w.r.t 't' when $u = e^x \sin y$ where $x = \log t$ and $y = t^2$.
- (b) If $x = r \cos \theta$, $y = r \sin \theta$ find $J = \frac{\partial(x, y)}{\partial(r, \theta)}$ and $J' = \frac{\partial(r, \theta)}{\partial(x, y)}$. Also verify $J \cdot J' = 1$
11. (a) Evaluate $\int_C 3x^2 dx + (2xz - y) dy + z dz$ along the line joining $(0, 0, 0)$ and $(2, 1, 3)$.
- (b) Evaluate $\int_C \left(\frac{a^2 y^2}{b^2} + \frac{b^2 x^2}{a^2} \right) ds$ around the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
12. (a) Evaluate $\int_0^a \int_0^{\sqrt{a^2 - x^2}} \int_0^{\sqrt{a^2 - x^2 - y^2}} \frac{dx dy dz}{\sqrt{a^2 - x^2 - y^2 - z^2}}$
- (b) Find the volume of the sphere $x^2 + y^2 + z^2 = a^2$

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