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36637

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

ZOOLOGY - VI

Z-6.1 : Genetics and Biotechnology (CBCS)

20613

Time : 3 Hours | Maximum Marks : 70

Instructions : *(i) Answer all the questions.*
(ii) Draw neat labelled diagrams wherever necessary.

SECTION - A

Answer **any five** of the following in **two** or **three** sentences each. 5x2=10

1. Define Phenotype and Genotype. Give example.
2. What are Complimentary Factors ? Give example.
3. What is Heterochromatin and Euchromatin ?
4. Write about Hypertrichosis.
5. Define Genetic RNA. Give example.
6. What is Triplet Code ? Mention Initiator and Terminator Codons.

SECTION - B

PART - A

Write short note on **any four** of the following. 4x5=20

7. Why did Mendel selected Garden Pea Plant (Pisum Sativum) for his experiment ?
8. What is Criss-Cross inheritance ? Explain it w.r.t. Color blindness in Man.
9. Write short notes on any two Inborn Errors of Metabolism.
10. Give an account of XX - XY type of Sex - determination in Man.
11. What is Dominant Epistasis ? Explain it with reference to Plumage color pattern in Leghorn.
12. Describe the Genetic aspects of Human Blood Group.

P.T.O.

PART - B

2x5=10

Answer **any two** of the following.

13. Sketch and label Watson and Crick model of DNA.
14. Enumerate the properties of Genetic Code.
15. Write a note on tools used in rDNA Technology.

SECTION - C

PART - A

2x10=20

Answer **any two** of the following in detail.

16. Describe the inheritance of Supplementary factors (9 : 3 : 4) with suitable example.
17. With a neat labelled diagram explain Ultrastructure of Chromosome.
18. Explain Sex determination :
    (a) XX - XY type
    (b) XX - XO type

PART - B

1x10=10

Answer **any one** of the following in detail.

19. Explain Griffith's experiment to prove DNA as Genetic material.
20. Explain the mechanism of Protein Biosynthesis.

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VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

ZOOLOGY - VII

Z - 6.2 : Animal Behavior

20606

(CBCS)

Time : 3 Hours

Maximum Marks :

Instructions : (i) Answer all questions.

(ii) Draw labelled diagrams wherever necessary.

SECTION - A

Answer **any five** of the following. 5x2=

1. Define human Ecology and behavioural Ecology.
2. Define gene flow and genetic drift.
3. What is Zoo-geography ?
4. What do you mean by telotaxis ?
5. Define imprinting and conditioned reflex.
6. What are termitaria ?

SECTION - B

(A) Write a short note on **any four** of the following. 4x5=

7. Write a short note on the patterns of migration in fishes.
8. Write the differences between innate and learnt behaviour.
9. Explain briefly about the principles of courtship behaviour.
10. Briefly explain about the social organisation in Termites.
11. Give an account of Kohler's experiment on Apes for insight learning.
12. Briefly explain the types of parental care in fishes.

(B) Answer **any two** of the following. 2x5

13. Briefly explain oriental realm and palaearctic realm.
14. Write a short note on Allopatric Speciation.
15. Write the differences between homologous and analogous organs.

P.

SECTION - C

(A) Answer **any two** of the following. 2x10=20

16. Describe the different kinds of parental care in amphibians with suitable examples.

17. Briefly explain the courtship behaviour in Scorpion and Frog.

18. Briefly explain the types of nests. Add a note on the nesting behaviour in birds with suitable examples.

(B) Answer **any one** of the following. 1x10=10

19. Describe Stanley Miller's experiment to prove the theory of the chemical evolution of life with a neat labelled diagram.

20. Give a detailed note on palaeontological evidences in favour of organic evolution.

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VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

MATHEMATICS - XII

6.1 : Trigonometry, Topology and Fuzzy Sets

(NEW)

Time : 3 Hours

Maximum Marks : 80

Instruction : *Answer all Sections.*

SECTION - A

Answer **any ten** of the following. 10x2=20

1. Define comparable topologies with example.
2. Prove that in a discrete topological space every subset of X is closed.
3. Define closure of a set with an example.
4. If A is closed and B is open then prove that $A - B$ is closed.
5. Give an example to prove that $d(A \cap B) \neq d(A) \cap d(B)$.
6. Let (X, τ) be a topological space then prove that $d(\phi) = \phi$.
7. Prove that a singleton set $\{x\}$ in a T_2 space is closed.
8. Prove that $\sinh(ix) = i\sin x$.
9. Find general and principle value of $\log(4+3i)$.
10. Separate into real and imaginary parts of $\sinh(x+iy)$.
11. Define compliment of a fuzzy subset.
12. Define strong α-cutset of a fuzzy subset A with an example.

SECTION - B

Answer **any five** of the following. 5x6=30

13. Let X be any set τ be family of subsets of X defined as follows.
    A subset G of X belongs to τ i.e. $G \in \tau$ iff.
    (a) G is empty or
    (b) G' is finite then prove that τ is a topology on X.

P.T.O.

14. Let (X, τ) be a topological space. Let $x \in X$, if A is neighbourhood of x, then prove that any superset of A is also a neighbourhood of X.

15. In the real space (R, u) find derived sets of Q and Q' i.e. d(Q) and d(Q').

16. Define closed set. Let (X, τ) be a topological space. A subset A of X is open if and only if A' is closed.

17. Let $X = \{a, b, c, d, e\}$, $\tau = \{\phi, X, \{a\}, \{a, b\}, \{a, b, c\}, \{a, b, c, d\}\}$ be a topology on X. Find A°, $(A')^\circ$ and $\partial(A)$ where $A = \{a, b, c\}$.s

18. Let (X, τ) be a topological space and a subset A of X is closed iff it contains all its limit points i.e. $d(A) \subset A$.

19. Define Hausdorff space and prove that every discrete space is Hausdorff space.

SECTION - C

Answer **any five** of the following. **5x6=30**

20. Expand $\sin^8\theta$ interms of cosines of multiples of θ.

21. Show that $\frac{\cos 7\theta}{\cos\theta} = 64\cos^6\theta - 112\cos^4\theta + 56\cos^2\theta - 7$.

22. Find general and principle values of $\log(1 + i\sqrt{3})$.

23. Find sum of the series $\sin\theta + \frac{\sin 2\theta}{2!} + \frac{\sin 3\theta}{3!} + \ldots\ldots \infty$.

24. Prove that $\log\left[\frac{\cos(x - iy)}{\cos(x + iy)}\right] = 2i\tan^{-1}[\tan x \tanh y]$.

25. Let $f : X \to Y$ be a function. A be a fuzzy subset of X, B be a fuzzy subset of Y, then prove that $f(1 - A) \geq 1 - f(A)$.

26. Let A, B be any two fuzzy subsets of X. Let $\alpha, \beta \in [0, 1]$ then prove that :
    (a) $\alpha_{A \wedge B} = \alpha_A \cap \alpha_B$
    (b) $\alpha_{A \vee B} = \alpha_A \cup \alpha_B$

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B.Sc. VI Semester Degree Examination, Sept.-2020-21
MATHEMATICS-XII

Paper 6.1 : Trignometry and Complex Analysis

Time : 3 Hours **Max. Marks : 80**

Instructions to Candidates : Answer all the Sections

SECTION-A

I. Answer any TEN of the following : **(10X2=20)**

1. Expand tan40 In terms of tan θ

2. If Sin(A+iB)=x_iy, then show that $\frac{x2}{sin2A} - \frac{y2}{cos2A} = 1$

3. Find the real and imaginary parts of sin(x+iy)

4. Find all the values of log $(-1 + i\sqrt{3})$

5. Define conformal transformation.

6. Find the fixed points of the transformation w=3z - 4/z

7. Find the Locus of the point z satisfying $|z+i| \geq 2$

8. Show that amp(z-1)= $\frac{\pi}{2}$ represents a line parallel imaginary axis.

9. Evaluate Lim. $Z \longrightarrow 1-i$ Z^2-2Z+1.

10. Show that f(z) = Sin Z is analytic

11. Evaluate $\int_o^{1+i}$ (x^2-iy) dz along $y = X^2$

12. Evaluate $\int_o^{3+i}$ Z^2 dz along the line 3y = X

SECTION-B

Answer any FIVE of the following : **(5X6=30)**

13. Expand $\frac{\cos 9\theta}{\cos\theta}$ as a series of powers of $\sin\theta$ and hence deduce the series for $\frac{\sin 9\theta}{\sin\theta}$

14. Show that $\cos^7\theta = 1/2^6$ [$\cos 7\theta + 7\cos 5\theta + 21\cos 3\theta + 35\cos\theta$]

15. Find the real and imaginary parts of tan (x+iy).

16. Sum the series $\cos^2 + \cos^2 2 + \cos^2 3 +$ ..... to n terms.

17. If f (z) is analytic in a domain D of the z-plane and $f^1(z) = o$ inside D, then prove that the mapping is conformal.

18. show that under the transformation W = ½ the image of the hyperbola $x^2 - y^2 = 1$ is the lemniscates $R^2 = \cos 2\theta$.

19. Find the bilinear transformation which maps the points z=1, i-1 into the points W=i, o, - i. Hence find the image of |z+| < |.

Section – C

Answer ant five of the following:

20. State and prove sufficient condition for f (z) to be analytic.

21. If a function f(z) = U+ i V is analytic in a domain D and f(z) is constant, show that F (z) is also a constant in D.

22. Show that f(z) = logz is analytic and hence show that $f^1 = 1/z$

23. Derive Cauchy – Riemann equations in polar form.

24. If F(z) = u+iv is analytic and ϕ is any differentiable function of x and y show that

$$\left(\frac{\partial\phi}{\partial x}\right)^2 + \left(\frac{\partial\phi}{\partial y}\right)^2 = \left[\left(\frac{\partial\phi}{\partial u}\right)^2 + \left(\frac{\partial\phi}{\partial v}\right)^2\right] \cdot |f'(z)|^2$$

25. Evaluate $\int_c (x2 - iy2)\,dz$ along $Y = 2X^2$ from (1,2) to (2,8).

26. Evaluate $\int_c \frac{4 - 3Z}{Z(z^2 - 3z + 2)}\,dz$ where C is the circule |z| =3/2 by using cauchy's Integral formula.

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36631

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

MATHEMATICS - XII

6.1 : Trigonometry, Topology and Fuzzy Sets

(CBCS)

21212

Time : 3 Hours

Maximum Marks : 70

Instruction : Answer all Sections.

SECTION - A

Answer **any five** of the following : 5x2=10

1. Define topology on a set.
2. If A is closed and B is open then prove that $A - B$ is closed.
3. Give an example to show that $\overline{A \cap B} \neq \overline{A} \cap \overline{B}$.
4. Prove that $\cosh(x-y) = \cosh x \cdot \cosh y - \sinh x \cdot \sinh y$.
5. Find the real and imaginary parts of $\sin(x+iy)$.
6. Define compliment of a fuzzy subset with an example.
7. Define α-cut and strong α-cut set of fuzzy subset A.

SECTION - B

Answer **any five** of the following : 5x6=30

8. Let X be any set. τ be family of subsets of X defined as follows.
   A subset G of X belongs to τ. i.e. $G \in \tau$ iff
   (a) G is empty or
   (b) G' is finite then prove that τ is a topology on X.
9. Let (X, τ) be a topological space then a subset A of X is open iff A is neighbourhood of each of its points.
10. Let (X, τ) be a topological space A, B be subsets of X then prove that :
    (a) $d(\phi) = \phi$
    (b) If $A \subset B$ then $d(A) \subset d(B)$

P.T.O.

11. Let (X, τ) be a topological space. Let A, B be subsets of X then prove that :
    (a) If $A \subset B$ then $\overline{A} \subset \overline{B}$
    (b) $\overline{A \cup B} = \overline{A} \cup \overline{B}$
    (c) $\overline{A \cap B} \subset \overline{A} \cap \overline{B}$

12. Let $X = \{a, b, c, d, e\}$, $\tau = \{\phi, X, \{a\}, \{a, b\}, \{a, b, c\}, \{a, b, c, d\}\}$ be a topology on X. Find A^0, $(A^1)^0$, $\partial(A)$ where $A = \{a, c, d\}$.

13. Let (X, τ) be a topological space and A be a subset of X which is neither empty nor singleton set. Find d(A).

14. Define Hausdorff Space and prove that every Discrete Space is a Hausdorff Space.

SECTION - C

Answer **any five** of the following : 5x6=30

15. Expand $\sin 7\theta$ in ascending powers of $\sin\theta$.

16. Expand $\frac{\cos 7\theta}{\cos\theta}$ as a series in powers of $\cos\theta$.

17. Show that $16\sin^5\theta = \sin 5\theta - 5\sin 3\theta + 10\sin\theta$.

18. Find all the values of $\log\left[\frac{1+\cos\alpha+i\sin\alpha}{1+\cos\alpha-i\sin\alpha}\right]$.

19. Sum the series $1+\frac{\cos\theta}{1!}+\frac{\cos 2\theta}{2!}+\frac{\cos 3\theta}{3!}+\ldots\ldots\infty$.

20. Let $f: X \to Y$ be a function where X, Y are two sets. Prove that $f(A \vee B) = f(A) \vee f(B)$.

21. Let A, B be any two fuzzy subsets of X. Let $\alpha, \beta \in [0, 1]$ then prove that
    (a) $\alpha_{A \wedge B} = \alpha_A \cap \alpha_B$
    (b) $\alpha_{A \vee B} = \alpha_A \cup \alpha_B$

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36632

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

MATHEMATICS

6.2 Paper - XIII : Numerical Analysis

(CBCS)

21223

Time : 3 Hours

Maximum Marks : 70

Instructions : *(i) Answer all the Sections.*

(ii) Non-programmable calculator may be used.

SECTION - A

Answer **any five** of the following : **5x2=10**

1. Find the interval in which the real root lies $x \log_{10}^{x} = 1.2$.

2. Find the relative error of the approximate number N = 437.4 if all its digits are valid.

3. If $\Delta^3 (1+\alpha x)(1-2x)(1+4x) = -192$ for h = 1, Find α.

4. Find the sixth term of the given series 8, 12, 19, 29 and 42.

5. State Lagrange's inverse interpolation formula.

6. State Simpson's $\frac{1}{3}^{rd}$ and $\frac{3}{8}^{th}$ rule for numerical integration.

7. Find K_1 of Runge-Kutta 4^{th} order method given $y^1 = 3xy$, $y(0) = 1$ and h = 0.2.

SECTION - B

Answer **any five** of the following : **5x6=30**

8. Find the real root of $x^3 - 5x - 7 = 0$ by Regula-Falsi method upto three decimal places.

9. Find the real root of the equation $x^3 - x - 1 = 0$ using Bisection method in four stages.

10. Solve by Gauss-elimination method.

$x + y + z = 6$

$3x + 3y + 4z = 20$

$2x + y + 3z = 10$

P.T.O.

11. Using Newton's divided difference formula find the value of $f(6)$ from the following table :

x	-2	1	3	7	8
$y=f(x)$	10	4	40	424	620

12. Find $f(8.2)$ from the table.

x :	8	8.5	9	9.5	10
$f(x)$:	43	50	67	94	131

13. Use Lagrange's interpolation formula to estimate the weight of the baby at the age of 7 months from the table.

Age in months (x) :	0	2	5	8
Weight in pounds $f(x)$:	6	10	12	16

SECTION - C

Answer **any five** of the following : 5x6=30

14. Find $f'(x)$ and $f''(x)$ from the table.

x	-1	1	2	3
$f(x)$	-21	15	12	3

15. Evaluate $\int_0^6 3x^2\,dx$ dividing the interval (0, 6) into six equal parts by applying Weddle's rule.

16. Evaluate $\int_0^1 e^x\,dx$ in steps of 0.2 using Trapizoidal rule.

17. Use Taylor's series method to solve $\frac{dy}{dx}=1+xy$ given $y(0)=2$, find $y(0.3)$.

18. Euler's method, find $y(0.5)$ given $\frac{dy}{dx}=x^2+y^2$ and $y(0)=1$, take $h=0.1$.

19. Solve $\frac{dy}{dx}=1+y^2$ using Picards method of successive approximation upto 3rd approximation with $y(0)=0$ find $y(0.2)$.

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Sl. No. 20052

30622

No. of Printed Pages : 3

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

MATHEMATICS

6.2 Paper-XIII : Numerical Analysis (NEW)

Time : 3 Hours

Maximum Marks : 80

Instructions : *(i) Answer all the Sections.*

(ii) Non-programmable calculator may be used.

SECTION - A

10x2=20

Answer **any ten** of the following.

1. What do you mean by interpolation and extrapolation ?
2. The absolute error is 0.005 and relative error is 3.264×10^{-6}. Find the true value.
3. Find the interval in which the real root lies for the equation $x^3 - 9x - 12 = 0$.
4. State Bisection Method.
5. Prove that $\Delta^3 Y_0 = Y_3 - 3Y_2 + 3Y_1 - Y_0$.
6. Evaluate : $\Delta^{10}[(1-2x)(1-3x^2)(1-4x^3)(1-5x^4)]$ taking $h = 1$.
7. Construct the forward difference table for $f(x) = 2^x$, for $x = 0, 1, 2, 3$ and 4.
8. Find the sixth term of the given series 8, 12, 19, 29 and 42.
9. State Simpson's $\frac{1}{3}^{rd}$ and $\frac{3}{8}^{th}$ rule for numerical integration.
10. State Newton's Backward interpolation formula.
11. Using Picards method of successive approximation find the solution of $\frac{dy}{dx} = 1 + xy$ subject to the condition $y(0) = 0$ upto second approximation.
12. Find K_1, of R-K method. Given $y' = 3xy$, $y(0) = 1$ and $h = 0.2$.

P.T.O

SECTION - B

5x6=30

Answer **any five** of the following.

13. Find the real root of $x^3+2x^2+10x-20=0$ by Newton-Raphson Method.

14. Find the real positive root of the equation $x^3-7x+5=0$ by bisection method, correct to 3 places of decimal.

15. Solve $x^3-9x+1=0$ for the root lying between [2, 4] by the Regula-Falsi Method.

16. If 0.182 is the approximate value for $\frac{2}{11}$ 'Find the absolute error, relative error and percentage error.

17. Using Gauss-Seidal iteration method solve the system of equations

$27x+6y-z=85$

$6x+15y+2z=72$

$x+y+54z=110$

and carry in three stages.

18. Using Newton's divided difference formula, find $f(15)$.

x :	4	5	7	10	11	13
$f(x)$:	48	100	294	900	1210	2028

19. Find polynomial of degree 2 which passes through the points (1, 0), (2, 2), (3, 4) and (4, 8).

SECTION - C

Answer **any five** of the following. 5x6=30

20. The population of a certain town is given below. Find the rate of growth of population in 1971.

x : Year	1931	1941	1951	1961	1971
y : Population (in thousands)	40.62	60.80	79.95	103.56	132.65

21. Calculate $\int_4^{5.2} \log x \, dx$ by using Weddle's rule.

22. Evaluate $\int_0^1 \frac{1}{1+x^2} \, dx$ using the Simpson $\frac{3}{8}$ rule by the interval into 3 equal parts.

Hence find an approximate of $\log \sqrt{2}$.

23. Use Euler's method to find y at $x = 0.1$ if $\frac{dy}{dx} = x^2 + y$. Given initial condition $y(0) = 1$, take $h = 0.05$.

24. Use Taylor's series method to solve.

$\frac{dy}{dx} = 1 + xy$, given $y(0) = 2$, find $y(0.3)$.

25. Using Picards method of successive approximation to find the solution of $\frac{dy}{dx} = x^2 + y^2$ given $y = 1$ when $x = 0$. Upto second approximation and obtain y when $x = 0.4$

26. Solve $\frac{dy}{dx} = x^2 + y$ given that $y = 1$ when $x = 0$ by Runge-Kutta 4^{th} order method also find y when $x = 0.1$ by taking $h = 0.1$.

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VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

MATHEMATICS

6.3 Paper - XIV (Optional) : Graph Theory - II

(CBCS)

21177

Time : 3 Hours

Maximum Marks : 70

Instruction : *Answer all Sections.*

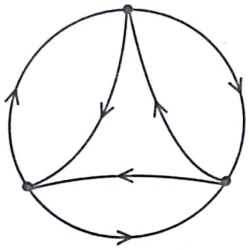
SECTION - A

5x2=10

Answer **any five** of the following.

1. Define regular digraph and balanced digraph with an example.

2. Find the out degree and in degree.

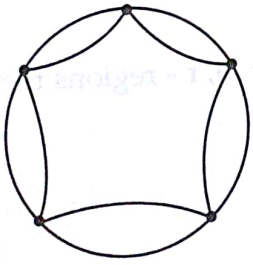


3. Define total graph and find $T(P_3)$.

4. Define inner vertex number. Find the inner vertex number of $K_{2,3}$.

5. Find chromatic number of K_4 and C_6.

6. Find the number of vertices, edges regions and verify Euler's theorem.



7. Define spectra of a graph.

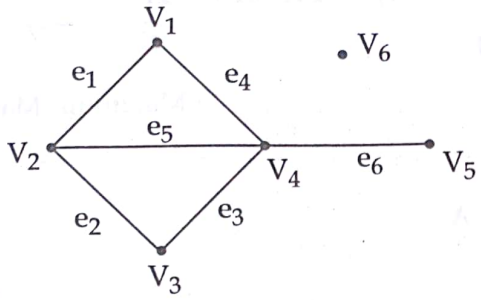
P.T.O.

SECTION - B

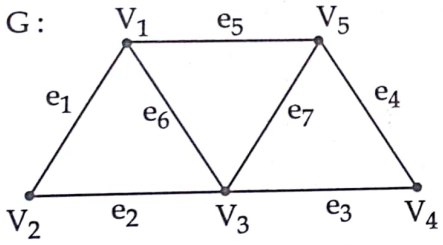
5x6=30

Answer any five of the following.

8. Define incidence matrix. Find the incidence matrix of a disconnected graph.



9. Find the cycle matrix of the graph G shown below.



10. Let G be a connected planar graph with p vertices, q edges and r - regions then prove that $q-p+2=r$.

11. If G is a (p, q) degree whose vertices have degrees d_i then show that L(G) has q vertices and q_L edges where $q_L = \sum d_i^2 - q$.

12. Show that K_5 and $K_{3,3}$ are non-planar.

13. Let G be a connected planar graph with p vertices and q edges (q > 2), r - regions then prove that

(i) $q \geq \frac{3}{2} r$

(ii) $q=3p-6$

14. Find the graph G whose incidence matrix is

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{bmatrix}$$

and find the incidence matrix of K_3.

SECTION - C

5x6=30

Answer **any five** of the following.

15. Prove that a cycle with n vertices is 2-chromatic if n is even and 3-chromatic if n is odd.

16. Prove that a tree with atleast 2 vertices is bi-chromatic or 2-chromatic.

17. If G is K-critical graph then prove that $\delta(G) \geq K-1$.

18. If D is a digraph with odd number of vertices and each vertex of D has an odd out degree, then prove that D has an odd number of vertices with odd indegrees.

19. Find the chromatic polynomial of K_4.

20. If G is connected graph and $e=\{a, b\}$ is an edge in G then

$$P(Ge, \lambda) = P(G, \lambda) + P(G'_e, \lambda)$$

21. Prove that every connected simple planar graph G is 6-colorable.

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20600

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

BOTANY - VIII

6.2 : Plant Physiology

(CBCS)

Time : 3 Hours Maximum Marks : 70

Instructions : *(i) Answer all the questions.*

(ii) Draw the diagram wherever necessary.

I. Answer **all** the questions. 15x1=15

1. What is diffusion ?
2. What is an isotonic solution ?
3. What are Quantosomes ?
4. Define growth.
5. What is transpiration ?
6. What is water potential ?
7. What is deplasmolysis ?
8. How many molecules of ATP produced during oxidation of $FADH_2$?
9. Which is the site of dark reaction ?
10. Which is end product of glycolysis ?
11. What are C_3 plants ?
12. What is Ascent of sap ?
13. What is aerobic respiration ?
14. What is Photoperiodism ?
15. What is vernalization ?

P.T.O.

II. Answer **any five** of the following : 5x5=25

16. Explain the mechanism of opening and closing of stomata.

17. Write a short note on Respiratory Quotient (RQ).

18. Explain the properties of enzymes.

19. Explain practical applications of Auxins and Gibberellins.

20. Explain the Calvin cycle of Photosynthesis.

21. Describe Dixon's theory of Ascent of sap.

22. Describe various steps of Krebs cycle.

III. Answer **any three** of the following : 3x10=30

23. Describe active mechanism and passive mechanism of water absorption.

24. Describe cyclic and noncyclic Photophosphorylation.

25. Illustrate the mechanism of electron transport system.

26. What is osmosis ? Explain the same by a Physical experiment.

27. Describe steps involved in glycolysis.

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No. of Printed Pages : 2

36621

20594

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

BOTANY - VI

6.1 : Plant Breeding, Biotechnology and Plant Tissue Culture (CBCS)

Time : 3 Hours

Maximum Marks : 70

Instructions : *(i) Answer* ***all*** *the questions.*

(ii) Draw ***diagrams*** *wherever necessary.*

I. Answer the following questions : **15x1=15**

1. Define Totipotency.
2. What are synthetic seeds ?
3. What is Micropropagation ?
4. Define Clone.
5. Expand ELISA.
6. What are molecular scissors ?
7. What are blunt ends ?
8. Which was the first restriction enzyme discovered ?
9. Define Plasmid.
10. Define Emasculation.
11. Expand HGPRT.
12. Which is the largest antibody ?
13. What are pollen bank ?
14. What are Shuttle vectors ?
15. Who is the father of plant breeding ?

P.T.O

II. Answer **any five** of the following questions : 5x5=25

16. Write the principles and objectives of Plant breeding.

17. Explain Gooting and Wedge grafting.

18. What are the tools involved in rDNA technology ?

19. Explain pBR322 with a neat labelled diagram.

20. Explain the steps involved in DNA finger printing.

21. Explain somatic embryogenesis.

22. Write a note on applications of Plant tissue culture.

III. Answer **any three** of the following questions : 3x10=30

23. Explain the process involved in rDNA technology.

24. What is haploid culture ? Explain anther culture with neat labelled diagram.

25. Explain mass selection method of Plant breeding.

26. Explain the practical applications of Plant Breeding.

27. Explain the production of Monoclonal antibodies.

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20076

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

PHYSICS

6.2 (VIII) : Material Science and Electronics - II (NEW)

Time : 3 Hours

Maximum Marks : 80

Instructions : (i) Answer all the questions of Section - A in the first two pages only.

(ii) Answer any five questions of Section - B and four questions from Section - C.

SECTION - A

Answer all the following : 15x1=15

1. What is meant by ferrous material ?
2. Define Hooke's Law.
3. What is hardness of a material ?
4. Define thin film.
5. Define thermal conductivity of materials.
6. Mention any one use of thin film.
7. What are nano materials ?
8. Mention the type of feedback used in oscillators.
9. What is a multivibrator ?
10. Write the logic symbol for XOR gate.
11. What is a Counter ?
12. How the decimal number 379 write in binary number ?
13. Mention the disadvantage of negative feedback.
14. What is modulation ?
15. What is the principle of super heterodyning ?

P.T.O.

SECTION - B

Answer **any five** of the following : 5x5=25

16. What is sputtering ? Explain CVD method of preparing thin film.
17. Define heat capacity, specific heat and thermal conductivity of materials.
18. Explain with neat diagram and truth table, the working of a full adder.
19. With neat diagram give the construction and working of Colpitt's oscillator.
20. List the differences between brittle structure and ductile structure.
21. Derive an expression for electrical conductivity in metals.
22. Write a note on Amplitude modulation.

SECTION - C

Answer **any four** of the following : 4x10=40

23. (a) Explain engineering classification of materials. 5+5
    (b) What are primary bonds ? Explain in brief with examples.
24. (a) Mention the techniques of synthesis of nano materials and explain any one. 5+5
    (b) Write a note on quantum nano structures.
25. (a) What are universal logic gates ? Show that NOR gate is a universal gate. 6+4
    (b) Prove (a) $AB + BC + \overline{B}C = AB + C$
    (b) $AC + ABC = AC$
26. (a) What is a flip-flop ? Explain J-K flip-flop 5+5
    (b) Write a note on creep.
27. (a) Write the two conditions of Barkhausen criteria. Explain with neat diagram, the working of phase shift oscillator. 7+3
    (b) A Wein bridge oscillator is used for operation at $f = 10$ kHz of the value of $R = 100$ kΩ. Find the value of the capacitor.
28. (a) Compare Amplitude modulation and frequency modulation. 5+5
    (b) Describe superheterodyne receiver with neat block diagram.

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56630

21164

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

PHYSICS - VIII

6.2 : Material Science and Electronics - II

(CBCS)

Time : 3 Hours

Maximum Marks : 70

Instruction : *Answers to questions in Section-A should be written in first two pages only.*

SECTION - A

Answer the following. **15x1=15**

1. What is crystalline state of a material ?
2. What are Ceramics ?
3. Give an example of ionic bond.
4. What is a phonon ?
5. What is fatigue of a material ?
6. Define thermal conductivity of a material.
7. What is spluttering technique ?
8. What is a thin film ?
9. What is the principle of phase shift oscillator ?
10. State Backhausen Criterion.
11. What is a register ?
12. Convert decimal 19 into binary equivalent.
13. What is amplitude modulation ?
14. What are superheterodynes ?
15. What is image rejection ?

P.T.O.

SECTION - B

Answer **any five** of the following. 5x5=25

16. Explain the engineering of classification of materials.

17. Explain the properties of metallic bond.

18. What is hardness of material and Moh's hardness of material ?

19. Explain the dielectric properties of insulators.

20. Describe an experimental method of preparation of thin film by physical vapour deposition method.

21. Explain with a neat diagram, the principle and working of Wein Bridge oscillator.

22. With a neat diagram explain the block diagram of AM and FM receivers.

SECTION - C

Answer **any three** of the following. 3x10=30

23. (a) Distinguish between crystalline and non-crystalline states of materials.
    (b) Write a note on creep. 6+4=10

24. (a) Write a note on quantum nano structures.
    (b) Mention the applications of nano materials. 6+4=10

25. (a) Write a note on astable multivibrator.
    (b) Explain the working of colpitts oscillator. 5+5=10

26. With truth table explain OR, AND, NOT gates. 10

27. (a) Derive an expression for equation of a frequency modulated wave.
    (b) Write a note on JK flip-flop. 6+4=10

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24617

20047

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

PHYSICS - VII

6.1 - Nuclear Physics, Solid State Physics, Astrophysics and Biophysics (New)

Time : 3 Hours

Maximum Marks : 80

Instruction : *Answer* ***all*** *questions from* ***Section - A*** *in first* ***two*** *pages only.*

SECTION - A

Answer the following questions. **15x1=15**

1. What is Binding energy of the nucleus ?
2. Define Decay Constant.
3. What is Scintillation ?
4. Give any two examples of Non-conventional energy source.
5. What are Thermonuclear reactions ?
6. What is Nuclear fission ?
7. State Curie's law.
8. Write a application of Superconductor.
9. Define a Primitive cell.
10. What is Tidal energy ?
11. Define critical field of a Superconductor.
12. What are white dwarf stars ?
13. What is Light year ?
14. Define Luminosity of a star.
15. What is Debye's temperature ?

P.T.O.

SECTION - B

Answer **any five** of the following questions. 5x5=25

16. What is a nuclear force ? Mention the characteristics of nuclear forces.

17. Deduce an expression for thermal conductivity of a metal.

18. State the Radioactive decay law and derive the expression $N = N_0 e^{-\lambda t}$.

19. Distinguish between Dia, Para and Ferromagnetic materials.

20. Explain Soft and Hard superconductors.

21. Derive Bragg's Law of X-ray diffraction.

22. Discuss the classification of stars on the basis of temperature.

SECTION - C

Answer **any four** of the following questions. 4x10=40

23. (a) Explain Dulong and Petit's law of specific heat of solids. 5+5
    (b) Explain the terms Half life and Mean life of radioactive substance and obtain the relation between them.

24. Explain the construction, working and theory of a cyclotron with a neat diagram. 10

25. (a) Write a note on wind energy. 5+5
    (b) Explain the theory of nuclear reactor.

26. (a) Explain Meissner effect. 5+5
    (b) What are Miller Indices and explain the procedure to find Miller Indices.

27. (a) Explain Einstein's theory of specific heat of solids. 5+5
    (b) Discuss the Langevin's theory of diamagnetism.

28. (a) Write the similarities between the liquid drop and nucleus of an atom. 5+5
    (b) Draw and explain Hertzsprung-Russel diagram or (HR diagram).

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21237

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

PHYSICS - VIII

6.2 : Material Science and Electronics - II

(CBCS)

Time : 3 Hours | Maximum Marks : 70

Instruction : *Answers to questions in Section-A should be written in first two pages only.*

SECTION - A

Answer the following. 15x1=15

1. What is crystalline state of a material ?
2. What are Ceramics ?
3. Give an example of ionic bond.
4. What is a phonon ?
5. What is fatigue of a material ?
6. Define thermal conductivity of a material.
7. What is spluttering technique ?
8. What is a thin film ?
9. What is the principle of phase shift oscillator ?
10. State Backhausen Criterion.
11. What is a register ?
12. Convert decimal 19 into binary equivalent.
13. What is amplitude modulation ?
14. What are superheterodynes ?
15. What is image rejection ?

P.T.O.

SECTION - B

Answer **any five** of the following. 5x5=25

16. Explain the engineering of classification of materials.

17. Explain the properties of metallic bond.

18. What is hardness of material and Moh's hardness of material ?

19. Explain the dielectric properties of insulators.

20. Describe an experimental method of preparation of thin film by physical vapour deposition method.

21. Explain with a neat diagram, the principle and working of Wein Bridge oscillator.

22. With a neat diagram explain the block diagram of AM and FM receivers.

SECTION - C

Answer **any three** of the following. 3x10=30

23. (a) Distinguish between crystalline and non-crystalline states of materials.
    (b) Write a note on creep. 6+4=10

24. (a) Write a note on quantum nano structures.
    (b) Mention the applications of nano materials. 6+4=10

25. (a) Write a note on astable multivibrator.
    (b) Explain the working of colpitts oscillator. 5+5=10

26. With truth table explain OR, AND, NOT gates. 10

27. (a) Derive an expression for equation of a frequency modulated wave.
    (b) Write a note on JK flip-flop. 6+4=10

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21705

VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

CHEMISTRY

6.2 : CHEMISTRY - VIII

(CBCS)

Time : 3 Hours Maximum Marks : 70

Instructions : (i) *Section - A contains questions from Inorganic, organic and physical chemistry.*

(ii) *Section-B contains questions from Inorganic chemistry, Section-C contains questions from organic chemistry and Section - D contains questions from physical chemistry.*

(iii) *Answer all the four Sections A, B, C and D.*

SECTION - A

Answer **any ten** of the following questions. 10x1=10

1. What are organolithium compounds ?
2. What are cytochromes ?
3. Define multiphase material.
4. Write the structure of iron pentacarbonyl.
5. What is meant by food adulteration ?
6. Give an example for antibiotic.
7. Draw the molecular orbital picture of furan.
8. Write one use of gammexene.
9. Define polarization.
10. Define over voltage.
11. What is the emf value of Daniel cell ?
12. What are fuel cells ?

SECTION - B

Answer **any two** of the following questions. 2x10=20

13. (a) Explain EAN-16 and 18 rule with examples. 6
    (b) Write one method of preparation of organolithium compound. 4

14. (a) Explain the structure and function of myoglobin. 6
    (b) What are essential trace and non-essential trace elements ? Give one example in each case. 4

P.T.O.

15. (a) Write a note on particle reinforced, fiber reinforced and structural composites. 6
(b) Explain nanomaterials with their applications. 4

SECTION - C

Answer **any two** of the following questions. 2x10=20

16. (a) Write any three electrophilic substitution reactions of pyrrole. 6
(b) Write any two methods of synthesis of furan. 4

17. (a) How do you determine chlorinated pesticides in food products by TLC method ? 6
(b) How do you analyse moisture in vegetable oils ? 4

18. (a) Discuss the classification of drugs. 6
(b) Write the synthesis of chloramine-T. 4

SECTION - D

Answer **any two** of the following questions. 2x10=20

19. (a) Write a note on Daniel cell with a neat labelled diagram. 6
(b) Derive Nernst equation for electrode potential. 4

20. (a) Write a note on calomel electrode with neat labelled diagram. 6
(b) Calculate EMF of Zn-Cu cell at 30°C when activity of Zn^{2+} ions is 0.5 and activity of Cu^{2+} ion is 10. 4
(Given std. emf of the cell = 1.1 volts)

21. (a) Describe Dry cell (primary cell) with neat labelled diagram. 6
(b) Explain the importance of hydrogen-oxygen fuel cell. 4

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VI Semester B.Sc. Degree Examination, Sept./Oct. - 2021

CHEMISTRY

6.1 : CHEMISTRY - VII

(CBCS)

Time : 3 Hours

Maximum Marks : 70

Instructions : *(i)* ***Section - A*** *contains questions from Inorganic, organic and physical chemistry.*

(ii) ***Section - B*** *contains questions from Inorganic chemistry*

Section - C *contains questions from organic chemistry and*

Section - D *contains questions from physical chemistry.*

(iii) *Answer* ***all*** *the four* ***Section A, B, C*** *and* ***D.***

SECTION - A

10x1=10

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

1. What are the ingredients of glass ?
2. Name the extenders used in paint.
3. What are silicones ?
4. What are different types of water pollution ?
5. Mention the uses of Atropine.
6. Write the structure of camphor.
7. What are hormones ? Give an example.
8. What is dipeptide ?
9. Define degree of freedom.
10. What is the criteria for a molecule to exhibit rotational spectra ?
11. What do you mean by zero point energy ?
12. What are antistoke lines ?

P.T.O.

SECTION - B

Answer **any two** of the following questions. 2x10=20

13. (a) Describe the manufacture of cement in dry process with a neat labelled diagram. 6
    (b) Explain types and sources of soil pollution. 4

14. (a) Describe the manufacture of white lead by Dutch process. 6
    (b) Point out differences between inorganic polymers and organic polymers. 4

15. (a) Explain the measurers of water pollution. 6
    (b) Write a note on polyphosphazenes. 4

SECTION - C

Answer **any two** of the following questions. 2x10=20

16. (a) Elucidate the structure of Nicotine. 6
    (b) Write a note on primary and secondary structure of proteins. 4

17. (a) What are co-enzymes ? Explain the classification of enzymes. 6
    (b) What are Vitamins ? Give the synthesis of Vitamin-C. 4

18. (a) What are terpens ? Discuss the classification of terpens. 6
    (b) Explain the biological importance of thyroxin and insulin. 4

SECTION - D

Answer **any two** of the following questions. 2x10=20

19. (a) Write a note on pure vibrational Raman spectra of diatomic molecule. 6
    (b) Explain the effect of Isotopic substitution on a diatomic rotational spectra. 4

20. (a) Explain harmonic oscillator model of the vibrational spectra with energy level diagram. 6
    (b) How the intensity of the spectral lines in the microwave spectra are determined ? 4

21. (a) Explain an harmonic oscillator model of the vibrational spectra with energy level diagram. 6
    (b) The internuclear distance of CO molecule is 1.13 Å. Calculate the energy in Joules of this molecule in the first excited rotational level. 4
    The atomic masses of $^{12}C = 1.19 \times 10^{-26}$ kg, $^{16}O = 1.66 \times 10^{-26}$ kg

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