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V Semester B.Sc 3 / B.Sc 4 Degree Examination, March - 2022

MATHEMATICS (OPTIONAL)

Paper : I - Real Analysis

(Regular/Repeaters w.e.f 2016-2017 (New Syllabus))

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. Question Paper contains 3 Parts namely A, B and C.
2. Answer all questions.

PART-A

Answer any Ten of the following.

(10×2=20)

1. a) Define Upper and Lower Riemann integrals.
- b) State Dourboux theorem.
- c) State Bonnet form of Second mean Value theorem of integral calculus.
- d) Prove that $\left| \int_a^b \sin x^2 dx \right| \leq \frac{1}{a}$.
- e) Define absolute convergence of an improper integral and give an example.
- f) Test the Convergence of $\int_1^{\infty} \frac{dx}{(5+x)\sqrt{x}}$.
- g) Test the Convergence of $\int_0^{\pi/2} \frac{dx}{\sqrt{\sin x}}$.
- h) Prove that $\sqrt{n+1} = n\sqrt{n}$.
- i) Find the Value of $\int_0^{\infty} e^{-x^2} dx$.
- j) Prove that $\beta(x+1, y) = \beta(x, y) \frac{x}{x+y}$.

[P.T.O.]



k) Evaluate $\int_0^1 \int_0^3 (x^2 + y^2) dx dy$.

l) Evaluate $\int_1^e \int_1^e \int_1^e \frac{dx dy dz}{xyz}$.

PART-B

Answer any Four of the following.

(4×5=20)

- If $f(x)$ and $g(x)$ are bounded and integrable in $[a, b]$ then prove that $f(x) \cdot g(x)$ is bounded and R-integrable in $[a, b]$.
- Prove that every continuous function in $[a, b]$ is R-integrable.
- If $f(x)$ and $g(x)$ are +ve in $[a, \infty)$ and $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)} = L$ (non-zero and finite). Then prove that

the Integrals $\int_a^{\infty} f(x) dx$ and $\int_a^{\infty} g(x) dx$ behave alike, where $a > 0$.

5. Test the Convergence of $\int_0^1 \frac{dx}{x^{\frac{1}{2}}(1-x)^{\frac{1}{3}}}$.

6. Prove that $\int_0^1 \frac{x^{m-1}(1-x)^{n-1}}{(x+a)^{m+n}} dx = \frac{1}{a^n(a+1)^m} \beta(m, n)$.

7. Find the volume of tetrahedron bounded by Co-Ordinater planer and the plane $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$.

PART-C

Answer any Four of the following:

(4×10=40)

8. a) State and Prove condition of R-integrability.

b) Prove that $f(x) = 3x + 1$ is integrable on $[1, 2]$ and $\int_1^2 (3x+1) dx = \frac{11}{2}$.

9. a) State and Prove Fundamental theorem of integral Calculus.

b) Prove that $\frac{1}{\pi} \leq \int_0^1 \frac{\sin \pi x}{1+x^2} dx \leq \frac{2}{\pi}$

10. a) State and Prove Abel's test for the Convergence of an improper integral.

b) Prove that $\int_0^{\infty} \frac{\sin kx}{x} dx$ Converger.

11. a) Establish the relation between Beta and Gamma function.

b) Prove that $\int_0^1 \frac{y^2}{\sqrt{1-y^4}} dy \times \int_0^1 \frac{dy}{\sqrt{1-y^4}} = \frac{\pi}{4}$.

12. a) State and Prove Leibnitz's theorem for differentiation under integral sign.

b) Prove that $\int_0^{\pi/2} \frac{\log(1 + \cos \alpha \cdot \cos x)}{\cos x} dx = \frac{\pi^2}{8} - \frac{\alpha^2}{2}$.

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V Semester B.Sc.3/B.Sc. 4 Degree Examination, March - 2022

MATHEMATICS (Optional)

Paper II : Numerical Analysis

(Regular and Repeaters w.e.f. 2016-17)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. Answer all questions.
2. Students are allowed to use scientific calculators.

PART-A

L Answer any Ten of the following questions.

(10×2=20)

1. a) Explain briefly Bisection method to find real root of $f(x) = 0$.
- b) Find the real root of $e^x - 2x = 0$ using iteration method in 3 stages.
- c) With usual notation prove that $E=1+A$.
- d) Construct the forward difference table of $x^2 + 2x + 1$ for the value of $x=0, 1, 2, 3, 4$.
- e) Evaluate $\Delta^4 [(1-x)(1-2x)(1-3x)(1-4x)]$, where $h=1$.
- f) Write the formula to find the first derivative using the forward difference.
- g) State Simpson's $\left(\frac{1}{3}\right)^{rd}$ formula to evaluate $\int_a^b f(x)dx$.
- h) From the Taylor's series for $y(x)$ find 'y' at $x=0.2$. If $y(x)$ satisfies $\frac{dy}{dx} = 2y + e^x$ $y(0) = 0$.
- i) Use Euler's modified method to compute $y_1^{(1)}$ for $x=0.05$ give that $\frac{dy}{dx} = x + y$ with the initial condition $x_0 = 0, y_0 = 1$.
- j) Define i) Order ii) Degree of difference equation.

[P.T.O.]



- k) From the difference equation by eliminating a and b from the relation $y_x = a(3)^x + b(-3)^x$.
- l) Solve $u_{x+2} - 25u_{x+1} + 46u_x = 0$.

PART-B

II. Answer any **Four** of the following questions.

(4×5=20)

- 2) Solve by Gauss-Serial iteration method carry out 4-iterations.
 $10x + y + z = 12$, $2x + 10y + z = 13$, $2x + 2y + 10z = 14$.
- 3) Express the function $f(x) = 2x^4 + 5x^2 + 4x + 5$ and its successive differences in a factorial notations when $h = 1$.
- 4) State and prove Newton-Gregory Forward interpolation formula.
- 5) Evaluate $\int_0^1 e^x dx$ approximately in steps of 0.2 using by Trapezoidal rule.
- 6) Explain Picard's method to solve the equation $\frac{dy}{dx} = f(x, y)$ with initial condition $y(x_0) = y_0$.
- 7) Solve $y_{x+2} - 3y_{x+1} - 4y_x = 5^x$.

PART-C

III. Answer any **Four** full of the following questions.

(4×10=40)

- 8) a) Derive Newton-Raphson formula $x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$ where $i = 0, 1, 2, \dots$
- b) Solve the equation $x^3 + 9x + 1 = 0$ for the root lying between 2 and 3, correct to three significant figures.
- 9) a) If $f(x)$ is a polynomial of degree n in x , then prove that $\Delta^n f(x)$ is constant, and $\Delta^{n+1} f(x) = 0$.
- b) Find the cubic polynomial which takes the following values.

x	0	1	2	3
f(x)	1	2	1	10



10) a) State and prove Lagrange's interpolation formula for an equal intervals.

b) The Population of town is as follows.

Years	1921	1931	1941	1951	1961	1971
Population in lakhs	20	24	29	36	46	51

Estimate the increase in Population during the period 1955 to 1961.

11) a) Explain Euler's Method to solve $\frac{dy}{dx} = f(x, y)$ with initial condition $y(x_0) = y_0$.

b) Find $y(0.1)$ and $y(0.2)$, given that $\frac{dy}{dx} = x - 2y$, $y(0) = 1$, taking $h = 0.1$, by Runge-Kutta method.

12) a) Solve $y_{x+2} - 4y_x = x - 1$.

b) Find the solution of the difference equation $y_{x+2} - 7y_{x+1} + 12y_x = \cos x$.

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V Semester B.Sc.3/B.Sc.4 Degree Examination, March - 2022

MATHEMATICS (OPTIONAL)

Dynamics and calculus of Variations.

Paper : III

(Regular/Repeater w.e.f. 2016-17 New Syllabus)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

- 1) Question paper has three parts namely A,B and C.
- 2) Answer all Questions.

PART-A

I. Answer any Ten of the following.

(10×2=20)

- 1) a) If the radial and transverse velocities are equal. Find the path.
- b) Prove that the angular acceleration of the direction of a point moving in a plane is $\frac{\rho}{\delta} \frac{d\rho}{ds} - \frac{\rho^2}{\delta^2} \frac{d\delta}{ds}$
- c) A particle is projected with velocity u making an angle α with the horizontal. Find the greatest height attained.
- d) A Particle is Projected with velocity u So that its range on a horizontal plane is twice the greatest height attained. Show that the range is $\frac{4u^2}{5g}$.
- e) State the laws of direct impact of two smooth spheres.
- f) Define: i) Central orbit ii) Law of Force.
- g) Find law of force towards the Pole for the curve $r^2 = ap$.
- h) Find the extremal of the functional $\int_{x_0}^{x_1} (x + y')y' dx$.
- i) Find the solution of Euler's equation when f is independent of x .
- j) State the variation problems of calculus of Variations.

[P.T.O.]

- k) Define Geodesic and What is the geodesic on a Sphere.
 l) Define ISO perimetric problem.

PART-B

II. Answer any Four of the following.

(4×5=20)

- 2) A Particle describes an equiangular spiral $r = e^{a\theta}$ in such a manner that its acceleration has no radial component. Prove that its angular Velocity is constant and magnitude of velocity and acceleration is each proportional to r .
- 3) The law of force is μu^3 , a particle is projected an apse at a distance 'a' with the velocity $\frac{2}{a}\sqrt{\frac{\mu}{3}}$. Show that equation of orbit is $r \cos \frac{\theta}{2} = a$.
- 4) When two spheres of masses m and m' moving with the velocities u and u' impact directly. Find the velocities after impact. Also show that the momentum lost by one and gained by the other is $\frac{mm'}{(m+m')}(1+e)(u-u')$.
- 5) A smooth Sphere of mass m impinges on another smooth sphere of mass $2m$ at rest, the direction of motion making an angle 45° with the line of centres at the momenta of impact. If $e = \frac{1}{2}$. Show that their path after impact are at rt angle.
- 6) Show that the general solution of Euler's equation for the integral $\int_a^b \frac{1}{y} \sqrt{1 + \left(\frac{dy}{dx}\right)^2} dx$ is $(x-h)^2 + y^2 = k^2$.
- 7) State and prove Brachistochrone problem.

PART-C

III. Answer any Four of the following.

(4×10=40)

- 8) a) Derive an expressions for tangential and normal velocities of a moving particle along the plane curve.
 b) A point moves in a curve so that its tangential and normal accelerations are equal and tangent rotates with constant angular velocity. Show that intrinsic equation of the path is $S = Ae^\psi + B$.

- 9) a) With usual notations prove that $F = h^2 u^2 \left[u + \frac{d^2 u}{d\theta^2} \right]$.
- b) If the central orbit is $a^n = r^n \cos n\theta$. Find the law of force.
- 10) a) A particle of mass m is projected from a fixed point into the air with the velocity u , in a direction making an angle 2 with the horizontal. Find the motion and path described.
- b) A particle is projected in a direction making an angle θ with horizon. If it passes through the points (x_1, y_1) and (x_2, y_2) referred to the horizontal and vertical axes through the point of projection then

$$\text{Prove that } \tan \theta = \frac{x_2^2 y_1 - x_1^2 y_2}{x_1 x_2 (x_2 - x_1)}.$$

- 11) a) State and prove necessary condition of Euler's equation.
- b) Find the curve passing through $(0,0)$ and $(\pi,0)$ along which the functional

$$\int_0^{\pi} (y'^2 + 2y \sin x) dx \text{ be an extremum.}$$

- 12) a) Prove that the sphere is the solid figure of revolution which, for a given surface area S , has maximum volume.

- b) Find the extremal for the functional $I = \int_0^1 (y'^2 + x^2) dx$ under the end conditions

$$y(0)=0=y(1) \text{ and Subjected to the constraint } I = \int_0^1 y dx = \frac{1}{6}.$$

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V Semester B.Sc. 4/3 Degree Examination, April - 2022

CHEMISTRY(Optional)

Paper : I

(Repeater/Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. All questions are compulsory.
2. Answer all questions in the same answer book.
3. Draw neat diagrams and Give equations wherever necessary.

SECTION - A

Answer any Ten of the following.

(10×2=20)

1. a) Give the IUPAC name of the following.
i) $K_4 [M_0(CN)_6]$ ii) $[Cr(H_2O)_4Cl_2]Cl$.
b) Define hydrate isomerism .Give an example.
c) Write von-weirmann equation.
d) What are phosphonitrilic compounds ? Give one example
e) What are condensed heterocycles ? Example.
f) How do you synthesise Barbituric acids from diethyl malonate ?
g) What are alkaloids ?
h) How do you detect presence of carbonyl group in Hygrine ?
i) What is zero point energy ?
j) State Hookes law.
k) Which type of molecule show's rotational spectrun ?
l) Write phase rule equation and name the terms involved.

SECTION - B

Answer any Four of the following

(4×5=20)

2. Explain the structure of $[Fe(CN)_6]^{4-}$ on the bases of VBT.
3. Explain co-precipitation and post-precipitation
4. Discuss the structure of Conine.

[P.T.O.]



(2)

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5. Explain the acidity of α - hydrogenation in Ethyl Aceto Acetate (EAA)
6. Draw the phase diagram of sulphur system and discuss the application of phase rule.
7. Discuss the determination of force constant for vibrational spectrum.

SECTION - C

Answer any **Four** of the following

(4×10=40)

8. a) What are In Organic polymer ? Discuss the classification of in organic polymer.
b) Write the principles of green chemistry.
9. a) Discuss the M.O picture of pyridine.
b) How do you synthesise.
i) Dicarboxylic acid ii) ketone from Ethyl Aceto Acetate(EAA)
10. a) The rotational spectrum of HCL shows a series of lines separated by 20.8cm. find the moment of inertia and the bond distance.
(Given : $N_A = 6.023 \times 10^{23}$, $C = 3 \times 10^8$ mts/sec , $h = 6.626 \times 10^{-34}$ joules)
b) Draw the phase diagram and discuss the phase-rule of Bismuth- cadmium system.
11. a) What is geometrical isomerism ? Explain with four Co-ordinate complex.
b) Write the Hoffmann's exhaustive methylation of pyridine .
12. a) Explain the energy levels of diatomic molecules (rigid rotator).
b) Discuss the comparative basic character of pyrrole, pyridine and piperidine.

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V Semester B.Sc. 4/3 Degree Examination, April - 2022

CHEMISTRY (Optional)

Paper : II

(Repeater / Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. ALL Questions are Compulsory.
2. Answer ALL Questions in the Same Answer Book.
3. Draw neat Diagram and Give Equations wherever necessary

SECTION - A

Answer any TEN of the following.

(10×2=20)

1. a) What are ferrous and nonferrous alloys? Give examples.
b) What is Cement? Mention its Raw Materials.
c) Give two advantages of Gaseous fuels.
d) Write any two applications of natural abrasives.
e) How PCC is Prepared?
f) What is base peak in mass spectroscopy?
g) What are azo dyes? Give an example.
h) Mention two applications of LiAlH_4 .
i) Write BET equation and mention the terms involved in it.
j) Give one example when K_p becomes equal to K_c .
k) Explain homogeneous catalysis with example.
l) What is Chain-inhibition? Give example.

SECTION - B

Answer any FOUR of the following.

(4×5=20)

2. How is brass manufactured by fusion method. Give two uses of brass?
3. Explain the manufacture of Port Land Cement by dry process.

[P.T.O.]

4. Write the mechanism of formation of Amide by using DCC.
5. Give the principle of mass spectroscopy & explain Mc-Lafferty rearrangement.
6. Describe the determination of surface area using BET equation.
7. Explain the steps involved in the mechanism of chain reaction with suitable example.

SECTION - C

Answer any **FOUR** of the following.

(4×10=40)

8.
 - a) Explain manufacture of glass using tank furnace.
 - b) Explain manufacture of bio-gas. Give its composition & two uses.
 9.
 - a) Give the synthesis and uses of
 - i) Malachite Green.
 - ii) Eosin.
 - b) Explain the mechanism of OsO_4 hydroxylation of alkenes.
 10.
 - a) Explain intermediate compound formation theory of Catalysis.
 - b) Derive relationship between K_p , K_c and K_x .
 11.
 - a) Write a note on Varnishes and Paints.
 - b) Derive Van't Hoff's reaction isotherm.
 12.
 - a) Write the synthesis of DDQ and How it is used in the Benzylic oxidation of tetralin?
 - b) Explain manufacture and application of Carborandum.
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V Semester B.Sc. 4 Degree Examination, March - 2022

PHYSICS

Paper : I

(Repeater / Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. *Calculator are allowed to solve the problems.*
2. *Write Intermediate Steps.*

PART - I

Answer any TEN questions.

(10×2=20)

1. a) What is Configuration Space?
b) State the Principle of Virtual Work.
c) What is Holonomic Constraints? Give one example.
d) What is Bounded Motion?
e) State Kepler's first law of Planetary Motion.
f) What is Length Contraction?
g) Define Zener Breakdown and Avalanche Breakdown.
h) State Maximum Power Transfer Theorem.
i) What is negative feedback?
j) How much electric energy could theoretically be obtained by annihilation of 1×10^{-3} Kg of matter.
k) The applied input Ac-power to a bridge rectifier is 150 Watts. Find the DC - output power if the rectification efficiency is 80%.
l) The amplification factor of FET is 3.5. Calculate the mutual conductance, if the drain resistance is 2.5 K Ω .

PART - II

Answer any FOUR questions.

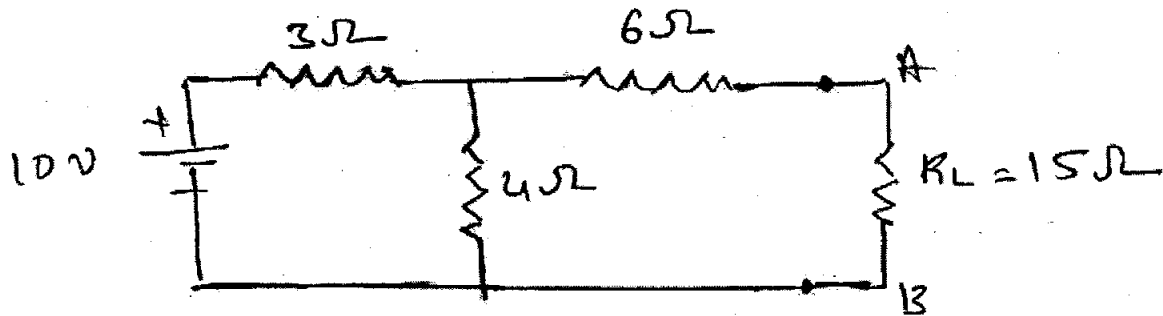
(4×5=20)

2. Explain the application of Lagrange's equation in case of motion of a single particle in Polar coordinates.

[P.T.O.]



3. Derive Second Law of Planetary Motion.
4. Derive Einstein's Mass-energy relation.
5. Compute the mass and speed of an electron having kinetic energy 1.5 Mev. Given - rest mass of an electron, $m_0 = 9.1 \times 10^{-31}$ Kg m. Velocity of light in vacuum, $C = 3 \times 10^8$ m/sec.
6. Draw Norton's equivalent circuit of the given circuit. Find the current in the load resistance.



7. Hartly Oscillator has a capacitor of 150 PF and inductance of each part of the inductance coil is 2.5mH. Calculate the operating frequency of the oscillator neglecting the mutual inductance between the two coil.

PART - III

Answer any **FOUR** questions.

(4×10=40)

8. Derive Lagrange's equation from D'Alembert's Principle.
 9. Derive an expression for the total energy of a particle moving under central force.
 10. Derive the relation for variation of mass with velocity.
 11. State and Prove Thevenin's Theorem.
 12. Explain the working of Hartley Oscillator, with a neat circuit diagram. Write expression for its frequency of oscillation.
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V Semester B.Sc. 4 Degree Examination, March - 2022

PHYSICS

Paper : II

(Repeater / Regular)

Time : 3 Hours

Maximum Marks : 80

*Instructions to Candidates :**Calculators are allowed to solve the problems.*

PART - I

Answer any **TEN** of the following.

(10×2=20)

1. a) Give the expression for Compton Shift.
- b) Mention any two properties of Lasers.
- c) What are Eigen function and Eigen values.
- d) Mention the quantum numbers used in vector model of atom.
- e) Give the expression for Lande's 'g' factor.
- f) Write the selection rule for rotational transition.
- g) Define Coherent and incoherent Scattering.
- h) Write the differential Equation for Hermite Polynomial.
- i) Mention two applications of Raman Effect.
- j) If the uncertainty in position of electron is $2A^\circ$. Calculate the uncertainty in momentum.
- k) Calculate interatomic distance between atoms of molecule given MI of molecule is $6.4 \times 10^{-48} \text{ Kgm}^2$ and reduced mass is $1.6 \times 10^{-27} \text{ Kg}$.
- l) Prove that $J_0^1 = -J_1$ using Bessel's Equation.

PART - II

Answer any **FOUR** of the following.

(4×5=20)

2. State the de-Broglie hypothesis and derive the expression for de-Broglie Wave length.

[P.T.O.]



3. Derive the expression for time independent Schrodinger Wave Equation.
4. Write a note on Quantum number associated with the vector model of atom.
5. Deduce the Zero point energy if the length of box is 10^{-10} m and there are 10 electrons in it, Find the total energy of the system.
6. Calculate the Zeeman shift observed in Normal Zeeman effect when spectral line of wavelength 5400 \AA is subjected to magnetic field of 1 Tesla, given $e = 1.6 \times 10^{-19} \text{ C}$ and $m = 9.1 \times 10^{-31} \text{ kg}$
7. Show that $J_{\frac{1}{2}}(x) = \sqrt{\left(\frac{2}{\pi x}\right)} \sin x$.

PART - III

Answer any **FOUR** of the following.

(4×10=40)

8. Explain Division and Germer experiment to prove the de-Broglie hypothesis.
 9. With neat diagram Explain the construction and working of Laser Diode.
 10. What is Zeeman Effect? Mention the difference between Normal and anomalous zeeman effect. Explain the experimental setup used to observe the normal Zeeman Effect.
 11. Give the theory of origin of pure rotational spectrum of diatomic molecule.
 12. Derive Rodrigue's formula for Legendre's Polynomial.
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V Semester B.Sc. Degree Examination, April - 2023
BOTANY
Plant Breeding, Tissue culture and Horticultural Practices
(Repeater)

Time : 3 Hours

Maximum Marks : 80

*Instructions to Candidates : Draw neat labelled diagrams wherever necessary.***I.** Answer any **Ten** of the following.

(10×2=20)

1. Corm.
2. Fertilizers.
3. Herbicides.
4. Dormancy.
5. Budding.
6. Poly house.
7. Mass - line.
8. Grading.
9. Invasive weeds.
10. Morphogenesis.
11. Irrigation.
12. Pollen - Bank.

II. Answer any **Six** of the following.

(6×5=30)

13. Write a note on polyploidy breeding.
14. Explain the budding method of grafting.
15. Explain the concept of dominance of invasive weeds.
16. Give an account of differentiation in plant tissue culture.
17. Write a note on drip irrigation.

[P.T.O.]



(2)

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18. Explain the somatic embryogenesis.
19. Explain the different types of green houses.
20. Explain maturity indices of fruits.

III. Answer the following.

(3×10=30)

21. a. Describe the steps involved in hybridisation.

(1×10=10)

(OR)

- b. Write a note on objectives of plant breeding.

22. a. Give an account of fruit plants management.

(1×10=10)

(OR)

- b. Write a note on flower management.

23. a. Write a note on Bonsai Culture.

(1×10=10)

(OR)

- b. Explain the different methods of weed control.

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44206/E0260

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V Semester B.Sc. (CBCS) Degree Examination, April - 2023

BOTANY

Genetics, Plant Breeding and Evolution

Paper - Elective - II

(Regulars)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates : Draw a neat labelled diagram wherever necessary.

1. Answer any ten of the following in two or three sentences. (10×2=20)

- Phenotype.
- Recessive.
- Co-dominance.
- Linkage.
- Mutagens.
- Euploidy
- Epistasis
- Hybridisation.
- Cross pollination.
- Spontaneous.
- Sympatric.
- DNA.

2. a. Explain law of independent assortment. (5)

b. Describe supplementary interaction of genes. (10)

(OR)

3. a. Explain Pleiotropism. (5)

b. In maize 'C' and 'R' are both necessary for the production of red aleurone colour, the absence of either resulting, in white aleurone, If 'P' is present in addition to 'C' and 'R', the aleurone is purple but 'P' has no effect in the absence of either 'C' or 'R' or both. In maize what is the aleurone colour of the offspring of the following crosses. The genotype of the parents being given.

1. $CcRrPp \times ccRrPp$.2. $ccRRPp \times CcRrPp$

(10)

P.T.O.



(2)

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4. a. Explain the process of incomplete linkage. (5)
b. Describe the concept and significance of crossing over. (10)

(OR)

5. a. Define mutation explain its types and significance. (5)
b. Describe numerical chromosomal changes. (10)

6. a. Explain selection method of plant breeding. (5)
b. Describe hybridisation in cross pollinated plants. (10)

(OR)

7. a. Explain mutational breeding technique. (5)
b. Describe important achievements and undesirable consequence of plant breeding. (10)

8. a. Explain theory of spontaneous generation. (5)
b. Describe chemical evolution. (10)

(OR)

9. a. Explain origin of prokaryotes. (5)
b. Describe modern concept of evolution. (10)
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44204/E0240

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V Semester B.Sc. Degree Examination, April - 2023

BOTANY

Economic Botany and Biotechnology

(CBCS Scheme Regular)

Paper - I

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :*Draw a neat Labelled diagram wherever necessary.***I.** Answer any **TEN** of the following.

(10×2=20)

1. Wheat.
2. Soybean.
3. Cow pea.
4. Clove.
5. Rubber.
6. Ground nut.
7. ELISA.
8. Hybridoma.
9. Androgenesis.
10. Bioreactor.
11. IPR.
12. PCR.

Answer any **FOUR** of the following.

(4×15=60)

- II.** a) Explain concept of centers of origin and their importance with reference Vavilov's work.
- b) General account of Gram.

(OR)

- III.** a) Explain uses of Rice.
- b) Explain origin, morphology and uses of chick pea.

[P.T.O.]



(2)

44204/E0240

- IV. a) Explain general account of Black pepper.
b) Explain morphology and uses of cotton, mention its Botanical name.

(OR)

- V. a) What are Beverages?
b) Explain morphology, processing, uses of Tea and mention its Botanical name.

- VI. a) Explain Bacterial Transformation.
b) Describe Endosperm culture with its applications.

(OR)

- VII. a) Explain genetic improvement of Industrial microbes.
b) Describe Human gene therapy.

- VIII. a) Explain transgenic plants and mention examples.
b) Describe Intellectual property Rights and possible ethical risks.

(OR)

- IX. a) Explain tools of genetic engineering.
b) Explain Blotting techniques Northern, Southern Blotting.
-

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42524/E240

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V Semester B.Sc. Degree Examination, April - 2023

BOTANY (Optional)

Ecology, Environmental Biology Phytogeography

Paper : II

(Repeaters)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

Draw neat labelled diagrams wherever necessary.

I. Answer any Ten of the following.

(10×2=20)

1. Food chain.
2. Ecads.
3. PAN.
4. Municipal waste.
5. Sere.
6. Detritus food chain.
7. Velumen.
8. Ecosystem.
9. Sunken stomata.
10. Pneumatophores
11. Biome.
12. Producers.

II. Answer any Six of the following.

(6×5=30)

13. What is ecosystem? Describe the structure of an ecosystem.
14. Write a note on significance of forests.
15. Explain hydrosere.
16. Write a note on social forestry.
17. Explain trophic structure of pond ecosystem.
18. Write a note on sewage and its control measures.
19. What are ecological pyramids? Explain pyramid of number.
20. Explain Ex-situ conservation of wildlife.

P.T.O.



(2)

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III. Answer the following.

(3×10=30)

21. a. What are hydrophytes? Write the morphological and anatomical adaptations of hydrophytes.

(OR)

b. Describe water pollution.

22. a. Explain vegetation types in Karnataka.

(OR)

b. What is forest? Describe the structure of tropical evergreen forest ecosystem.

23. a. Explain soil profile.

(OR)

b. What is ecological succession? Describe hydrosere.

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44242/E5020

Reg. No.

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V Semester B.Sc Degree Examination, March/April - 2023

BOTANY SEC

Medicinal Botany

(Regular)

Time : 2 Hours

Maximum Marks : 40

Instructions to Candidates :

In question number Q II or III. and Q.IV or V answer .

I. Answer any Five of the following.

(5×2=10)

1. Pancha Mahabhutas.

2. Nursery.

3. Ethnomedicinal plants.

4. Propagation.

5. Palaco-ethnobotany.

6. Sacred grooves.

II. 7. Describe scope of Ayurveda.

(5)

8. Describe plants used in siddha medicine.

(10)

OR

III. 9. Write a note on Red list criteria.

(5)

10. What is Exsitu conservation? Describe Types.

(10)

IV. 11. Describe objectives of nursery

(5)

12. What is layering? Describe types of layering.

(10)

P.T.O.



(2)

44242/E5020

OR

- V. 13. Write a note on Ethnobotany in India. (5)
14. Describe applications of natural products with respect to blood pressure and skin diseases. (10)
-

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44208/E0280

Reg. No.

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V Semester B.Sc. (CBCS) Degree Examination, April - 2023

CHEMISTRY

Paper : II

(Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. All questions are compulsory.
2. Draw neat diagrams and give equations wherever necessary.

I. Answer any ten questions.

(10×2=20)

- a. What are alloys? Mention the types of alloys.
- b. Write major raw materials used in the manufacture of glass.
- c. Write the advantages of gaseous fuels.
- d. How NBS is prepared?
- e. Write two requirements of a dye.
- f. What are azo-dyes? Give example.
- g. State carnot's theorem.
- h. Write the entropy change in reversible and irreversible process.
- i. Write equations of dependence of free energy on temperature and pressure.
- j. What are consecutive reactions? Give example.
- k. What are ellingham diagrams?
- l. What is refining? Mention two methods of refining.

II. Answer any Three questions.

(3×5=15)

- a. What is carborundum? How it is manufactured?
- b. Write the composition and use of following.
 - i. Pyrex glass.
 - ii. Crooke's glass.
 - iii. Flint glass.

P.T.O.



(2)

44208/E0280

- c. Explain :
- Setting of cement.
 - Moh's scale of hardness.
- d. What is water gas? Explain the manufacture of water gas.

III. Answer any **Three** questions.

(3×5=15)

- Give the mechanism of formation of amide from carboxylic acid using DCC.
- Write the mechanism of Benzylic oxidation of tetralin to Naphthalene using DDQ.
- Write the synthesis of following.
 - Congo red.
 - Indigo.
- Give the synthesis of Alizarin.

IV. Answer any **Three** questions.

(3×5=15)

- Derive Langmuir adsorption isotherm.
- Derive Michaelis - Menten equation.
- A carnot engine working between 0°C and 100°C absorbs 1897 KJ heat from 100°C heat reservoir. Calculate
 - Work done by the engine.
 - Heat discharged in to reservoir at 0°C
 - Efficiency of the engine.
- Derive Gibb's - Helmholtz equation.

V. Answer any **Three** questions.

(3×5=15)

- Derive an expression for rate of unimolecular reaction by Lindemann hypothesis and collision theory.
 - What are parallel reactions? Discuss the kinetics of parallel reactions.
 - Explain the use of carbon and carbon monoxide as reducing agent in the reduction of metal oxides by Ellingham diagram.
 - Explain the Mond's process for Nickel.
-



42525/E250

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V Semester B.Sc. 4 Degree Examination, April - 2023

CHEMISTRY (Optional)

Paper - I

(Repeater)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. All questions are compulsory.
2. Answer all questions in the same answer book.
3. Draw neat diagrams and give equations wherever necessary.

SECTION - A

Answer any Ten of the following.

(10×2=20)

1. a) What are silicones? Give its general formula.
b) What is co-precipitation? How it is minimised?
c) Define hydrate isomerism. Give an example.
d) Write von - weimann equation.
e) How do you synthesis Barbituric acid from diethyl malonate?
f) Draw the molecular orbital picture of pyridine molecule.
g) Write the structure of coniine.
h) Write any two general properties of alkaloids.
i) Write the selection rule for rotational spectra.
j) Write Gibbs - phase rule equation. And explain the terms in it.
k) Calculate number of vibrational modes in CO₂ molecule.
l) What is triple point?

[P.T.O.]



SECTION - B

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

(4×5=20)

2. Explain
 - i. Hydrate isomerism and
 - ii. Ionisation isomerism in coordination compounds with C.N.6.
3. Explain the steps involved in gravimetric analysis.
4. Write a note on ketoenol tautomerism.
5. Explain the acidity of α - hydrogenation in Ethyl Aceto Acetate (EAA).
6. Draw the phase diagram of sulphur system and discuss the application of phase rule.
7. The fundamental vibrational frequency of HCl is 2890 cm^{-1} . Calculate the force - constant of HCl molecule.

SECTION - C

Answer any **Four** of the following Questions.

(4×10=40)

8. a) Explain any five principles of green chemistry.
b) Explain geometrical isomerism and optical isomerism in coordination compounds with C.N.4.
9. a) Compare the basicities of pyridine, Piperidine and pyrrole.
b) How do you synthesise.
 - i. Dicarboxylic acid
 - ii. Ketone from Ethyl Aceto Acetate (EAA).
10. a) Explain energy levels of diatomic molecule (rigid rotator).
b) Give the synthesis of Nicotine.
11. a) Explain the structure of $[\text{Fe}(\text{CN})_6]^{4-}$ on the bases of VBT.
b) Give that the rotational spectrum of HCl has lines spaced at 384.2 cm apart. Calculate the moment of inertia and bond length of molecule $\mu = 1.627 \times 10^{-27} \text{ kg}$ $h = 6.626 \times 10^{-34} \text{ joules}$.
12. a) Explain applications of phase - rule to KI-water system.
b) How is force constant of a diatomic molecule related to it's vibrational frequency? Deduce the relationship.



44208/E0280

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V Semester B.Sc. (CBCS) Degree Examination, April - 2023

CHEMISTRY

Paper : II

(Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. All questions are compulsory.
2. Draw neat diagrams and give equations wherever necessary.

I. Answer any ten questions.

(10×2=20)

- a. What are alloys? Mention the types of alloys.
- b. Write major raw materials used in the manufacture of glass.
- c. Write the advantages of gaseous fuels.
- d. How NBS is prepared?
- e. Write two requirements of a dye.
- f. What are azo-dyes? Give example.
- g. State carnot's theorem.
- h. Write the entropy change in reversible and irreversible process.
- i. Write equations of dependence of free energy on temperature and pressure.
- j. What are consecutive reactions? Give example.
- k. What are ellingham diagrams?
- l. What is refining? Mention two methods of refining.

II. Answer any Three questions.

(3×5=15)

- a. What is carborundum? How it is manufactured?
- b. Write the composition and use of following.
 - i. Pyrex glass.
 - ii. Crooke's glass.
 - iii. Flint glass.

P.T.O.



(2)

44208/E0280

- c. Explain :
- Setting of cement.
 - Moh's scale of hardness.
- d. What is water gas? Explain the manufacture of water gas.

III. Answer any **Three** questions.

(3×5=15)

- Give the mechanism of formation of amide from carboxylic acid using DCC.
- Write the mechanism of Benzylic oxidation of tetralin to Naphthalene using DDQ.
- Write the synthesis of following.
 - Congo red.
 - Indigo.
- Give the synthesis of Alizarin.

IV. Answer any **Three** questions.

(3×5=15)

- Derive Langmuir adsorption isotherm.
- Derive Michaelis - Menten equation.
- A carnot engine working between 0°C and 100°C absorbs 1897 KJ heat from 100°C heat reservoir. Calculate
 - Work done by the engine.
 - Heat discharged in to reservoir at 0°C
 - Efficiency of the engine.
- Derive Gibb's - Helmholtz equation.

V. Answer any **Three** questions.

(3×5=15)

- Derive an expression for rate of unimolecular reaction by Lindemann hypothesis and collision theory.
 - What are parallel reactions? Discuss the kinetics of parallel reactions.
 - Explain the use of carbon and carbon monoxide as reducing agent in the reduction of metal oxides by Ellingham diagram.
 - Explain the Mond's process for Nickel.
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44207/E0270

Reg. No.

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V Semester B.Sc. 5 (CBCS) Degree Examination, April - 2023

CHEMISTRY (Optional)

Paper : I

(Regulars)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. All questions are compulsory.
2. Answer all questions in the same answer book.
3. Draw neat diagrams and give equations wherever necessary.

I. Answer any Ten questions.

(10×2=20)

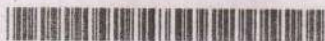
1. What are bio inorganic nanomaterials?
2. Define coprecipitation.
3. Write Von - weimann equation.
4. What is Eco - efficiency?
5. What are alkaloids?
6. Write the nitration reaction of furan.
7. Define zero point energy.
8. Calculate the number of vibrational modes in CO₂ molecules.
9. Give the statement of Hooks law.
10. Write the synthesis of polyvinyl chloride.
11. Write the structure of Novalac.
12. Define disconnection of pentanol.

II. Answer any Three questions.

(3×5=15)

1. Discuss the different steps in gravimetric analysis.
2. Explain the formation of phosphonitrilic chloride.
3. Explain the one dimensional control of nanoarchitecture.
4. Explain the formation of silicones.

[P.T.O.]



(2)

44207/E0270

III. Answer any **Three** questions.

(3×5=15)

1. Discuss the Hofmann exhaustive methylation of pyridine.
2. Write the principles of Green chemistry.
3. Discuss the structure of coniine.
4. Explain the comparative basic character of pyrrole, Pyridine and piperidine.

IV. Answer any **Three** questions.

(3×5=15)

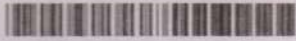
1. Explain energy levels of a diatomic molecule (Rigid - Rotator).
2. The Rotational spectrum of HCl has lines spaced at 384.2 cm calculate moment of inertia and bond length. Given μ of HCl = 1.626×10^{-27} kg, $h = 6.626 \times 10^{-34}$ Joules and $C = 3 \times 10^8$ m/s.
3. Explain qualitative relation between force constant and bond dissociation energy.
4. Determine the force constant for vibrational spectra.

V. Answer any **Three** questions.

(3×5=15)

1. Give Retrosynthetic root for 4 - methoxyacetophenone.
2. Write a note on polyolefins.
3. Write the structure and conductivity of polypyrrole and polythiophene.
4. Explain thermal and mechanical properties of polystyrene.

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42526/E260

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V Semester B.Sc. Degree Examination, April - 2023

CHEMISTRY (Optional)

Paper - II

(Repeaters)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. All sections are compulsory.
2. Draw neat **diagrams** and give equations wherever necessary.

SECTION - A

1. Answer any **TEN** questions.

(10×2=20)

- a. Mention the types of alloys with examples.
- b. Write major raw materials used in the manufacture of glass.
- c. Write the composition and use of Lithophone.
- d. Write the characteristics of good fuels.
- e. How NBS is prepared?
- f. Write the structure and use of Osmium tetroxide (OsO_4)
- g. Write two requirements of A dye.
- h. Write the structure of fluorescein.
- i. Write BET equation.
- j. Write two industrial applications of catalysis.
- k. State the law of mass action.
- l. What is chain inhibition? Give example.

P.T.O.



(2)

42526/E260

SECTION - B

Answer any **FOUR** questions.

(4×5=20)

2. What is Carborundum? How it is manufactured?
3. Write the composition and use of following.
 - i. Pyrex glass.
 - ii. Crooke's glass.
 - iii. Flint glass.
4. What is base peak? Explain McLafferty rearrangement with respect to butyraldehyde.
5. Explain the mechanism of oxidation of 1,2 - diols using lead tetra acetate.
6. Derive Micheal's - Menten equation.
7. Derive the relation between K_p and K_x . When $K_p = K_c = K_x$.

SECTION - C

Answer any **FOUR** questions.

(4×10=40)

8. a. Explain
 - i. Setting of cement.
 - ii. Moh's scale of hardness.
- b. How Biogas is manufactured? Mention its advantages.
9. a. Write the mechanism of formation of amide from carboxylic acid using DCC.
- b. Write the synthesis of following.
 - i. Congo red.
 - ii. Indigo.
10. a. Derive Langmuir adsorption isotherm.
- b. What is homogeneous catalysis? Explain the Intermediate compound formation theory of catalysis.
11. a. Write the synthesis of Alizarin.
- b. Derive Van't hof reaction isotherm.
12. a. Explain the mechanism of Benzylic oxidation of titration to Naphthalene using DDQ.
- b. Discuss the steps involved in the chain reaction with example.



44243/E5030

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V Semester B.Sc (CBCS) Degree Examination, March/April - 2023

CHEMISTRY (SEC)

Basic Analytical Chemistry

Paper : 1.5

(Regular)

Time : 1½ Hours

Maximum Marks : 40

Instructions to Candidates :

1. All questions are compulsory.
2. Draw neat labelled diagram wherever necessary.

I. Answer any Five of the following.

(5×2=10)

1. Define precision.
2. What is chelation?
3. What is dissolved oxygen(DO) of water? Give its significance.
4. Mention the principle in paper chromatography.
5. Give the constituents of talcum powder.
6. What are deodorants?

II. Answer any three of the following.

(3×5=15)

- a) Explain how the accuracy of data is expressed in terms of absolute error and relative error.
- b) Explain in brief methods of purification of water.
- c) Give the estimation of calcium as calcium carbonate by complexometric titration.
- d) Explain in brief the identification of adulterants in some common food items.

P.T.O.



(2)

44243/E5030

III. Answer any three of the following.

(3×5=15)

- a) Explain in brief the separation of Fe^{3+} and Al^{3+} by paper chromatography.
 - b) Give a brief account of ion-exchange chromatography.
 - c) How do you determine magnesium in talcum powder by complexometric titration?
 - d) Mention the major and minor constituents of cosmetics and give their functions.
-

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V Semester U.G. Degree Examination, March/April - 2023

KANNADA

ಕೌಶಲ್ಯ ಕನ್ನಡ ಮತ್ತು ಕಂಪ್ಯೂಟರ್

Paper - SEC

Time : 1½ (90 Minutes)

Maximum Marks : 40

1. ಕೇಂದ್ರ ಸಂಸ್ಕರಣಾ ಘಟಕವು ----- ಒಳಗೊಂಡಿದೆ.

A) ಅಂಕಗಣಿತದ ತರ್ಕ ಘಟಕ

B) ದಾಖಲಾತಿಗಳು

C) ನಿಯಂತ್ರಣ ಘಟಕ

D) ಮೇಲಿನ ಎಲ್ಲಾ

2. ಎಮ್.ಎಸ್.ವರ್ಲ್ಡ್ 2007 ರಲ್ಲಿ ಥೀಮ್ ಬಟನ್ ಟ್ಯಾಬ್ ----- ಅಡಿಯಲ್ಲಿದೆಯೇ ?

A) ಮನೆ

B) ಸೇರಿಸು

C) ಪೇಜ್-ಲೇ-ಔಟ್

D) ಉಲ್ಲೇಖಿ

3. ಕಾಲಮ್‌ನ ಅಗಲವನ್ನು ಸ್ವಯಂ ಹೊಂದಿಸುವುದೆಂದರೆ -----

A) ಕಾಲಮ್‌ನ ಬಲಗಡಿಯ ಮೇಲೆ ಡಬಲ್ ಕ್ಲಿಕ್ ಮಾಡಿ

B) ಕಾಲಮ್ ಹೆಡರ್ ಅನ್ನು ಡಬಲ್ ಕ್ಲಿಕ್ ಮಾಡಿ

C) ಕಾಲಮ್‌ನ ಎಡಗಡಿಯ ಮೇಲೆ ಡಬಲ್ ಕ್ಲಿಕ್ ಮಾಡಿ

D) ಸೆಲ್ ಮೇಲೆ ಡಬಲ್ ಕ್ಲಿಕ್ ಮಾಡಿ.

4. ಶಕ್ತಿಯ ಅನುಪಸ್ಥಿತಿಯಲ್ಲಿಯೂ ತನ್ನ ವಿಷಯಗಳನ್ನು ಉಳಿಸಿಕೊಳ್ಳುವ ಶೇಖರಣಾ ಮಾಧ್ಯಮವನ್ನು ----- ಉಲ್ಲೇಖಿಸಲಾಗುತ್ತದೆ ?

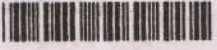
A) ಭಾಷ್ಪಶೀಲ ಸಂಗ್ರಹಣೆ

B) ಭಾಷ್ಪಶೀಲವಲ್ಲದ ಸಂಗ್ರಹಣೆ

C) ಪ್ರಾಥಮಿಕ ಸಂಗ್ರಹಣೆ

D) ದ್ವಿತೀಯ ಸಂಗ್ರಹಣೆ

[P.T.O.]



5. ಕಂಪ್ಯೂಟರ್ ----- ಹೊಂದಿಲ್ಲದಿದ್ದರೆ ಬೂಟ್ ಮಾಡಲು ಸಾಧ್ಯವಿಲ್ಲ
- A) ವ್ಯಾಖ್ಯಾನಕ B) ಕಂಪೈಲರ್
C) ಅಪರೇಟಿಂಗ್ ಸಿಸ್ಟಮ್ D) ಅಪ್ಲಿಕೇಶನ್ ಸಾಫ್ಟ್‌ವೇರ್
6. ಔಟ್‌ಪುಟ್‌ಗೆ ಇನ್‌ಪುಟ್ ಪ್ರಕ್ರಿಯೆಯು ----- ನಿರ್ದೇಶಿಸಲ್ಪಟ್ಟಿದೆ.
- A) ಮಂತ್ರಾಂಶ B) ಪ್ರಿಂಟರ್
C) ಸಾಫ್ಟ್‌ವೇರ್ D) ಯಾವುದು ಅಲ್ಲ
7. ಎಮ್.ಎಸ್. ಪವರ್ ಪಾಯಿಂಟ್‌ನ ----- ಮಾನ್ಯ ಆವೃತ್ತಿ ಅಲ್ಲ.
- A) ಎಮ್.ಎಸ್. ಪವರ್ ಪಾಯಿಂಟ್ - 2003
B) ಎಮ್.ಎಸ್. ಪವರ್ ಪಾಯಿಂಟ್ - 2007
C) ಎಮ್.ಎಸ್. ಪವರ್ ಪಾಯಿಂಟ್ - 2010
D) ಎಮ್.ಎಸ್. ಪವರ್ ಪಾಯಿಂಟ್ - 1920
8. ಅಂಕಿ ಅಂಶಗಳ ಲೆಕ್ಕಾಚಾರಗಳು, ಕೋಷ್ಟಕಗಳು ಮತ್ತು ಗ್ರಾಫ್‌ಗಳ ತಯಾರಿಕೆಯನ್ನು ----- ಬಳಸಿ ಮಾಡಬಹುದು.
- A) ಅಡೋಬ್ ಫೋಟೋಶಾಪ್ B) ಎಕ್ಸೆಲ್
C) ನೋಟ್ ಪ್ಯಾಡ್ D) ಪವರ್ ಪಾಯಿಂಟ್
9. ಈ ಕೆಳಗಿನವುಗಳಲ್ಲಿ ----- ಡೇಟಾಬೇಸ್ ಮ್ಯಾನೇಜ್‌ಮೆಂಟ್ ಸಾಫ್ಟ್‌ವೇರ್ ಅಲ್ಲ.
- A) MYSQL B) COBOL
C) ಸೈಬೇಸ್ D) ಜರ್ಯಾಕಲ್
10. ಈ ಕೆಳಗಿನವುಗಳಲ್ಲಿ ಯಾವುದು ಇಮೇಲ್ ವಿಳಾಸದ ಭಾಗವಾಗಿರಬಾರದು ?
- A) ಅಂಡರಸ್ಕೋರ್ B) ಸ್ಪೇಸ್ ()
C) ಚಿಹ್ನೆಯಲ್ಲಿ(@) D) ಅವಧಿ (-)



11. ವೆಬ್‌ನಲ್ಲಿ ನಿರ್ದಿಷ್ಟ ಕಂಪ್ಯೂಟರ್ ಮತ್ತು ಸಂಪೂರ್ಣ ಸೈಟ್‌ನ ಮುಖ್ಯಪುಟವನ್ನು ----- ಪದವು ಗುರುತಿಸುತ್ತದೆ.
A) ಡಬ್ಲ್ಯು.ಡಬ್ಲ್ಯು.ಡಬ್ಲ್ಯು (w.w.w.) B) ಲಿಂಕ್
C) ಎಸ್.ಕ್ಯೂ.ಎಲ್ (S.Q.L) D) ಯು.ಆರ್.ಎಲ್. (U.R.L)
12. ಯು.ಆರ್.ಎಲ್.ಗಳ 2 ಮೂಲಭೂತ ಭಾಗಗಳು
A) ಟಿ.ಸಿ.ಪಿ. ಮತ್ತು ಎಫ್.ಟಿ.ಪಿ. (TCP & FTP)
B) ಪ್ರೋಟೋಕಾಲ್ ಮತ್ತು ಡೊಮೇನ್ ಹೆಸರು
C) ಟಿಪಿಪಿ/ಐಪಿ ಮತ್ತು ಐಎಸ್‌ಪಿ (TCP/IP & ISP)
D) ಯಾವುದು ಅಲ್ಲ
13. ಇಮೇಲ್ ಕಳುಹಿಸಿದಾಗ ----- ಸಾಲು ಸಂದೇಶದ ವಿಷಯಗಳನ್ನು ವಿವರಿಸುತ್ತದೆ ?
A) ಗೆ B) ಸಿಸಿ
C) ವಿಷಯ D) ವಿಷಯಗಳು
14. ವೆಬ್‌ಪುಟ ಸಂಪಾದಕರು ----- ತತ್ವದ ಮೇಲೆ ಕಾರ್ಯನಿರ್ವಹಿಸುತ್ತಾರೆ ?
A) ಡಬ್ಲ್ಯು.ಡಬ್ಲ್ಯು.ಡಬ್ಲ್ಯು B) HTML
C) WYSIWYG D) WYGWYSI
15. ವೆಬ್ ಪುಟಗಳನ್ನು ವೀಕ್ಷಿಸಲು ವೆಬ್ ಕ್ಲೈಂಟ್‌ಗಳು ---- ಪ್ರೋಗ್ರಾಂ ಅನ್ನು ಬಳಸುತ್ತಾರೆ ?
A) ವೆಬ್ ಬ್ರೌಸರ್ B) ಪ್ರೋಟೋಕಾಲ್
C) ವೆಬ್ ಸರ್ವರ್ D) ಸರ್ಚ್ ಇಂಜಿನ್
16. ಹೈಪರ್ಟೆಕ್ಸ್ಟ್ ಡಾಕ್ಯುಮೆಂಟ್‌ಗಳ ಸ್ಥಳ ವಿಳಾಸದ ಹೆಸರು -----
A) ಏಕರೂಪದ ಸಂಪನ್ಮೂಲ ಲೋಕೇಟರ್ B) ವೆಬ್ ಸರ್ವರ್
C) ಫೈಲ್ D) ವೆಬ್ ವಿಳಾಸ



17. ಇಂಟರ್ನೆಟ್‌ನಲ್ಲಿ ----- ಹಂಚಿಕೊಳ್ಳಲಾಗುತ್ತದೆ.

- A) ಕಾರ್ಯಕ್ರಮಗಳು B) ಕೇಬಲ್‌ಗಳು
C) ಹೈಪರ್ಟೆಕ್ಸ್ ದಾಖಲೆಗಳು D) ಯಾವುದು ಅಲ್ಲ

18. ಕೆಳಗಿನವುಗಳಲ್ಲಿ ----- DTP ಮೂಲಕ ಮಾಡಲಾಗುತ್ತದೆ.

- A) ಬ್ಲಾಕ್ ವಿನ್ಯಾಸ B) ಕರಪತ್ರ ವಿನ್ಯಾಸ
C) ಜಾಹೀರಾತು D) ಎಲ್ಲವೂ

19. ----- ಮುದ್ರಕವು ವೇಗವಾಗಿ ಮುದ್ರಿಸುತ್ತದೆ.

- A) ಲೇಸರ್ B) ಇಂಕ್ ಜೆಟ್
C) ಡಾಟ ಮೆಟ್ರಿಕ್ಸ್ ಪ್ರಿಂಟರ್ D) ಡಾಟ ಮ್ಯಾಟ್ರಿಕ್ಸ್ ಪ್ರಿಂಟರ್

20. ಇವುಗಳಲ್ಲಿ ಯಾವುದು ಡೆಸ್ಕ್‌ಟಾಪ್ ಪಬ್ಲಿಷಿಂಗ್ ಅಡಿಯಲ್ಲಿ ಬರುತ್ತದೆ.

- A) ಎಂಜಿನಿಯರಿಂಗ್ ಡ್ರಿಂಗ್ B) ಅನಿಮೇಷನ್
C) ವೆಬ್ ಪುಟದ ವಿನ್ಯಾಸ D) ಎಲ್ಲವೂ

21. E - ಪುಸ್ತಕ ----- ರೂಪದಲ್ಲಿದೆ.

- A) ಅನಲಾಗ್ B) A ಮತ್ತು B
C) ಡಿಜಿಟಲ್ D) None

22. ಎಲೆಕ್ಟ್ರಾನಿಕ್ ಬುಕ್ ಮಾರ್ಕ್‌ಗಳು ----- ಸುಲಭಗೊಳಿಸುತ್ತವೆ.

- A) ಉಲ್ಲೇಖ B) ಶೀರ್ಷಿಕೆ
C) ದರಗಳು D) ಸೌಕರ್ಯಗಳು



23. E - ಪುಸ್ತಕಗಳನ್ನು ಓದಲು ವಿಶೇಷವಾಗಿ ವಿನ್ಯಾಸಗೊಳಿಸಲಾದ ಸಾಧನ
- A) E - ರೀಡರ್
B) E - ರೈಟರ್
C) E - ಲರ್ನರ್
D) E - ಸೆನ್ಸರ್
24. ಕಂಪ್ಯೂಟರ್ ಅಥವಾ ಇತರ ಎಲೆಕ್ಟ್ರಾನಿಕ್ ಸಾಧನಗಳಿಂದ ವಿತರಿಸಲಾದ ಪಠ್ಯ ಗ್ರಾಫಿಕ್ಸ್, ಕೃತಿ, ಧ್ವನಿ, ಎನಿಮೇಶನ್ ಮತ್ತು ವಿಡಿಯೋಗಳ ಸಂಯೋಜನೆಯನ್ನು ----- ಎಂದು ಕರೆಯಲಾಗುತ್ತದೆ ?
- A) ಮಲ್ಟಿ ಮೀಡಿಯಾ
B) ಎಲೆಕ್ಟ್ರಾನಿಕ್ ಮಾಧ್ಯಮ
C) ದೃಶ್ಯ ಮಾಧ್ಯಮ
D) ಯಾವುದು ಅಲ್ಲ
25. ಮಲ್ಟಿ ಮೀಡಿಯಾದ ಅನಾನುಕೂಲಗಳಲ್ಲಿ ----- ಒಂದಾಗಿದೆ.
- A) ವೆಚ್ಚ
B) ಹೊಂದಿಕೊಳ್ಳುವಿಕೆ
C) ಉಪಯುಕ್ತತೆ
D) ಸಾಪೇಕ್ಷತೆ
26. ಕೆಳಗಿನವುಗಳಲ್ಲಿ ಯಾವುದು ಕಂಪ್ಯೂಟರ್ ಆಧಾರಿತ ಪ್ರಸ್ತುತಿ ತಂತ್ರವಾಗಿದೆ.
- A) ಸ್ಲೈಡ್‌ಗಳು
B) ಟುಟೋರಿಯಲ್
C) ಮಲ್ಟಿಮೀಡಿಯಾ
D) ಡೆಮಾ ಸಂಸ್ಕರಣೆ
27. ಮೂವೀ, ಪಿಕ್ಚರ್ಸ್ ಏಕ್ಸ್‌ಪರ್ಟ್ ಗ್ರೂಪ್ ----- ಅನ್ನು ಸಂಕುಚಿತಗೊಳಿಸಲು ಬಳಸಲಾಗುತ್ತದೆ.
- A) ಚೌಕಟ್ಟುಗಳು
B) ಚಿತ್ರಗಳು
C) ಆಡಿಯೋ
D) ವಿಡಿಯೋ
28. G.I.F. ಎಂದರೆ
- A) ಗ್ರಾಫಿಕ್ ಇನಫಾರ್ಮೇಶನ್ ಫೈಲ
B) ಗ್ರಾಫಿಕ್ ಇಂಟರಚೇಂಜ್ ಫಾರ್ಮ್ಯಾಟ್
C) ಗ್ರಾಫಿಕ್ ಇನಫಾರ್ಮೇಶನ್ ಫಾರ್ಮ್ಯಾಟ್
D) ಗ್ರಾಫಿಕ್ ಇಂಟರಚೇಂಜ್ ಫೈಲ
29. D.P.I. ಎಂದರೆ _____
- A) ಪ್ರತಿ ಇಂಚಿಗೆ ಪ್ರದರ್ಶನ
B) ಡಿಸ್‌ಪ್ಲೇ ಪಾಯಿಂಟ್ ಛೇದಕ
C) ಪ್ರತಿ ಇಂಚಿಗೆ ಚುಕ್ಕೆಗಳು
D) ಪ್ರತಿ ಛೇದಕಕ್ಕೆ ಚುಕ್ಕೆಗಳು



30. ಮಲ್ಟಿಮೀಡಿಯಾ ಪ್ರಸ್ತುತಿಯನ್ನು ಯೋಜಿಸುವ ಪ್ರಕ್ರಿಯೆ -----
- A) ವಿನ್ಯಾಸ B) ಅಭಿವೃದ್ಧಿ
C) ಲೇಔಟ್ D) ಸ್ಟೋರಿಬೋರ್ಡ್
31. ಯೂನಿಕೋಡನ್ನು ಹಲವಾರು ವಿಭಿನ್ನ ----- ನ್ನು ಬಳಸಿಕೊಂಡು ಸಂಗ್ರಹಿಸಬಹುದು.
- A) ಡಿಕೋಡಿಂಗ್ B) ಎನ್‌ಕೋಡಿಂಗ್
C) ಎನ್‌+ಡಿ D) ಯಾವುದು ಅಲ್ಲ
32. ಪಠ್ಯ ಸಂಸ್ಕರಣೆಯಲ್ಲಿ ----- ಪ್ರತಿ ಅಕ್ಷರಕ್ಕೂ ಒಂದು ಅನನ್ಯ ಕೋಡ್ ಪಾಯಿಂಟ್‌ನ್ನು ಒದಗಿಸುವ ಪಾತ್ರ ತೆಗೆದುಕೊಳ್ಳುತ್ತದೆ.
- A) ಡಿಕೋಡ್ B) ಅಸಿಕ್ಯೋಡ್
C) ಯುನಿಕೋಡ್ D) ಯಾವುದು ಅಲ್ಲ
33. ಯಡಿ ----- ಲಿಪಿಯನ್ನು ನಿರ್ವಹಿಸಲು ಮತ್ತು ಪ್ರದರ್ಶಿಸಲು ಬಳಸಲಾಗುತ್ತದೆ.
- A) ಹಿಂದಿ B) ಕನ್ನಡ
C) ಎಲ್ಲಾ ಸ್ಥಳೀಯ ಭಾಷೆಗಳು D) ಸಂಸ್ಕೃತ
34. “ನುಡಿ” ತಂತ್ರಾಂಶ ----- ಶಿಷ್ಟತೆಗಳನ್ನು ಅಳವಡಿಸಲಾಗಿದೆ.
- A) UTF - 8 B) UNI Code
C) ಯುನಿಕೋಡ್ D) ಯಾವುದು ಅಲ್ಲ
35. ----- ಯುನಿಕೋಡ್‌ನಲ್ಲಿ ಉಳಿಸುವಂತೆ ಅನುವು ಮಾಡಿಕೊಡುತ್ತದೆ.
- A) ನುಡಿ B) ನುಡಿ ಎಂಜಿನ್
C) ನುಡಿ ಎಕ್ಸ್‌ನ್ D) ನುಡಿ ಎಡಿಟರ್



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36. ನುಡಿ ----- ಆಧಾರಿತ ಡಾಟಾಚೀಪ್ ವ್ಯವಸ್ಥೆಗಳನ್ನು ಬೆಂಬಲಿಸುತ್ತದೆ.
- A) ಎಕ್ಸ್‌ಎಸ್ B) ವಿಂಡೋಸ್
C) ಓರಾಕಲ್ D) ಎಲ್ಲಾವೂ
37. ಶ್ರೀ ಲಿಪಿಯನ್ನು ಕೊನೆಯದಾಗಿ ನವೀಕರಿಸಿದ ವರ್ಷ -----
- A) 5 - ಜೂನ್ - 2021 B) 4 - ಜೂನ್ - 2022
C) 1 - ಜೂನ್ - 2021 D) 5 - ಜೂನ್ - 2022
38. ಶ್ರೀ ಲಿಪಿಯಲ್ಲಿ ----- ಸಿಂಬಲ್ ಫಾಂಟ್‌ಗಳಿವೆ.
- A) 50 B) 60
C) 90 D) 85
39. 'ಬರಹ' ಪ್ರೌಢಗ್ರಾಂನ ಹೊಸ ಆವೃತ್ತಿ -----
- A) ಬರಹ ನೋಟ್ಸ್ B) ಬರಹ ನೋಟಪ್ಯಾಡ
C) ಬರಹ ಪ್ಯಾಡ D) ನೋಟ ಪ್ಯಾಡ ಬರಹ
40. ----- ಕನವರ್ಷನ ಯುಟಿಲಿಟಿಯ ಸಣ್ಣ ಪ್ರೌಢಗ್ರಾಂ ಆಗಿದೆ.
- A) ಕುವೆಂಪು B) ನುಡಿ
C) ಶ್ರೀ ಲಿಪಿ D) ಬರಹ
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V Semester B.Sc 5 Degree Examination, April - 2023

MATHEMATICS - I

Paper : I : Real Analysis

(w.e.f. 2022-23) (Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- 1) Question paper contains 3 parts namely A,B and C.
- 2) Answer all questions.

Part - AAnswer any **ten** of the following

(10×2=20)

1. a) If $f(x)=1$, x is rational $=-1$, x is irrational. Prove that $f(x)$ is not R-integrable in $[0,1]$.b) With usual notations prove that $m(b-a) \leq \int_a^b f(x)dx \leq M(b-a)$.

c) State Weierstrass form of second mean value theorem of integral calculus.

d) Prove that $\left| \int_1^2 \frac{\sin x}{x} dx \right| \leq 2$ e) Discuss the convergence of $\int_0^{\infty} \frac{dx}{1+x^2}$.

f) State Abel's Test for the convergence of improper integral of product of two functions.

g) Test the convergence of $\int_0^1 \frac{\sin \frac{1}{x}}{\sqrt{x}} dx$ h) Prove that $\Gamma(n) = \frac{1}{n} \int_0^{\infty} e^{-y} y^{n-1} dy$

P.T.O.



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i) Find the value of $\int_0^{\infty} \frac{x^4(1+x^5)}{(1+x)^{15}} dx$

j) Evaluate $\int_0^{\pi/2} \sin^7 \theta d\theta$ by using Beta and Gamma functions.

k) Evaluate $\iint_A x^2 y^3 dx dy$, where A is rectangle $[0 \leq x \leq 1; 0 \leq y \leq 3]$.

l) Evaluate $\int_0^3 \int_0^2 \int_0^1 (x+y+z) dx dy dz$

Part - B

Answer any **four** of the following

(4×5=20)

2. If $f(x)$ and $\phi(x)$ are bounded and integrable in $[a, b]$ then prove that $f(x) + \phi(x)$ is bounded and R-integrable in $[a, b]$.
3. Prove that every monotonic function is R-integrable.

4. If $f(x)$ and $\phi(x)$ are positive functions on $[a, b]$ and $\lim_{x \rightarrow a} \left[\frac{f(x)}{\phi(x)} \right] = l, (l \neq 0, \infty)$ where 'a' being point of infinite discontinuity, then prove that the integral $\int_a^b f(x) dx$ and $\int_a^b \phi(x) dx$ behave alike.

5. Test the convergence of $\int_2^{\infty} \frac{dx}{x^{2/3} (1+x)^{1/2}}$.

6. Prove that $\frac{\beta(m+2, n-2)}{\beta(m, n)} = \frac{m(m+1)}{(n-1)(n-2)}$.

7. Find the volume of the sphere $\frac{x^2}{4} + \frac{y^2}{9} + z^2 = 1$ by triple integrals.



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Part - C

Answer any four of the following

(4×10=40)

8. a) State and prove condition of R-integrability.

b) Prove that $f(x) = x^2 + 1$ is integrable on $[1, 2]$ and $\int_1^2 (x^2 + 1) dx = \frac{10}{3}$.

9. a) State and prove fundamental theorem of integral calculus.

b) Prove that $\frac{\pi^2}{9} \leq \int_{\pi/6}^{\pi/2} \frac{x}{\sin x} dx \leq \frac{2\pi^2}{9}$.

10. a) State and prove Dirichlet's test for the convergence of improper integral of product of two functions.

b) Show that $\int_0^{\infty} e^{-ax} \frac{\sin x}{x} dx, a \geq 0$ is convergent.

11. a) Establish the relation between Beta and Gamma Functions.

b) Prove that $\int_0^{\infty} e^{-y^2} \sqrt{y} dy \times \int_0^{\infty} \frac{e^{-y^2}}{\sqrt{y}} dy = \frac{\pi}{2\sqrt{2}}$.

12. a) State and Prove Leibnitz's theorem for differentiation under integral sign.

b) Prove that $\int_0^{\pi/2} \frac{\log(1 + y \sin^2 x) dx}{\sin^2 x} = \pi(\sqrt{1+y} - 1)$



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V Semester B.Sc. 5 Degree Examination, March/April - 2023

MATHEMATICS - II A

Numerical Analysis and Difference Equation

Paper : II

(Regular w.e.f. 2022-23)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- 1) Answer All questions.
- 2) Students are allowed to use scientific calculators.

PART - A

Answer any TEN of the following questions.

(10×2=20)

1. a) Explain briefly iteration method to find the real root of $f(x)=0$
- b) Find the real root of $x^3 - x - 1 = 0$ using bisection method in two stages.
- c) With usual notation, prove that $\Delta E = E\Delta$.
- d) If $u_0 = 3, u_1 = 12, u_2 = 81, u_3 = 200, u_4 = 100, u_5 = 8$ find $\Delta^5 u_0$.
- e) Evaluate $\Delta^{10} [(1-x)(1-2x^2)(1-3x^3)(1-4x^4)]$ by taking $h = 1$
- f) Write the formula to find the second derivative using forward difference.
- g) State 'Trapezoidal rule' to evaluate $\int_a^b f(x)dx$
- h) From the Taylor's series for $y(x)$, find y at $x = 0.1$, correct to 4 decimal places, if $y(x)$ satisfies $y' = x - y^2$ with $y(0) = 1$
- i) Explain Euler's method to solve $\frac{dy}{dx} = f(x, y)$ with initial condition $y(x_0) = y_0$
- j) Find the order and degree of the difference equation $y_{n+3} - 8y_{n+1} - 15y_n = 5x - 2$.
- k) Form the difference equation by eliminating a and b from the relation $y_x = a.2^x + b.3^x$.
- l) Write the formula for second order Runge-Kutta method.

[P.T.O.]



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PART - B

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

(4×5=20)

2. Explain the Gauss-Seidel method to solve the equations: $a_1x + b_1y + c_1z = d_1$, $a_2x + b_2y + c_2z = d_2$, $a_3x + b_3y + c_3z = d_3$.
3. Express the function $f(x) = x^4 - 12x^3 + 24x^2 - 30x + 9$ and its successive differences in a factorial notations, when $h = 1$.
4. State and prove Newton-Gregory backward interpolation formula.
5. Evaluate $\int_0^1 \frac{x}{1+x^2} dx$ using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule with $h = 0.2$ and hence obtain the approximate value of $\log(\sqrt{2})$
6. Using Euler's method to compute y for $x = 0.05$ and $x = 0.1$, given that $\frac{dy}{dx} = x + y$ with the initial condition $x_0 = 0, y_0 = 1$.
7. Solve $y_{n+2} - 4y_{n+1} + 3y_n = 5^n$

PART - C

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

(4×10=40)

8. a) Derive the Newton-Raphson formula $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$. $n = 0, 1, 2, 3, \dots$
b) Find the real root of $x^3 - 3x - 5 = 0$ in the interval $(2, 2.5)$, Correct to three decimal places using Bisection method.
9. a) State and prove 'Lagrange's interpolation formula for unequal intervals.'
b) Find the number of students from the following data who secured marks not more than 45

Marks	30-40	40-50	50-60	60-70	70-80
No.of. Students	35	48	70	40	22



10. a) State and prove 'General Quadrature formula for equidistant ordinates.
b) Find $f'(1.2)$ and $f''(1.2)$ from the following data.

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
$f(x)$	2.72	3.32	4.06	4.96	6.05	7.39	9.02

11. a) Explain Picards method to solve the equation $\frac{dy}{dx} = f(x, y)$ with initial condition $y(x_0) = y_0$.
b) Using Runge-Kutta method of second order, find $y(1.4)$, given that $\frac{dy}{dx} = xy$ with $y(1) = 2$ by taking $h = 0.2$.
12. a) Solve $y_{x+2} - 2y_{x+1} + y_x = x^2 \cdot 2^x$
b) Find the solution of the difference equation $y_{x+2} - 7y_{x+1} + 12y_x = \cos x$.

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42537/35537/E370

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V Semester B.Sc.3./B.Sc.4. Degree Examination, April - 2023

MATHEMATICS (OPTIONAL)

Real Analysis

Paper - I

(Repeaters/Regulars)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. Question paper contains 3 parts namely A, B and C.
2. Answer all questions.

PART - A

Answer any TEN of the following.

(10×2=20)

1. a. Define upper and lower Riemann integrals.
b. Prove that $L(p, f) \leq U(p, f)$.
c. Prove that $\frac{\pi}{4} \leq \int_0^{\pi/4} \sec x dx \leq \frac{\pi}{2\sqrt{2}}$.
d. State first mean value theorem of integral calculus.
e. Discuss the convergence of $\int_1^{\infty} \frac{dx}{(10+x)\sqrt{x}}$.
f. Test the convergence of $\int_1^2 \frac{dx}{\sqrt{4-x^2}}$.
g. State Dirichlet's test for the convergence of an improper integral.
h. Prove that $\beta(m, n) = \beta(n, m)$.
i. Find the value of $\int \frac{1}{2}$.
j. Evaluate $\int_0^{\pi/2} \sin^4 \theta \cdot \cos^6 \theta \cdot d\theta$.
k. Evaluate $\int_1^2 \int_0^1 x^3 y^3 dx dy$.
l. Evaluate $\int_0^1 \int_0^2 \int_0^2 xy^2 z dx dy dz$.

P.T.O.



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PART - B

Answer any **FOUR** of the following.

(4×5=20)

2. If $f(x)$ and $g(x)$ are bounded and R - integrable in $[a, b]$ then prove that $f(x) + g(x)$ is bounded and R - integrable in $[a, b]$.
3. State and prove bonnet form of second mean value theorem of integral calculus.
4. If $f(x)$ and $g(x)$ are +ve in $[a, \infty)$ and $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)} = L$ (non zero and finite) then prove that

$\int_a^{\infty} f(x) dx$ and $\int_a^{\infty} g(x) dx$ behave alike, where $a > 0$.

5. Prove that $\beta(m, n) = \int_0^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx$.

6. Prove that $\int_0^{\infty} x^2 \cdot e^{-x^4} dx \times \int_0^{\infty} e^{-x^4} \cdot dx = \frac{\pi}{8\sqrt{2}}$.

7. Find the volume of sphere by using triple integration.

PART - C

Answer any **FOUR** of the following.

(4×10=40)

8. a. State and prove condition of R- integrability.
- b. If $f(x) = x^2$ defined on $[0, a]$, then show that $f(x)$ is R - integrable in $[0, a]$ and

$$\int_0^a f(x) dx = \frac{a^3}{3}.$$

9. a. State and prove fundamental theorem of integral calculus.

b. Show that $\int_0^{\pi} \frac{6x^2}{1 + \cos x} \geq \pi^3$.

10. a. Test the convergence $\int_a^b \frac{dx}{(x-a)^n}$.

b. Discuss the convergence of $\int_0^{\infty} e^{-x} \cdot \cos x dx$.

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11. a. Prove that $\beta(m, n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$.

b. Show that $\int_0^{\pi/2} \frac{d\theta}{\sqrt{\sin \theta}} \times \int_0^{\pi/2} \sqrt{\sin \theta} \cdot d\theta = \pi$.

12. a. State and prove Leibnitz's theorem for differentiation under integral sign.

b. Prove that $\int_0^{\pi/2} \frac{\log(1 + a \sin^2 x)}{\sin^2 x} dx = \pi(\sqrt{1+a} - 1)$ if $a \geq -1$.

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V Semester B.Sc.4 Degree Examination, March/April - 2023

MATHEMATICS

Numerical Analysis Difference Equation

Paper - II

(Repeater)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. Answer all questions.
2. Students are allowed to use scientific calculators.

Part - A

I. Answer any Ten of the following. (2 marks each).

(10×2=20)

1. a. Find the real root of $x^3 - 2x - 5 = 0$ in $[2,3]$ by bisection method in two stages.
b. Explain briefly Iteration method to find the real root of $f(x) = 0$.
c. With usual notation prove that $E\Delta = \Delta E$.
d. If $u_0 = 1, u_1 = 11, u_2 = 21, u_3 = 28, u_4 = 29$, find $\Delta^4 u_0$.
e. Evaluate $\Delta^3(1+4x)(1+6x)(1+8x)$ where $n = 1$.
f. Write the formula for finding first derivative using forward difference.
g. From the Taylor's series for $y(x)$, find 'y' at $x = 0.1$, correct to 3 decimal places if $y(x)$ satisfies $y' = x - y^2$ and $y(0) = 1$.
h. Explain Euler's method to solve $\frac{dy}{dx} = f(xy)$ with initial condition $y(x_0) = y_0$.
i. Find the order and degree of the difference equation $y_{n+3} - 3y_{n+2} + 6y_{n+1} - 4y_n = 1$.
j. From the difference equation by eliminating a and b from the relation $y_x = a3^x + b(-3)^x$.
k. Write the formula for second order Runge - Kutta method.
l. Solve $u_{x+2} - 25u_{x+1} + 46u_x = 0$ by method of differences.

Part - B

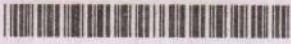
II. Answer any Four of the following.

(4×5=20)

2. Solve by Gauss - seidal iteration method. Carry out 4 iterations.

$$28x + 4y - z = 82, \quad x + 3y + 10z = 24, \quad 2x + 17y + 4z = 35.$$

[P.T.O.]



3. Express $f(x) = 11x^4 + 5x^3 + 2x^2 + x + 15$ and its successive differences in a factorial notation $h = 1$.
4. State and prove Newton - Gregory forward interpolation formula.
5. Evaluate $\int_4^{5.2} \log x \, dx$ by using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule.
6. Determine the value of Y when $x = 0.1$ given that $y(0) = 1$, $\frac{dy}{dx} = \frac{y-x}{y+x}$ using Euler's modified method.
7. Solve $y_{x+2} - 4y_{x+1} + 4y_x = ax + b$.

Part - CAnswer any **Four** of the following.**(4×10=40)**

8. a. Derive the Newton-Raphson formula, $x_{i+1} = x_i - f(x_i) / f'(x_i)$
b. Estimate the missing term in the following table.

x	0	1	2	3	4	5
y	0	-	8	15	-	35
9. a. Prove that the n th difference of a polynomial of degree ' n ' is a constant proportional to ' n ' and higher order differences are zero.
b. Find the polynomial of 3rd degree which takes the following values.

x	3	4	5	6	7
f(x)	6	24	60	120	210
10. a. State and prove Lagrange's interpolation formula for unequal intervals.
b. Find $f'(0.4)$ and $f''(0.4)$ from the following table.

x	0.1	0.2	0.3	0.4
f(x)	1.10517	1.22140	1.34986	1.49182
11. a. Explain Picard's method to solve the equation $\frac{dy}{dx} = f(x, y)$ with initial condition $y(x_0) = y_0$.
b. Using Runge - Kutta method of order 2. Find $y(0.2)$, given that $\frac{dy}{dx} = \frac{y^2 + x^2}{10}$, $y(0) = 1$ take $h = 0.1$
12. a. Solve the equation $u_{x+2} - 7u_{x+1} + 10u_x = 4^x$.
b. Solve $y_{x+2} - 10y_{x+1} + 25y_x = 0$ by the method of differences using $y(0) = 1$ and $y(1) = 0$.



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V Semester B.Sc. 5 Degree Examination, March/April - 2023

MATHEMATICS(SEC)

Number theory

(Regular)

Time : 2 Hours

Maximum Marks : 40

Instructions to Candidates :

- 1) Question paper containing two parts A and B.
- 2) Answer all parts.

Part - AAnswer any **five** of the following.

(5×2=10)

1.
 - a) Define greatest common divisor.
 - b) If a/bc and $(a,b) = 1$, then prove that a/c .
 - c) Define bracket function.
 - d) State Euler's theorem of relative prime numbers.
 - e) Find the number of positive integers ≤ 2205 that are relatively prime to 2205.
 - f) If $(P,7) = 1$, then prove that $P^{12}-1$ is divisible by 7.
 - g) State Fermat's theorem of prime numbers.

Part - BAnswer any **six** of the following.

(6×5=30)

2. Prove that for any two integers a and b , then there exist a unique numbers g and r such that $a = bg + r$ where $0 \leq r < b$.
3. Find the Greatest common Divisor of 275 and 726, also express it in the form of $275m + 726n$.
4. Prove that $9^n - 8^n - 1$ is divisible by 8.

[P.T.O.]



(2)

44248/E5080

5. State and prove Fundamental theorem of Arithmetic.
 6. Find the number of divisors and sum of divisors of 360.
 7. State and prove Wilson's theorem of prime numbers.
 8. If m and n are relatively prime to 133, then prove that $m^{18} - n^{18}$ is divisible by 133.
 9. Prove that $12! + 209$ is divisible by 221.
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V Semester B.Sc. 5 Degree Examination, March/April - 2023

Physics (SEC)

Basic Instrumentation Skills

(Regular)

Time : 2 Hours

Maximum Marks : 40

Part - A

I. Answer any five sub questions.

(5×2=10)

- a) Define sensitivity of an instrument.
- b) Define Error in a measurement.
- c) What is multimeter?
- d) What is loading effect in measurement of voltages?
- e) What is signal generator?
- f) What is Q-meter?
- g) What is working principle of CRT?
- h) What is the meaning of following symbols on multimeter

i)

ii)

Part - B

Answer question no.2 or question no.3

2. a) What are errors in measurement, explain in brief. (5)
- b) Explain the measurement of d.c. current and a.c. current also the resistance using multimeter with suitable diagrams. (10)

(OR)

3. a) What is electronic voltmeter? Write it's advantages. (5)
- b) What is CRT? With neat diagram explain the parts of CRT. (10)

[P.T.O.]



(2)

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PART - C

Answer question no. 4 or question no. 5.

4. a) Write the difference between digital instruments and analog instruments. (5)
b) Explain the working of a pulse-generator with the help of block diagram. (10)

(OR)

5. a) Write applications of multimeter. (5)
b) Explain the construction and working of Q-meter, write its applications. (10)

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V Semester B.Sc. 5 (CBCS) Degree Examination, March/April - 2023

PHYSICS - I

Mathematical and Nuclear Physics
(Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- 1) Calculators are allowed.
- 2) Write intermediate steps.

Part - I

Answer any Ten questions.

(10×2=20)

1.
 - a) Mention the orthogonality condition of cosine functions.
 - b) State Laplace Transform of a function.
 - c) Find the Laplace Transform of $f(t) = e^{at}$.
 - d) What is dead time of G.M. Counter?
 - e) State Geiger- Nuttal law of α -decay.
 - f) Write any two uses of cyclotron.
 - g) Explain α -decay with an example.
 - h) What is constraint? Give one example.
 - i) What are degrees of freedom? Mention it's equation.
 - j) State D'Alembert's principle.
 - k) Complete the following reaction.
 - i) ${}_4\text{Be}^9 + \dots \rightarrow {}_6\text{C}^{12} + {}_0n^1$
 - ii) ${}_7\text{N}^{14} + {}_2\text{He}^4 \rightarrow \dots + {}_1\text{H}^1$
 - l) The half life of a radioactive element is 4×10^8 years calculate decay constant.

[P.T.O.]



Part - II

Answer question number 2 or question number 3.

2. a) Derive the equations for Fourier coefficients a_0, a_n, b_n . (10)
- b) Find the Fourier series representing
- $$f(x) = x, 0 < x < 2\pi \text{ or } -\pi < x < \pi \quad (5)$$
3. a) i) Derive Laplace transform of derivative of order n
- ii) Write the differences between Laplace and Fourier Transform. (10)
- b) Find the Laplace Transform of $\sin^2 t$. (5)

Part - III

Answer question number 4 or question number 5.

4. a) Explain the theory of successive disintegration and arrive at Bateman equation. (10)
- b) Calculate the half-life and mean life of a radioactive element. Given decay constant is $6 \times 10^{-4} \text{ s}^{-1}$. (5)
5. a) Describe the construction and working of a linear accelerator. Show that the length of the cylinders are in the ratio of $l_1 : l_2 : l_3 : \dots :: 1 : \sqrt{2} : \sqrt{3} : \dots$. (10)
- b) Calculate the frequency of oscillating potential applied to a cyclotron so as to accelerate deuteron using magnetic field of 2.5T. Given
- Mass of deuteron = $3.34 \times 10^{-27} \text{ kg}$.
- Charge of deuteron = $1.6 \times 10^{-19} \text{ C}$. (5)

Part - IV

Answer question number 6 or question number 7.

6. a) Derive an expression for the Q-value of nuclear reaction in terms of mass. K.E. of incident particle and product particle. (10)
- b) Calculate the energy released (Q-value) in the following reaction.
- $${}_3\text{Li}^6 + {}_1\text{H}^2 \rightarrow {}_2\text{He}^4 + {}_2\text{He}^4 + Q$$
- The atomic masses are
- $${}_1\text{H}^2 = 2.0141024, {}_3\text{Li}^6 = 6.0151234 \text{ and } {}_2\text{He}^4 = 4.0026034. \quad (5)$$



(3)

44225/E0450

7. a) Explain the types of Nuclear reactions with examples. (10)
- b) Complete the following reactions. (5)
- i) ${}_1H^2 + {}_8O^{16} \rightarrow {}_7N^{14} + \dots$
- ii) ${}_2He^4 + {}_3Li^6 \rightarrow {}_5B^9 + \dots$
- iii) ${}_6C^{12} + {}_0n^1 \rightarrow {}_6C^{11} + \dots$
- iv) ${}_7N^{15} \rightarrow {}_8O^{15} + \dots$
- v) ${}_{92}U^{239} \rightarrow \dots + {}_2He^4$

Part - V

Answer question number 8 or question number 9

8. a) Derive Lagrange's equation of motion from D'Alembert's principle. (10)
- b) Arrive at an equation of motion for simple pendulum using Lagrangian formulation. (5)
9. a) Derive an expression for Lagrange's equation from Hamilton's principle. (10)
- b) State and prove law of conservation of energy. (5)

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42542/E420

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V Semester B.Sc.4. Degree Examination, March/April - 2023

PHYSICS (OPTIONAL)

Paper - I

(Repeater)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

1. Simple calculators are allowed.
2. Write intermediate steps.

Part - I

1. Answer any Ten of the following. (10×2=20)
- a. What are constraints? Give examples.
 - b. Define degrees of freedom.
 - c. What is central force?
 - d. What are dangling bonds?
 - e. What is time dilation?
 - f. How mass varies with velocity according to relativistic mechanics?
 - g. State Norton's theorem.
 - h. Draw circuit symbols of n and p channel FET.
 - i. What is ripple factor of a rectifier circuit?
 - j. Find the peak value of voltage across the secondary winding if load resistance of centre tap full wave rectifier is $3000\ \Omega$, peak current is 0.1 A and forward bias dynamic resistance is $5\ \Omega$.
 - k. The amplification factor of FET is 4.5. Calculate the mutual conductance, if the drain resistance is $2.5\ \text{k}\Omega$.
 - l. What is positive feedback?

[P.T.O.]

**Part - II**

Answer any **Four** questions. Each question carries **5** marks.

(4×5=20)

2. State and derive kepler's third law of planetary motion.
3. Derive Einstein's mass energy relation.
4. Explain with neat circuit diagram, the working of full wave bridge rectifier.
5. The period of earth is 365.25 days and that of venus is 224.7 days. Find the ratio of major axis of their orbits.
6. Applied input AC power to a half wave rectifier is 200 watts, if rectification efficiency is 37%, find the dc output power.
7. A Hartley oscillator has a capacitor of 250 pF and inductance of each part of inductance coil is 15 mH. calculate the frequency of the oscillator neglecting the mutual inductance between the two coil.

Part - III

Answer any **Four** of the following, each question carries **10** marks.

(4×10=40)

8. What are generalised co-ordinates? Obtain expression for generalised kinetic energy.
 9. Reduce two body central force problem to an equivalent one body problem.
 10. Describe Michelson - Morley experiment to detect motion of earth through ether.
 11. a. What are voltage and current sources? Explain.
b. State and prove superposition theorem.
 12. Explain the working of FET with neat diagram. Define FET parameters and obtain the relation between them.
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42543/E430

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V Semester B.Sc.4. Degree Examination, April - 2023

PHYSICS (OPTIONAL) - II

(Repeaters)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates : Calculators are allowed for calculations, write the intermediate steps.

PART - A

1. Answer any Ten of the followings.

(10×2=20)

- Write the expression for Compton shift.
- What are metastable states in atom.
- State the orthogonality condition for wave functions.
- State Fermi's theorem.
- What is orbital quantum number.
- On what factor does the normal Zeeman shift depend on.
- Mention the types of molecular spectrum.
- Show that $P_n(1) = 0$.
- What are Stokes and anti-Stokes lines.
- Uncertainty in position of electron is 4×10^{-10} m, calculate the uncertainty in momentum.
- Write Hermite differential equation.
- Calculate the interatomic distance for a molecule where $\mu = 1.6 \times 10^{-27}$ kg
 $I = 4 \times 10^{-47}$ kg-m².

PART - B

Answer any Four of the following questions each carries 5 marks.

(4×5=20)

2. Illustrate uncertainty principle with electron diffraction.

[P.T.O.]



(2)

42543/E430

3. Explain the physical significance of wave function.
4. Mention the difference between Normal and anomalous Zeeman effect.
5. Show that $\int_{-1}^1 x P_n(x) P_{n-1}(x) dx = \frac{2n}{4n^2-1}$.
6. An electron is confined to one dimension box of length $2A^\circ$, Calculate lowest energy state of the system.
7. Calculate Zeeman shift observed in a spectral line of wavelength 600 nm is subjected to field of 2T and Given $e = 1.6 \times 10^{-19} \text{ J}$, $m = 9.1 \times 10^{-37} \text{ kg}$.

PART - C

Answer any **Four** of the following.

(4×10=40)

8. Derive the expression for Compton shift.
9. With neat diagram explain the construction working of He-Ne laser.
10. Explain the experimental setup used to study the Raman Effect.
11. Obtain the expression for energy of electron (particle) confined to one dimensional box.
12. Derive the orthogonality of Bessel's functions.

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44226/E0460

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V Semester B.Sc 5 (CBCS) Degree Examination, April - 2023

PHYSICS OPTIONAL

Quantum Mechanics-I Electronics and Optoelectronics

Paper : II A

(Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

Calculators allowed to solve problems, write the intermediate steps.

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

(10×2=20)

1. a) What are matter waves and write the expression for de broglie wavelength.
- b) Define group velocity and phase velocity.
- c) Draw the symbol of zener diode and photo diode.
- d) Write down barkhausen criterion for oscillator.
- e) What are 'h' parameter and mention their units.
- f) Draw the symbol of FET and Transistor .
- g) Write down the truth table of NAND gate.
- h) Define dark current.
- i) If rating mention in zener diode are $v_z=7.2v$ and $p_z=0.25$ watts calculate zener current I_z .
- j) The value of trans conductance and drain resistance of FED are $g_m = 0.5 \times 10^{-3} \Omega^{-1}$ and $r_d = 2.5 \times 10^3 \Omega$ calculate amplification factor.
- k) Mention the factor on which transmission loss depends on.

II. Answer any **one** of the following (question 2 or question 3)

2. a) Derive the expression for wavelength of de broglie's wave, write expression of wavelength in terms of temperature, momentum and energy. (10)
- b) Calculate the wavelength of electron having energy 40 Kev. (5)

P.T.O.



(2)

44226/E0460

3. a) State and explain uncertainty principle with illustration. (10)
- b) A photon having energy 10eV is incident on photoemissive surface of work function 6eV, find the velocity of ejected electrons. (5)

III. Answer any **one** of the following (question 4 or question 5)

4. a) Mention the difference between conductor, insulator, and semiconductor on the basis of band theory of solids, and explain the concept of effective mass and hole. (10)
- b) Find the range of input voltage to maintain 30 volts across the load resistance of $2k\Omega$, Given $R_s = 200\Omega$ and $I_z = 25mA$ (5)
5. a) Explain How zener diode acts as regulator with a neat diagram. (10)
- b) Electron and hole mobilities of a sample are $0.135 m^2/v-s$ and $0.04 m^2/v-s$ respectively determine conductivity and resistivity at $300^\circ K$, If the intrinsic concentration is $1.5 \times 10^{16} \text{ atoms}/m^3$. (5)

IV. Answer any **one** of the following (question 6 or question 7)

6. a) What is FET? Mention the types of FET, Explain the experiment to determine parameters of FET. (10)
- b) P.T. $A + \overline{AB} = A + B$. (5)
7. a) Explain the construction and working of Hartley Oscillator. (10)
- b) In Case of phase shift oscillator with Op Amp $R = 56k\Omega$ and $C = .5nF$ calculate the frequency of oscillator (5)

V. Answer any **one** of the following (question 8 or question 9)

8. a) Explain the construction and working of photo diode. (10)
- b) Calculate the critical angle and Numerical aperture for an optical fiber where $n_{core} = 1.5$ $n_{clad} = 1.45$ (5)
9. a) Mention the difference between step index and graded index optical fiber, also mention advantages of optical fiber. (10)
- b) Explain in brief opto couplers. (5)



44252/E5120

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V Semester B.Sc. 5 (CBCS) Degree Examination, March/April - 2023

ZOOLOGY

Apiculture

Paper - ZOOSECT - 5.3

(Regular)

Time : 2 Hours

Maximum Marks : 40

Instructions to Candidates:

- 1) Answer all the questions.
ಎಲ್ಲಾ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ.
- 2) Draw diagrams wherever necessary.
ಅವಶ್ಯವಿದ್ದಲ್ಲಿ ಚಿತ್ರಗಳನ್ನು ಬಿಡಿಸಿ.

I. Answer any five.

(5×2=10)

ಬೇಕಾದ ಐದಕ್ಕೆ ಉತ್ತರಿಸಿ.

1. Name any two species of honey bees.
ಜೇನುಹುಳುವಿನ ಯಾವುದಾದರೂ ಎರಡು ಸ್ಪೀಸೀಜ ಹೆಸರಿಸಿ.
2. What do you mean by comb foundation?
ಬಾಚಣಿಗೆಯ ಅಡಿಪಾಯ ಎಂದರೇನು ?
3. What is nuptial (marriage) flight?
ಮದುವೆಯ ಯಾಣ ಎಂದರೇನು ?
4. Name any two infectious diseases of honey bee.
ಜೇನುಹುಳುವಿನ ಯಾವುದಾದರೂ ಎರಡು ಸಾಂಕ್ರಾಮಿಕ ರೋಗ ಹೆಸರಿಸಿ.
5. What is beekeeping?
ಜೇನು ಸಾಕಾಣಿಕೆ ಎಂದರೇನು ?
6. Mention any two protozoan diseases of honey bee.
ಜೇನು ಹುಳುವಿನ ಯಾವುದಾದರೂ ಎರಡು ಆದಿಜೀವಿರೋಗ ಹೆಸರಿಸಿ.

[P.T.O.]



II. Answer the following questions.

(3×5=15)

- ಈ ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿ.
7. Explain social organization in honey bees.
ಜೇನು ಹುಳುಗಳಲ್ಲಿಯ ಸಾಮಾಜಿಕ ಸಂಘಟನೆ ವಿವರಿಸಿ.
8. Illustrate life history of honey bees.
ಜೇನುಹುಳುವಿನ ಜೀವನ ಚರಿತ್ರೆ ವಿವರಿಸಿ.
9. Write a note on selection of honey bees for apiculture.
ಜೇನುಹುಳು ಸಾಕಾಣಿಕೆಗೆ ಜೇನುಹುಳುಗಳ ಆಯ್ಕೆ ಕುರಿತು ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ.

(OR/ಅಥವಾ)

10. Write a note on beekeeping equipments.
ಜೇನುಹುಳು ಸಾಕಾಣಿಕೆಯ ಸಲಕರಣೆಗಳ ಕುರಿತು ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ.

III. Answer the following questions.

(3×5=15)

- ಈ ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿ.
11. Explain preventive and control measures of honeybee diseases.
ಜೇನುಹುಳುಗಳ ರೋಗ ತಡೆ ಮತ್ತು ನಿಯಂತ್ರಣ ಕ್ರಮಗಳನ್ನು ವಿವರಿಸಿ.
12. Narrate the uses of Apiculture industry.
ಜೇನುಹುಳು ಸಾಕಾಣಿಕೆ ಉದ್ಯಮದ ಉಪಯೋಗಗಳನ್ನು ತಿಳಿಸಿ.
13. Write a note on modern rearing method of apiculture.
ಆಧುನಿಕ ಜೇನುಹುಳು ಸಾಕಾಣಿಕೆ ಕ್ರಮದ ಕುರಿತು ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ.

(OR/ಅಥವಾ)

14. Write a note of factors those control honey yield.
ಜೇನು ಇಳುವರಿಯನ್ನು ನಿಯಂತ್ರಿಸುವ ಅಂಶಗಳ ಕುರಿತು ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ.



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V Semester B.Sc. (CBCS) Degree Examination March/April - 2023

ZOOLOGY

Immunology

Paper - II

(Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

- 1) Answer All the questions.
ಎಲ್ಲಾ ಪ್ರಶ್ನೆಗಳು ಕಡ್ಡಾಯ.
- 2) Draw diagrams wherever necessary.
ಅವಶ್ಯವಿದ್ದಲ್ಲಿ ಹೆಸರಿಸಿದ ಅಂದವಾದ ಚಿತ್ರ ಬಿಡಿಸಿರಿ.

I. Answer any TEN of the following questions.

(10×2=20)

ಕೆಳಗಿನ ಯಾವುದಾದರೂ ಹತ್ತು ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ.

1. Name any two components of Immune system.
ಜೀವನಿರೋಧಕ ಶಾಸ್ತ್ರದ ಎರಡು ಘಟಕಗಳನ್ನು ಹೆಸರಿಸಿ.
2. Name cells involved in Innate immunity.
ಪ್ರತಿರಕ್ಷಣಾ ವ್ಯವಸ್ಥೆಯಲ್ಲಿ ಒಳಗೊಂಡಿರುವ ಕೋಶಗಳನ್ನು ಹೆಸರಿಸಿ.
3. Define Hematopoiesis.
ಹಿಮ್ಯಾಟೋಪೋಯಿಸಿಸ್ ಎಂದರೇನು ? ವ್ಯಾಖ್ಯಾನಿಸಿ.
4. What are Adjuvants in Immunology?
ರೋಗನಿರೋಧಕ ಶಾಸ್ತ್ರದಲ್ಲಿ ಸಹಾಯಕಗಳು ಎಂದರೇನು ?
5. What are B-cell epitopes?
B-ಕೋಶ ಎಪಿಟೋಪಗಳು ಎಂದರೇನು ?
6. Define antigen.
ಪ್ರತಿ ಜನಕ ಎಂದರೇನು ವ್ಯಾಖ್ಯಾನಿಸಿ.
7. What are endogenous antigen.
ಅಂತರ್ವರ್ಧಕ ಪ್ರತಿ ಜನಕಗಳು ಎಂದರೇನು ?

[P.T.O.]



8. What are Cytokines?
ಸೈಟೋಕೈನ್‌ಗಳು ಎಂದರೇನು ?
9. What is MHC?
ಪ್ರಮುಖ ಹಿಸ್ಟೋ ಕಾಂಪ್ಯಾಟಿಬಿಲಿಟಿ ಎಂದರೇನು ?
10. Define autoimmunity.
ಸ್ವಯಂ ನಿರೋಧಕತೆ ಎಂದರೇನು ?
11. Define Vaccine.
ಲಸಿಕೆ ಎಂದರೇನು?

II. Answer the following questions.

(3×5=15)

ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ.

12. Write note on adaptive immunity.
ಹೊಂದಾಣಿಕೆ ರೋಗನಿರೋಧಕತೆ ಎಂದರೇನು ಬರೆಯಿರಿ.
13. Explain primary lymphoid organs.
ಪ್ರಾಥಮಿಕ ದುಗ್ಧರಸೋತ್ಪಾದಕಗಳ ಕುರಿತು ವಿವರಿಸಿ.
14. Describe basic concept of immunity.
ರೋಗನಿರೋಧಕ ಶಾಸ್ತ್ರದ ಪರಿಕಲ್ಪನೆ ಕುರಿತು ವಿವರಿಸಿ.

(OR/ಅಥವಾ)

15. Explain the secondary Lymphoid organs.
ದ್ವಿತೀಯ ದುಗ್ಧರಸೋತ್ಪಾದಕಗಳ ಕುರಿತು ವಿವರಿಸಿ.

III. Answer the following questions.

(3×5=15)

ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ.

16. Write a note on Monoclonal antibodies.
ಮೋನೋಕ್ಲೋನಲ್ ಪ್ರತಿಕಾಯಗಳು ಎಂದರೇನು ಬರೆಯಿರಿ.
17. Describe properties of antigens.
ಪ್ರತಿಜನಕಗಳ ಗುಣಲಕ್ಷಣಗಳ ಕುರಿತು ಬರೆಯಿರಿ.



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18. Describe Haptens.
ಹಾಪ್ಟೆನ್‌ಗಳು ಎಂದರೇನು ವಿವರಿಸಿ.

(OR/ಅಥವಾ)

19. Explain Epitopes.
ಎಪಿಟೋಪಗಳು ಎಂದರೇನು ವಿವರಿಸಿ.

IV. Answer the following questions.

(3×5=15)

ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ.

20. Write down the basic properties of Cytokine.
ಸೈಟೋಕೈನ್‌ಗಳ ಮೂಲಭೂತ ಗುಣಲಕ್ಷಣಗಳ ಕುರಿತು ಬರೆಯಿರಿ.
21. Compare two classes of MHC molecules with reference to their structure.
ಎರಡು ವರ್ಗಗಳ ಎಂ.ಎಚ್.ಸಿ.ಗಳ ಅಣು ರಚನೆಯನ್ನು ಹೋಲಿಸಿ ಬರೆಯಿರಿ.
22. Write note on alternate pathways of complement activation.
ಪೂರಕ ಸಕ್ರಿಯಗೊಳಿಸುವಿಕೆಯ ಪರ್ಯಾಯ ಮಾರ್ಗಗಳ ಕುರಿತು ಬರೆಯಿರಿ.

(OR/ಅಥವಾ)

23. Explain the components of complement system.
ಪೂರಕ ವ್ಯವಸ್ಥೆಯಲ್ಲಿನ ಘಟಕಗಳ ಕುರಿತು ವಿವರಿಸಿ.

V. Answer the following questions.

(3×5=15)

ಕೆಳಗಿನ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ.

24. Explain Hyper sensitivity.
ಅತಿಸೂಕ್ಷ್ಮತೆ ಕುರಿತು ವಿವರಿಸಿ.
25. Explain different types of vaccines.
ವಿವಿಧ ಪ್ರಕಾರಗಳ ಲಸಿಕೆಗಳ ಕುರಿತು ಬರೆಯಿರಿ.
26. Describe Gell in immune system.
ರೋಗನಿರೋಧಕ ಶಾಸ್ತ್ರದಲ್ಲಿ ಜೆಲ್‌ಗಳ ಕುರಿತು ಬರೆಯಿರಿ.

(OR/ಅಥವಾ)

27. Describe auto Immune diseases.
ಸ್ವಯಂ ನಿರೋಧಕ ಕಾಯಿಲೆಗಳ ಕುರಿತು ಬರೆಯಿರಿ.



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V Semester B.Sc. (CBCS) Degree Examination, March/April - 2023

ZOOLOGY - I

Applied Zoology and Ethology

Paper - I

(Regular)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

- 1) Answer all questions.
ಎಲ್ಲಾ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ.
- 2) Draw diagram wherever necessary.
ಅವಶ್ಯಕತೆ ಇರುವಲ್ಲಿ ಅಂದವಾದ ಚಿತ್ರ ಬಿಡಿಸಿರಿ.

I. Answer any Ten of the following questions.

(10×2=20)

ಬೇಕಾದ ಹತ್ತಕ್ಕೆ ಉತ್ತರಿಸಿರಿ.

1. What is Vermiwash?

ವರ್ಮಿವಾಶ್ ಎಂದರೇನು ?

2. Name any two species of pearl producing molluscs.

ಮೃದ್ವಂಗಿಗಳಲ್ಲಿ ಮುತ್ತುಗಳನ್ನು ಉತ್ಪಾದಿಸುವ ಎರಡು ತಳಿಗಳನ್ನು ಹೆಸರಿಸಿ.

3. Name any two species of exotic breeds of fowls.

ವಿದೇಶಿ ತಳಿ ಕೋಳಿಗಳಲ್ಲಿನ ಎರಡು ಪ್ರಕಾರಗಳನ್ನು ತಿಳಿಸಿ.

4. Name any two Indian Major carps.

ಯಾವುದಾದರೂ ಎರಡು ಪ್ರಮುಖ ಭಾರತೀಯ ಕಾರ್ಪ್ ಮೀನುಗಳನ್ನು ಹೆಸರಿಸಿ.

5. Write any two economic importance of honey bees.

ಜೇನು ಹುಳದ ಎರಡು ಆರ್ಥಿಕ ಪ್ರಾಮುಖ್ಯತೆಯನ್ನು ತಿಳಿಸಿರಿ.

6. What is Isinglass?

ಐಸಿಂಗ್ಲಾಸ್ ಎಂದರೇನು ?

7. What is Commensalism? Give one example.

ಕಮಿನ್ಸಿಲಿಸಮ್ ಎಂದರೇನು ? ಉದಾಹರಣೆ ಕೊಡಿ.

8. Write any two important properties of lac.

ಅರಗದ ಎರಡು ಉಪ ಉತ್ಪನ್ನಗಳನ್ನು ಹೆಸರಿಸಿ.

[P.T.O.]



9. Name the parasite causing Elephantiasis and Taeniasis.

ಆನೆಕಾಲು ರೋಗ ಹಾಗೂ ಟೆನ್ಯಾಸಿಸ್ ರೋಗ ಹರಡುವ ಪರಾವಲಂಬಿ ಜೀವಿಗಳನ್ನು ಹೆಸರಿಸಿ.

10. Define Taxes and mention its types.

ಟ್ಯಾಕ್ಸ್ ಎಂದರೇನು ? ಮತ್ತು ಅದರ ಪ್ರಕಾರಗಳನ್ನು ಹೆಸರಿಸಿ.

11. What is innate behaviour?

ಜನ್ಮದಿಂದ ಬಂದ ಸ್ವಭಾವವೆಂದರೇನು ?

12. What is circadian rhythm?

ಸರಕ್ಯಾಡಿಯನ್ ಲಯ ಎಂದರೇನು ?

II. Answer any Three of the following.

(3×5=15)

ಬೇಕಾದ ಮೂರಕ್ಕೆ ಉತ್ತರಿಸಿರಿ.

13. Explain pit culture technique in vermicompost preparation.

ಎರೆಗೊಬ್ಬರ ತಯಾರಿಕೆಯಲ್ಲಿನ ಪಿಟ ಕಲ್ಚರ್ ಪದ್ಧತಿಯನ್ನು ವಿವರಿಸಿರಿ.

14. Explain Pokkali culture of Prawn.

ಪೊಕ್ಕಾಳಿ ವಿಧಾನದಿಂದ ಸೀಗಡೆ ಮೀನು ಸಾಕಾಣಿಕಾ ವಿಧಾನವನ್ನು ವಿವರಿಸಿ.

15. Write a note on fish preservation method.

ಮೀನುಗಳ ಸಂರಕ್ಷಣಾ ವಿಧಾನಗಳ ಬಗ್ಗೆ ಬರೆಯಿರಿ.

16. Explain the process of Pearl formation.

ಸಮುದ್ರದಲ್ಲಿ ಮುತ್ತುಗಳು ಹೇಗೆ ತಯಾರಾಗುತ್ತವೆ ಎಂಬುದರ ಬಗ್ಗೆ ವಿವರಿಸಿ.

III. Answer any Three of the following.

(3×5=15)

ಬೇಕಾದ ಮೂರಕ್ಕೆ ಉತ್ತರಿಸಿರಿ.

17. Write a note on Nutritive value of egg in poultry.

ಕೋಳಿ ಸಾಕಾಣಿಕೆಯಲ್ಲಿ ತತ್ತಿಯ ಪೌಷ್ಟಿಕಾಂಶಗಳ ಮೌಲ್ಯವನ್ನು ವಿವರಿಸಿ.

18. Explain any two diseases of cattle.

ಜಾನುವಾರುಗಳಲ್ಲಿ ಯಾವುದಾದರೂ ಎರಡು ರೋಗಗಳ ಬಗ್ಗೆ ವಿವರಿಸಿ.

19. Explain the life cycle of Plasmodium vivax in man.

ಪ್ಲಾಸ್ಮಾಡಿಯಮ್ ವೈವಾಕ್ಸ್ ಮನುಷ್ಯನಲ್ಲಿಯ ಜೀವನ ಚಕ್ರವನ್ನು ವಿವರಿಸಿ.

20. Write a note on Hallikar breed.

ಹಳ್ಳಿಕಾರ ತಳಿಯ ಬಗ್ಗೆ ಬರೆಯಿರಿ.



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IV. Answer any Three of the following.

(3×5=15)

ಬೇಕಾದ ಮೂರಕ್ಕೆ ಉತ್ತರಿಸಿರಿ.

21. Write a note on advantages of deep litter system in poultry keeping.
ಕೋಳಿ ಸಾಕಾಣಿಕೆಯಲ್ಲಿ ದಪ್ಪಸತ್ತೆ (ಡೀಪ್ ಲಿಟರ್) ವಿಧಾನದಿಂದ ಆಗುವ ಅನುಕೂಲತೆಗಳನ್ನು ಬರೆಯಿರಿ.
22. Explain Konard Lorenz contributions to the field of Ethology.
ನೀತಿಶಾಸ್ತ್ರದ ಬಗ್ಗೆ ಕುರ್ನಾಡ್ ಲಾರೆಂಜನ ಕೊಡುಗೆ ಬಗ್ಗೆ ಬರೆಯಿರಿ.
23. Write a note on Imprinting.
ಮುದ್ರಯೋತ್ತುವಿಕೆಯ ಬಗ್ಗೆ ಬರೆಯಿರಿ.
24. Write a note on Economic importance of Lac.
ಅರಗದ ಆರ್ಥಿಕ ಪ್ರಾಮುಖ್ಯತೆ ಕುರಿತು ಬರೆಯಿರಿ.

V. Answer any Three of the following.

(3×5=15)

ಬೇಕಾದ ಮೂರಕ್ಕೆ ಉತ್ತರಿಸಿರಿ.

25. Explain parental care in Amphibia.
ಉಭಯವಾಸಿಗಳ ಬೆಳಸುವಲ್ಲಿ ಮಾತಾಪಿತೃಗಳ ಕಾಳಜಿಯನ್ನು ವರ್ಣಿಸಿರಿ.
26. Explain Mimicry in animal.
ಪ್ರಾಣಿಗಳಲ್ಲಿ ಅನುಕರಿಸಿ ಬಗ್ಗೆ ವಿವರಿಸಿ.
27. Write a note on Innate behaviour.
ಸಹಜ ನಡವಳಿಕೆ ಬಗ್ಗೆ ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ.
28. Explain courtship behaviour in scorpion.
ಚೇಳು ಹುಳದ ಪ್ರಣಯದ ವರ್ತನೆ ಬಗ್ಗೆ ಬರೆಯಿರಿ.