

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SECOND SEMESTER DEGREE EXAMINATION MAY 2024
ZOOLOGY

Biochemistry and Physiology

Duration: 2 Hours

Max Marks: 60

SECTION - A

Answer the following strictly observing the internal choice provided:

4×5=20

UNIT 1

- 1) Write a note on conjugated proteins.

OR

- 2) Explain the characteristics of Isozymes.

UNIT 2

- 3) Write the reactions of Gluconeogenesis.

OR

- 4) Define Glycolysis. Write salient features of Glycolysis.

UNIT 3

- 5) Explain protein digestion in small intestine.

OR

- 6) Give a comprehensive account of respiratory pigments in animals.

UNIT 4

- 7) Explain the structure of actin with a schematic sketch.

OR

- 8) Describe the structure of the human kidney.

SECTION - B

Answer the following strictly observing the internal choice provided:

4×10=40

UNIT 1

- 9) Write in detail the general properties of amino acids.

OR

- 10) Write the Michaelis-Menten equation and explain the terms V_m and K_{max} .

UNIT 2

11) Explain Vitamin B-Complex Vitamins.

OR

12) Explain Beta oxidation.

UNIT 3

13) With a neat labeled diagram describe the internal structure of human heart.

OR

14) Give a brief account on ABO blood groups.

UNIT 4

15) Distinguish the transmission of nerve impulse in myelinated and non myelinated neurons.

OR

16) Explain the hormones of Pancreas.

21ZOOE21

Reg No :

**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.A./B.Com/B.B.A/B.C.A SECOND SEMESTER DEGREE EXAMINATION MAY 2024**

**ZOOLOGY
Parasitology**

Duration:2 Hours

Max Marks:60

SECTION - A

Answer the following strictly observing the internal choice provided:

4×5=20

UNIT 1

- 1) Explain the morphology of *Schistosoma haematobium*.

OR

- 2) Comment on host defenses. List any five defense mechanisms.

UNIT 2

- 3) Explain the nematode plant interaction.

OR

- 4) Explain the morphology of *Ascaris lumbricoides*.

UNIT 3

- 5) Write a note on French fever.

OR

- 6) Write a note on characteristics of parasitoid insects.

UNIT 4

- 7) Write a note on nutritional adaptations shown by Vampire bats.

OR

- 8) Differentiate between antigen and antibody.

SECTION - B

Answer the following strictly observing the internal choice provided:

4×10=40

UNIT 1

- 9) Explain the morphology, pathogenicity, prophylaxis of *Hymenolepis nana*.

OR

- 10) What are ectoparasites? Describe the epidemiology and symptoms of parasitic infections.

UNIT 2

11) Explain the morphology of *Trypanosoma gambiense*.

OR

12) Draw a neat labelled diagram of *Entamoeba histolytica*. Add a note on its control measures.

UNIT 3

13) Give a detailed account of parasitic behavior of Cooki Cutter Shark. Add a note on its effect on host.

OR

14) Explain the morphology and behaviour of American dog tick and Brown dog tick.

UNIT 4

15) Give an account of immunodiagnosis method and molecular biological methods of diagnosis of parasites.

OR

16) Define immunoassay. Explain with with reference to Counter Current Immuno-electrophoresis.

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SECOND SEMESTER DEGREE EXAMINATION MAY 2024
STATISTICS

Probability and Distributions - I

Duration: 2 Hours

Max Marks: 60

Answer any THREE of the following : **(3×2= 06)**

1. Define Bernoulli distribution and give an example for it.
2. If X has Uniform distribution over the range $(0,1)$, find the mean and the variance.
3. What is the difference between positive and negative frequencies?
4. Explain ultimate classes.
5. Write the function for p.m.f of Poisson distribution in R .

Answer any FOUR of the following in not more than a page each : **(4×6= 24)**

6. Find the mode of Poisson distribution.
7. Define Binomial distribution. Find the variance assuming mean.
8. Obtain the mean and variance of Negative Binomial distribution.
9. Obtain an expression for Mean Deviation from Mean for a Normal variate.
10. Derive an expression for $r_{12,3}$.
11. Write a programme to obtain mode from the following data:

Size	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	5	7	12	18	14	10	5

Answer any THREE of the following in not more than two page each : **(3×10= 30)**

12. Obtain the mean and variance of Hyper Geometric distribution.
13. Derive the mean and variance of Beta distribution of first kind.
14. Define Gamma distribution with parameter n and obtain the first four central moments of this distribution and comment on the skewness and kurtosis.
15. Define multiple correlation coefficient and obtain the expression for $R_{1,2,3}$.
16. If the three regression planes coincide and it is given by $ax+by+cz=0$ for all $a,b,c \geq 0$ then show that all the three partial correlation coefficient are equal to -1 .

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SECOND SEMESTER DEGREE EXAMINATION MAY 2024
COMPUTER SCIENCE
Data Structures using C

Duration:2 Hours

Max Marks:60

PART A

Answer any FIVE questions:

(5×2= 10)

- 1) What is a non-linear data structure? Give an example.
- 2) What do you understand by Circular Linked List?
- 3) Write the algorithm to add an element into the stack.
- 4) What is the difference between Input restricted queue and Output restricted queue in a Double-ended Queue?
- 5) What is a non-terminal node?
- 6) What is edge of a tree?

PART B

Answer any FIVE questions :

(5×6= 30)

- 7) What is a recursive function? Explain the factorial calculation problem using recursion.
- 8) Explain calloc() function with its syntax and example.
- 9) Consider an array of integers: 23 15 29 11 2
Sort the array using insertion sort.
- 10) With an example, explain Enqueue operation on a Circular Queue.
- 11) Explain two methods of binary tree representation with an example.
- 12) Write a program to find the GCD using recursion.

PART C

Answer any TWO questions :

(2×10= 20)

- 13) Explain insertion and deletion operations in a singly linked list.
- 14) (a) Write an algorithm to convert an infix expression to postfix expression.
(b) Evaluate the postfix expression: 20 50 3 6 + * * 300 / 2 -
- 15) (a) Write the rules for In-order and Post-order traversal.
(b) Construct a binary search tree using the following traversal.
Preorder : A B D G E H I J C F
Inorder : D G B E I H J A C F

21MICC201

Reg No :

**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SECOND SEMESTER DEGREE EXAMINATION MAY 2024**

MICROBIOLOGY

Microbial Biochemistry and Physiology

Duration:2 Hours

Max Marks:60

SECTION - A

Answer the following strictly observing the internal choice provided:

4×5=20

UNIT 1

- 1) Comment on covalent bond.

OR

- 2) List the applications of buffer.

UNIT 2

- 3) Write a brief note on heteropolysaccharides.

OR

- 4) Define vitamins. Mention the different types of vitamins.

UNIT 3

- 5) Write short notes on ion channels.

OR

- 6) Write short notes on spectrophotometer.

UNIT 4

- 7) Write the C3 Cycle.

OR

- 8) Write short notes on lactic acid fermentation.

SECTION - B

Answer the following strictly observing the internal choice provided:

4×10=40

UNIT 1

- 9) Enumerate the properties of water.

OR

- 10) Explain acids and bases with suitable examples.

UNIT 2

11) Describe the structure of proteins.

OR

12) Give a detailed account on lipids.

UNIT 3

13) Explain the nutritional requirements of bacteria.

OR

14) Explain in detail about passive transport.

UNIT 4

15) Explain oxidation and reduction reactions with suitable examples.

OR

16) Give a detailed account of glycolysis.

21MATC201

Reg No :

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SECOND SEMESTER DEGREE EXAMINATION MAY 2024
MATHEMATICS

Number Theory, Algebra, Calculus II

Duration:2 Hours

Max Marks:60

PART - A

I. Answer any 6 questions. Each question carries 2 marks: (2×6= 12 Marks)

- Find the sum of positive integers less than 190 and relatively prime to 190.
- Find the value of $\phi(100)$.
- Let $G = \mathbb{Z}$. Define $*$ by $a * b = a + b - ab$. Check whether $*$ is commutative and associative.
- Prove that if G is a group such that $a^2 = e, \forall a \in G$ then G is abelian.
- Find the domain of definition of the function :
(i) $z = f(x, y) = \frac{1}{\sqrt{x^2+y^2-16}}$ (ii) $z = f(x, y) = \log(x + y)$
- Find $f_y(x, y)$ if $f(x, y) = e^{ax} \sin by$.
- Evaluate $\int_{\frac{\pi}{2}}^{\pi} \int_0^x \sin(4x - y) dy dx$.
- Evaluate the line integral
 $\int_C F \cdot dR; f(x, y) = y\hat{i} + x\hat{j}, R(t) = t\hat{i} + t^2\hat{j}, 0 \leq t \leq 1$.

PART - B

2. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- State and prove Wilson's theorem.
- Is converse of Fermat's theorem true? Justify your answer.
- Find the last two digits in the decimal representation of 3^{256} .
- Represent $\frac{71}{55}$ as a simple continued fraction.

PART - C

3. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. Show that for any subset A of G , the normalizer $N(A)$ of A is a subgroup of G .
- b. Prove that G is an abelian group if and only if $(a \cdot b)^2 = a^2 \cdot b^2 \quad \forall a, b \in G$.
- c. Let H and K be any two subgroups of a group G . Prove that HK is a subgroup of G if and only if $KH = HK$.
- d. Prove that any subgroup of a cyclic group is cyclic.

PART - D

4. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. If $u = e^x(x \cos y - y \sin y)$, show that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$.
- b. If $u = \sin^{-1} \frac{x^2+y^2}{x+y}$, then show by Euler's theorem that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \tan u$.
- c. Find $\frac{dw}{dt}$ as a function of t , both by using the chain rule and by expressing w in terms of t and differentiating directly with respect to t . Also find $\frac{dw}{dt}$ at the given point, $w = \frac{x}{z} + \frac{y}{z}$, $x = \cos^2 t$, $y = \sin^2 t$, $z = \frac{1}{t}$, $t = 3$
- d. Determine the relative extrema of $f(x, y) = x^2 - 4xy + y^3 + 4y$ if there are any.

PART - E

5. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. Find the volume of the solid in the first octant bounded by the cone $z = r$ and the cylinder $r = 3 \sin \theta$.
- b. Find the surface area of top half of the sphere $x^2 + y^2 + z^2 = a^2$.
- c. Find the volume of the solid in the first octant bounded below by the xy plane, above by the plane $z = y$ and laterally by the cylinder $y^2 = x$ and the plane $x = 1$.
- d. Evaluate $\int_C (x^2 + xy)dx + (y^2 - xy)dy$ where C is the line $y = x$ from the origin to the point $(2, 2)$.

21MATE22

Reg No :

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.A./B.Com./B.B.A/B.C.A. SECOND SEMESTER DEGREE EXAMINATION MAY 2024

Business Mathematics II

Duration:2 Hours

Max Marks:60

PART - A

I. Answer any 8 questions . Each question carries 3 marks: (3×8= 24 Marks)

- a. At what rate of simple interest a certain sum will be doubled in 15 years.
- b. Find the compound interest on Rs.10000 in two years at 4% per annum, the interest being compounded half yearly.
- c. Check whether 246591 is divisible by 9.
- d. In a caravan, in addition to 50 hens there are 45 goats and 8 camels with some keepers. If the total number of feet be 224 more than the number of heads, find the number of keepers.
- e. Given that $268 \times 74 = 19832$, find the value of 2.68×0.74
- f. Which of the following are prime numbers?
(i) 571 (ii) 337 (iii) 391
- g. The average weight of 16 boys in a class is 50.25kgs and that of the remaining 8 boys is 45.15kgs. Find the average weight of all the boys in the class.
- h. A bus leaves at 12.25 noon and reaches destination at 10.45am. Find the duration of the journey.
- i. A takes twice as much time as B or thrice as much time as C to finish a piece of work. Working together, they can finish the work in 2 days. In how many days B alone can complete the work .
- j. A car covers a distance of 432km at the speed of 48km/hr. In how many hours will the car cover this distance?
- k. A train 132m long passes a telegraph pole in 6 seconds. Find the speed of the train.
- l. Find the angle between the hour hand and the minute hand of a clock when the time is 3.25.

PART - B

2. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. Find the simple interest on Rs.700 at 8 % for one year one month (June) and six days.

- b. Find the sum of money which will amount to Rs.26010 in six months at the rate of 8% per annum when the interest is compounded quarterly.
- c. Find the sum of an immediate annuity consisting of six annual payments of Rs. 400 , if the rate of interest is 5% compounded annually.
- d. Shwetha avails a loan of Rs. 100000 at an interest rate of 8% per annum to be paid back in 3 years.As per this flat rate method shwetha will pay the interest on the total loan amount of Rs.100000. Calculate EMI using reducing balance method.

PART - C

3. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. When a certain number is multiplied by 18, the product consists entirely of 2's. Find the smallest such number.
- b. The sum of seven consecutive natural numbers is 1617. How many of these numbers are prime?
- c. The ratio of the present ages of a mother and her daughter is 7 : 1 . Four years ago, the ratio of their ages was 19 : 1. What will be the mother's age four years from now?
- d. A library has an average of 510 visitors on Sundays and 240 on other days. Find the average number of visitors per day in a month of 30 days beginning with a Sunday.

PART - D

4. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. A can do a piece of work in 8 days and B can do the same piece of work in 12 days. A and B together complete the same piece of work and get Rs.200 as the combined wages. Find the share of B.
- b. A man riding his bicycle covers 150 metres in 25seconds. What is his speed in km per hour?
- c. It was Sunday on Jan 1, 2006. What was the day of the week on Jan 1, 2010.
- d. A man takes 3hours 45 minutes to row a boat 15km downstream of a river and 2 hours 30minutes to cover a distance of 5km upstream. Find the speed of the river current in km/hr.

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SECOND SEMESTER DEGREE EXAMINATION MAY 2024

Mathematics - II

Duration: 2 Hours

Max Marks: 60

PART - A

I. Answer any 8 questions. Each question carries 3 marks: (3×8= 24 Marks)

- a. Define group.
- b. If $f(x,y)=x^2+xy^2$ then find the partial derivative of f with respect x .
- c. Define binary operation.
Give an example of a binary operation on \mathbb{Z} , the set of integers.
Also give an operation which is not a binary operation on \mathbb{Z} .
- d. Define subgroup. Prove that the set \mathbb{Z} of all integers form a subgroup of $(\mathbb{Q}, +)$ where \mathbb{Q} is the set of all rational numbers.
- e. Find the domain of definition of the function :
(i) $z = f(x, y) = \sqrt{x^2 + y^2 - 4}$ (ii) $z = f(x, y) = \log(x + y)$
- f. Find $f_x(x, y)$ if $f(x, y) = y \tan^{-1}(x + y)$.
- g. Evaluate $\int_1^2 \int_1^2 (2x^2 - 3y) dx dy$.
- h. Evaluate $\int_0^1 \int_0^2 \int_0^3 x dx dy dz$.
- i. Evaluate $\int_0^1 \int_0^1 (x - 3) dx dy$.
- j. Evaluate $\int_0^1 \int_0^1 \int_0^1 dx dy dz$.

PART - B

3. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. Let G be a set with a binary operation which is associative.
Assume that G has a right unit element and every element of G has a right inverse. Prove that G is a group.
- b. Let $a \in G$. Then show that $N(a)$ is a subgroup of G .

- c. If H and K are finite subgroups of G such that $G = HK$ and $H \cap K = \{e\}$, then prove that $o(G) = o(H)o(K)$.
- d. Prove that any subgroup of an infinite cyclic group is also an infinite cyclic group.

PART - C

4. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. If $\sin v = \frac{x+2y+3z}{\sqrt{x^8+y^8+z^8}}$, show by Euler's theorem that $x \frac{\partial v}{\partial x} + y \frac{\partial v}{\partial y} + z \frac{\partial v}{\partial z} + 3 \tan v = 0$.
- b. If $u = \log_e \sqrt{x^2 + y^2 + z^2}$, prove that $(x^2 + y^2 + z^2) \left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} \right) = 1$.
- c. Find $\frac{dw}{dt}$ as a function of t , both by using the chain rule and by expressing w in terms of t and differentiating directly with respect to t . Also find $\frac{dw}{dt}$ at the given point, $w = x^2 + y^2, x = \cos t, y = \sin t, t = \pi$.
- d. Determine the relative extrema of $f(x, y) = x^3 + y^2 - 6x^2 + y - 1$ if there are any.

PART - D

5. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

- a. Evaluate $\int_0^1 \int_0^x \int_0^{x+y} (x + y + z) dz dy dx$.
- b. Find the area of the portion of the surface of the plane $36x + 16y + 9z = 144$ which is cut by the co-ordinate plane.
- c. Find by double integration, the area of the region enclosed by one leaf of the rose $r = \sin 3\theta$.
- d. Evaluate $\int_C 4xy dx + (2x^2 - 3xy) dy$, if the curve C is the first quadrant arc of the circle $x^2 + y^2 = 1$ from $(1, 0)$ to $(0, 1)$.

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SECOND SEMESTER DEGREE EXAMINATION MAY 2024

CHEMISTRY

Inorganic and Physical Chemistry - I

Duration: 2 Hours

Max Marks: 60

PART - A

I. Answer any Six from the following :

(2×6= 12 Marks)

1. What is shielding effect? Which orbitals show greatest shielding effect?
2. Write the electronic configuration of Cu (At No.29).
3. Give reason: Be and N in the II period have first ionisation energy greater than expected.
4. Draw the structure of silica.
5. Write the expression for specific and molar refraction.
6. Define most probable velocity and average velocity.
7. State Nernst distribution law. Write its expression.
8. What are nematic liquid crystals?

PART - B

II. Answer any SIX of the following choosing at least one question from each unit:

(6×8= 48 Marks)

UNIT I

9. a) What is quantum number? Name the different quantum numbers and give their significance.
b) Discuss the sign of angular wave function. (5+3)
- 10 a) Derive the de Broglie equation and explain its significance. ~
b) Discuss the postulates of wave mechanical model of an atom. (4+4)

UNIT II

11. a) Discuss the trends in electron affinity along the period and down the group in p block elements.
b) Write a brief note on the oxides of group 17.(4+4)

- 12 a) What are the applications of electronegativity?
b) Give an account of halides of Group 13. (4+4)

UNIT III

13. a) Derive the reduced equation of state.
b) Write Van der waal's equation of state for n moles of real gas and write the significance of the van der waal constants a and b. (4+4)
- 14 a) State the assumptions of kinetic theory of gases.
b) In the determination of surface tension of a liquid by drop number method, it gives 65 drops while water gave 35 drops for the same volume. The densities of liquid and water are $0.996 \times 10^3 \text{ kg/m}^3$ and $0.8 \times 10^3 \text{ kg/m}^3$. Find the surface tension of the liquid if the surface tension of water is $72 \times 10^{-3} \text{ N/m}$. (5+3)

UNIT IV

15. a) How is distribution law modified when the solute molecule undergoes association in one of the solvents?
b) How is crystal structure determined using single crystal method? (4+4)
- 16 a) Define Miller indices. Calculate the Miller indices of a plane which makes intercepts 2a, 1b and is parallel to the z axis.
b) Name the different Bravais lattices of a cube. (5+3)

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.A./B.Com./B.B.A./B.C.A SECOND SEMESTER DEGREE EXAMINATION MAY 2024

CHEMISTRY

Molecules of Life

Duration:2 Hours

Max Marks:60

PART A

I. Answer any FIVE of the following:

5×2= 10

- 1 Define denaturation of proteins.
- 2 What are oligosaccharides? Give an example.
- 3 Give two biological importance of steroids.
- 4 Give two biological importance of glycolipids.
- 5 Mention two biological functions of nucleic acids.
- 6 Write the types of RNA.

PART B

II. Answer any FIVE of the following choosing at least one question from each Unit. 5×10= 50

UNIT I

- 7 a. Explain the classification of amino acids based on biological importance.
b. Write a note on the importance of carbohydrates.
c. With an example explain anomers. (4+3+3)
- 8 a. Write a short note on starch.
b. Write the classification of proteins based on the structure.
c. Write a note on conversion of food into energy. (4+3+3)

UNIT II

- 9 a. Write a note on the importance of proteins.
b. Write the chemical properties of fructose.
c. How is the primary structure of peptides determined? (4+3+3)
- 10 a. Explain the classification of lipids.
b. Write a note on co enzymes and cofactors in biological reactions. (5+5)

UNIT III

- 11 a. Explain the following terms disaccharides and polysaccharides with examples.
b. Write any five biological importances of triglycerides. (5+5)
- 12 a. Write a note on lock and key model.
b. Write any five biological importances of phospholipids. (5+5)

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SECOND SEMESTER DEGREE EXAMINATION MAY 2024

BOTANY

Diversity of Non-flowering Plants

Duration:2 Hours

Max Marks:60

I. Answer any Five of the following :

(5×2= 10 Marks)

1. Name the algae used in the production of antibiotics.
2. Define (i) Endophytes (ii) Parasitic algae
3. Write any two economic importance of bryophytes.
4. What is moss flower?
5. Write any two angiospermic features of *Gnetum*.
6. Write any four characteristic features of Gymnosperms.
7. List any two techniques to study fossils.
8. Give any two primitive features of *Rhynia*.

II. Answer any FOUR of the following :

(4×5= 20 Marks)

9. Explain asexual reproduction in *Oedogonium*.
10. Draw a neat labelled diagram of T.S. of *Sargassum* leaf.
11. Describe the structure of sporocarp in *Marselia*.
12. Explain the structure of sporophyte of *Anthoceros*.
13. Explain the internal anatomy of *Equisetum* stem.
14. Explain the structure of female cone in *Cycas*.
15. What is a fossil? What is their significance?
16. What is a geological time? How did plants get evolved through this time scale?

III. Answer any THREE of the following :

(3×10= 30 Marks)

17. Write a note on Diatoms and their importance.
18. List the characteristic features of Pteridophytes.
19. What is heterospory? Write a detailed note on it.
20. Give the stelar evolution in pteridophytes.

21PHYC201

Reg No :

**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SECOND SEMESTER DEGREE EXAMINATION MAY 2024**

PHYSICS

Electricity and Magnetism

Duration:2 Hours

Max Marks:60

PART - A

Answer any five questions, selecting minimum of one question from every unit: 5×9=45

UNIT I

- 1 a) Is there any electric field present inside a conductor? Explain.
b) Define capacitance. Derive an expression for capacitance of a parallel plate capacitor. (2+7)
- 2 a) What are active circuit elements? Give example.
b) Derive an expression for the charge in a CR circuit while charging and define the time constant. (2+7)

UNIT II

- 3 a) How do you estimate the potential due to a volume charge distribution?
b) Derive an expression for potential due to electric quadrupole. (2+7)
- 4 a) Write a note on Lorentz force.
b) Derive an expression for coefficient of mutual inductance of two solenoids. (2+7)

UNIT III

- 5 a) Why is a series resonance circuit called an acceptor circuit while a parallel resonance a rejector circuit?
b) Derive an expression for the resonance frequency for a series LCR circuit in terms of the geometric mean of the half power frequencies. (2+7)
- 6 a) Deduce the expression for r.m.s value of alternating current.
b) What is a low pass filter? Explain how a CR circuit can be used as a low pass filter and obtain the expression for cut-off frequency. (2+7)

UNIT IV

- 7 a) State the physical significance of Curl.
 b) Write Ampere's circuital law in vector form and show that it is inconsistent with the equation of continuity when displacement current is considered. (2+7)
- 8 a) How materials are classified depending upon their magnetic properties?
 b) Prove the law of energy of electromagnetic wave using Poynting theorem. (2+7)

PART - B

Answer any three questions:

3×5= 15

- 9 A capacitor with a capacitance of $5\mu\text{F}$ is discharged through a coil of self inductance 0.4H and a resistor. What must be the maximum resistance of the circuit in order that discharge is critically damped?
- 10 The electric potential in space is given by $V = 3x + 4y - 7z$. Obtain the expression for potential gradient and electric intensity.
- 11 Calculate the cut off frequency for a RC high pass filter consisting of an 82 pF capacitor connected in series with a $240\text{ K}\Omega$ resistor. Also design a RC high pass filter for a cut off frequency 1 kHz using a capacitor of $0.2\text{ }\mu\text{F}$.
- 12 If $\phi = 3x^2y - y^3z^2$ and $F = 2x^2y - xy^2$, find $\nabla\phi$ and ∇F at $(1, -2, -1)$.

21PHYE21

Reg No :

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.A./B.Com./BBA/BCA SECOND SEMESTER DEGREE EXAMINATION MAY 2024

PHYSICS

Energy Sources

Duration:2 Hours

Max Marks:60

PART A

Answer any 5 questions. Each question Carries 3 marks:

5×3= 15

- 1 Explain the principle of functioning of Solar green house.
- 2 Write a note on Solar Pond.
- 3 Define the nature of wind.
- 4 Mention the types of Ocean energy.
- 5 Draw a schematic diagram of geothermal plant.
- 6 What is ocean biomass? Give the food chain of the same.

PART B

Answer any 5 questions. Each question Carries 9 marks:

5×9= 45

- 7 Explain in detail a Solar distiller. Give any three advantages and disadvantages of the same.
- 8 Describe the formation of petroleum and Natural gas. What are its uses?
- 9 With a relevant diagram explain the working of a Solar cell.
- 10 Mention the disadvantages of tidal energy.
- 11 Mention major components of hydro electric plant and explain how hydro energy is converted into electrical energy.
- 12 What are the problems encountered when wind energy is converted into electrical energy.
