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3-1-101A-R23

FOUR YEAR B.Sc. DEGREE EXAMINATION, JANUARY - 2024

CHOICE BASED CREDIT SYSTEM

FIRST SEMESTER

PART - I

PAPER - I : ESSENTIALS AND APPLICATION OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

(Common to Mathematics, Statistics, Chemistry, Computer Science, Data Science, Electronics and Physics)

(Under CBCS New Regulation w.e.f the academic year 2023-24)

Time : 3 Hours

Max. Marks : 75

SECTION - A

Answer any Five of the following questions. Each question carries equal marks.

$(5\times5= 25)$

1. Define Mechanics and discuss Newtonian Mechanics.
2. Draw a neat Diagram of Electromagnetic waves with labelled
3. Write a note on classification of matter with examples.
4. Give a list of Monosaccharides.
5. Write the importance of chemistry in Materials Science.
6. What is the role of physics in Aerospace industries?
7. Discuss the various types of Networks.
8. Write a note on Cryptography.
9. Find the modular and amplitude form of $3+2i$
10. Find the vector product of vectors $2i+3j+4k$ and $3i+4j+2k$.

SECTION - B

Answer All the questions. Each Question carries equal marks.

$(5\times10=50)$

11. a) Discuss the laws of thermodynamics and significance

(OR)

   b) Write a note on the following
      i) Wave particle duality
      ii) Nuclear particles

12. a) Discuss the Modern periodic table based on electronic configuration.

(OR)

b) Write a note on the following

i) Fats

ii) Vitamins

13. a) Write the applications of physics in the Electronics and semiconductor industry.

(OR)

b) Write the applications of chemistry in the Food and Beverage industry.

14. a) Define Internet and discuss role of internet in computer evolution

(OR)

b) Write a note on

i) Malware

ii) Fraud Techniques.

15. a) In triangle ABC, $\underline{B} = 90°$ and BA =3, BC=4 and AC= 5 then find

i) All trigonometric ratios of angle B and

ii) Verify $\sin^2 B + \cos^2 B = 1$

(OR)

b) Find the mean, median and mode of the following data.

Class interval	40-50	50-60	60-70	70-80	80-90
Frequency	5	12	23	8	2

FOUR YEAR B.Sc. DEGREE EXAMINATION, JANUARY - 2024

CHOICE BASED CREDIT SYSTEM

FIRST SEMESTER

PART - II

PAPER- II: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

(Common to Mathematics, Statistics, Chemistry, Computer Science, Data Science, Electronics and Physics)

(Under CBCS New Regulation w.e.f the academic year 2023-24)

Time : 3 Hours   Max. Marks : 75

SECTION - A

Answer any Five of the following questions. Each question carries equal marks.

(5×5=25)

1. Write a note on Nanosensors.

2. Discuss impact of chemical pollutants on ecosystem.

3. Write a note on solid waste management.

4. Write the recent advances in biophysics.

5. Discuss energy efficient materials and devices.

6. Discuss application of medical physics.

7. Give detailed use of the Binary Number system on Advance level.

8. Define Signals and explain working of Digital Modem.

9. Find the point of intersection of the lines x+y=1 and x-y=3.

10. Find the derivative of the function $x^2 e^x$

SECTION - B

Answer All the questions. Each question carries equal marks.   (5×10=50)

11. a) Write a note on Recent advances in the field of nanotechnology.

(OR)

   b) Discuss about Quantum dots.

12. a) Write a note on Dye removal through the catalysis method.

(OR)

b) Discuss the impact of chemical pollutants on Human health.

13. a) Discuss Mathematical modeling applications in physics.

(OR)

b) Discuss Mathematical modeling applications in chemistry.

14. a) Write a note on the following Networking devices

   i) Repeater

   ii) Router.

(OR)

b) Write a note on the following Networking devices

   1) Bridge

   2) Hub

15. a) Evaluate the following integrals

   i) $\int \sin^2 x \, dx$ and

   ii) $\int (x^2 + 2x - 3)^2 (x+1)dx$

(OR)

b) Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$. Then verify that

   i) $(AB)^T = B^T A^T$ and

   ii) $\det(AB) = (\det A)(\det B)$