

UKA TARSADIA UNIVERSITY

B. Pharm. (1st Semester)

Subject : 030020105 - Elementary (Remedial) Mathematics

Time : 2.30 pm to 5.30 pm

Date : 31/05/2014

Duration: 3 Hours

Max. Marks: 70

Instructions:

1. Attempt all questions.
2. Write each section in a separate answer book.
3. Make suitable assumptions wherever necessary.
4. Figures to the right indicate full marks allocated to that question.
5. Draw diagrams/figures whenever necessary.

Section-1

Q-1 (A) Do as Directed

[07]

- I) When the both real roots of quadratic equation are same?
- II) If $\begin{vmatrix} 1 & -3 \\ x & 4 \end{vmatrix} = 22$ then find the value of x.
- III) Explain Diagonal Matrix.
- IV) Why the standard deviation gives the better dispersion value compare to mean deviation?
- V) Explain mutually exclusive events.
- VI) Evaluate ${}^9C_3 + {}^9C_2$
- VII) Verify that $\sin^2 30^\circ + \sin^2 45^\circ + \sin^2 60^\circ = 3/2$

Q-1 (B) Do as Directed (Any Four)

[08]

- I) Solve the following simulation of equations
 $x^2 + 5x + y = 4$, $x + y = 8$
- II) If $A = \begin{bmatrix} 1 & 0 & -1 \\ -2 & 1 & 1 \\ 1 & -1 & 0 \end{bmatrix}$ then find A^2 .
- III) Find standard deviation for the following data: 23, 27, 12, 17, 32, 18, 27, 30, 11, 25 .
- IV) Find the value of r for ${}_5P_{r-1} : {}_4P_r = 5 : 6$
- V) If $P(A) = 0.4$, $P(B) = p$ and $P(A \cup B) = 0.7$, find the value of p such that A and B are independent.
- VI) Evaluate $\cot (15\pi/4)$.

Q - 2 Answer the following.

- (A) Prove that $\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ bc & ca & ab \end{vmatrix} = (a-b)(b-c)(c-a)(ab+bc+ca)$ [05]

OR

- (A) The following data shows the monthly expenditure of 80 students of a university hostel on morning breakfast. Calculate coefficient of variation.

Expenditure	78-82	73-77	68-72	63-67	58-62	53-57	48-52	43-47	38-42	33-37
Students	2	6	7	12	18	13	9	7	4	2

- (B) 100 tablets are found to be defective out of 5000 tablets. Find the probability that the box of 100 tablets contains (i) at least 2 defective tablets (ii) at most 3 defective tablets (ii) exactly 5 defective tablets. [05]

OR

- (B) Prove that $2\sin^2 (3\pi/4) + 2\cos^2 (\pi/4) + 2\sec^2 (\pi/3) = 10$

Q - 3 Answer the following. (Any Two)

[10]

- A) If $A = \begin{bmatrix} -2 & 5 \\ 4 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 1 \\ -2 & 2 \end{bmatrix}$ then show that $(AB)^{-1} = B^{-1} A^{-1}$
- B) Using binomial expansion prove that
(i) $(\sqrt{2} + 1)^5 - (\sqrt{2} - 1)^5 = 82$ (ii) $(\sqrt{2} + 1)^6 - (\sqrt{2} - 1)^6 = 198$
- C) Prove that $\sin 4\theta = 1 - 8\cos^2 \theta + 8\cos^4 \theta$

Section-2

Q-4 (A) Do as Directed

[07]

- I) What is the relation between slopes when two straight lines are perpendicular to each other?
- II) Explain collinear points.
- III) Find, $\lim_{x \rightarrow 2} \frac{x^2 + x - 6}{x^2 - 4}$
- IV) If $y = 2x^3 + 5x - 7$ then find $\frac{d^2y}{dx^2}$
- V) If $f(x) = \sec^{-1}x$ then what is the value of $f'(x)$?
- VI) Evaluate $\int \frac{(\log x)^3}{x} dx$
- VII) What is the differential equation for all circle touching the x-axis at the region.

Q-4 (B) Do as Directed (Any Four)

[08]

- I) Find the equation of line passing through the points U(-3,6) and V(5, -4)
- II) If G(2,3) is the centroid of ΔABC . If A(5,6) and B(-1,4) are vertices of ΔABC , find the coordinates of vertex C.
- III) Find $\lim_{x \rightarrow 0} 2 + \frac{1}{3 + \frac{4}{x}}$
- IV) If $y = \frac{\sqrt{1+x}}{\sqrt{1-x}}$ then find dy/dx
- V) Evaluate $\int e^{2x} \cos 4x dx$
- VI) Verify that $y = e^x$ is the solution of $d^2y/dx^2 - y = 0$

Q - 5 Answer the following.

- (A) If (4,-1), (7,1) and (-2,6) are the mid-points of the sides of a triangle, find the coordinates of its vertices and the coordinates of its centroid.

[05]

OR

- (A) Find $x^2 + y^2 = 1$ then prove that $x^2 \frac{d^2y}{dx^2} = n(n+1)y$

- (B) Evaluate $\int \frac{2x-1}{x^4+x^2+1} dx$

[05]

OR

- (B) Solve the following differential equation
 $dy/dx = (y/x) + \tan(y/x)$

Q - 6 Answer the following. (Any Two)

[10]

- (A) Find the area of triangle having the vertices as follows:
(1,-1), (2,5) and (7,-3)
- (B) Find the n^{th} derivative of $e^x \sin x \sin 2x$
- (C) Solve the differential equation
 $\operatorname{cosec} x \frac{dy}{dx} = y + \cos x$