

UKA TARSADIA UNIVERSITY

B.Pharm. (1st Semester)

Subject :030020105 - Elementary (Remedial) Mathematics

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) Give an example of quadratic equation.
- II) Evaluate $\begin{vmatrix} x+y & x \\ x & x-y \end{vmatrix}$
- III) What is the necessary condition for the multiplication of two matrices?
- IV) Define: Variance
- V) When can we say that two events are independent?
- VI) If $P(A) = 0.4$ then find $P(A')$.
- VII) Find the 12th term of the arithmetic progression 2, 7, 12, 17, 22,

Q-1 (B) Answer the following in brief. (Any 4)

[08]

- I) Write the expansion of $(2x + \frac{3}{x})^4$.
- II) In many ways, we can arrange 8 women on a round table such that they have not same neighbors in any two arrangements.
- III) An urn contains four red balls, three green balls, and five white balls. If a single ball is drawn, what is the probability that it is green?
- IV) If $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \\ 2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, then calculate AB.
- V) What do you mean by determinant and order of determinant?
- VI) Find the value of $6P_2 \times 7P_2$.

Q-2 Answer the following.

[10]

- A) A pharmaceutical factory kept increasing its output by the same percentage every year. Find the percentage if it is known that the output doubled in the last two years.

OR

- A) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then prove that $A^2 - 5A + 7I = O$ where I and O are identical and zero matrices respectively.

- B) Solve the following system of equations using Cramer's rule:
 $x + 2y + 3z = 6, 2x + 4y + z = 7$ and $3x + 2y + 9z = 14$

OR

- In a group of students there are 4 girls and 6 boys. In how many ways a committee of five members can be formed such that (1) there are at least 3 girls (2) there are at the most 3 boys in the committee.

Q-3 Answer the following in detail. (Any 2)

[10]

- A) Calculate standard deviation from the following data:

20-30	30-40	40-50	50-60	60-70	70-80	80-90
3	61	132	153	140	51	2

12% of the tablets produced by a tablet machine are defective. Find the probability that
 B) out of a random sample of 20 tablets produced by the machine, (1) exactly 5 are defective? (2) at least 2 are defective.

C) Using binomial expansion, prove that $(\sqrt{2} + 1)^5 - (\sqrt{2} - 1)^5 = 82$.

Section-2

Q-4 (A) Do as directed.

[07]

- I) Define order and degree of differential equation.
- II) Write down the integration by parts formula.
- III) Find $\frac{dy}{dx}$, if $y = \sin^{-1}(5x^2)$.
- IV) Find the slope of the line perpendicular to the line $2y + 6x = 24$.
- V) What is the distance between the points (3, -2) and (6, 4).
- VI) When can we say that three points are collinear?
- VII) In a right angle triangle ABC, $\angle B = 90^\circ$ and $\cos \theta = \frac{9}{4}$. Find $\sin \theta$.

Q-4 (B) Answer the following in brief. (Any 4)

[08]

- I) Find $\sin \theta$ if $\cos \theta = -\frac{12}{5}$, if θ lies in the third quadrant.
- II) Find the value of $\sin^2 45^\circ + \cos^2 45^\circ + \tan^2 30^\circ$
- III) Differentiate $y = x^x$ with respect to x .
- IV) Evaluate $\int_1^3 (3x^2 + e^x) dx$
- V) Find the equation of a line with slope $\frac{1}{3}$ and passing through (-2, 7)
- VI) Find the slope and both intercepts of the line $2x + 5y = 11$.

Q-5 Answer the following.

[10]

- A) Find the equation of a line passing through the points (-3, 5) and perpendicular to the line passing through the points (2, 5) and (-3, 6).

OR

- A) If (3, k), (9, 3) and (5, 2) are vertices of a triangle whose area is 7 sq. units, find the value of k.

- B) Evaluate the following expression
 $\cos 3\frac{\pi}{2} + \sin 3\frac{\pi}{2} \operatorname{cosec} 3\frac{\pi}{2} + \cot 3\frac{\pi}{2}$.

OR

- B) Find the values of $\cos 15^\circ$ and $\cos 75^\circ$.

Q-6 Answer the following in detail. (Any 2)

[10]

- A) Find $\frac{d^2y}{dx^2}$ when $\theta = 0$ given that $y = 4 \sec 2\theta$
- B) Evaluate $\int \frac{\sin 2x}{\sin^4 x + \cos^4 x} dx$
- C) Show that $y = ae^x + be^{2x}$ is the solution of $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = 0$.