

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) Determine the value of $\begin{vmatrix} 3 & -2 \\ 7 & 4 \end{vmatrix}$
- II) Let $ax^2 + bx + c = 0$ be quadratic equation and $b^2 - 4ac = 0$, then comment on the root of the quadratic equation.
- III) Give an example of null matrix.
- IV) Find the range for the following data:
120, 130, 120, 110, 100 and 120.
- V) If we toss a coin, then what is the probability of obtaining head?
- VI) In a right angle triangle ABC, $\angle B = 90$ and $\cos \theta = \frac{9}{4}$. Find $\sin \theta$.
- VII) What is the major difference between matrix and determinant?

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

[08]

- I) Solve the equation: $5x^2 - 2x - 4 = 0$.
- II) Find x and y if $\begin{bmatrix} x+y & 4 \\ x-y & 1 \end{bmatrix} = \begin{bmatrix} 1 & 4 \\ 0 & 1 \end{bmatrix}$
- III) If $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$ then find A^{-1} .
- IV) A student has seven books on his desk. In how many different ways can he selected a set of three?
- V) If $P(A) = \frac{1}{3}$, $P(B') = \frac{1}{4}$ and $P(A \cap B) = \frac{1}{6}$ then $P(A \cup B)$.
- VI) Prove that $\sin^2 \theta \cot \theta \sec \theta = \sin \theta$.

Q-2 Answer the following.

[10]

- A) Solve the following simultaneous equations using Cramer's rule.
 $x + y + z = 4$; $2x - 3y + 4z = 33$; $3x - 2y - 2z = 2$.

OR

- A) Solve the following equations

$$\frac{1}{x+1} + \frac{1}{x+2} = \frac{1}{x+3}.$$

- B) Show that $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ satisfies the equation $A^2 - 4A - 5I = O$, where I and O are identity and zero matrix respectively.

OR

Find the standard deviation of the following distribution:

B) Age	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50
Frequency	170	110	80	45	40	35

Q-3 Answer the following in detail. (Any 2)**[10]**

- A Sortie of 20 aero planes is sent on an operational flight. The chance that an aero plane fails to return is 5%. Find the probability that (1) one plane does not return (2) at the most five planes do not return.
- B) Find the value of $\cos 15^\circ$ and $\cos 75^\circ$.
- C) If $\cot \theta = -\frac{12}{5}$ and θ lies in second quadrant, find the value of other five trigonometric function.

Section-2**Q-4 (A) Do as directed.****[07]**

- I) What is the distance between the points (2,-1) and (3,1)?
- II) Write down the condition of collinearity of three points.
- III) Find the slope of the line passing through the point (a, b) and (b, a).
- IV) When we can say two functions are equal?
- V) What is the value of $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1}$?
- VI) Differentiate the function $2y^4$ with respect to x .
- VII) What is the slope of the line perpendicular to the line $2x - 5y + 3 = 0$.

Q-4 (B) Answer the following in brief. (Any 4)**[08]**

- I) Check whether the following function is one-one :
 $f: \mathbb{R} \rightarrow \mathbb{R}, f(x) = x^2$
- II) Evaluate $\lim_{x \rightarrow \infty} \frac{x^2 - x + 3}{2x^3 + 1}$
- III) Integrate the function $\frac{1}{3(\sqrt{x})}$ with respect to x .
- IV) What is the difference between explicit and implicit function?
- V) Find the equation of the line which is parallel to y -axis and passing through the point (3,-4).
- VI) If the distance between A(5, a) and B(2, 6) is $3\sqrt{2}$, find the value of a .

Q-5 Answer the following.**[10]**

- A) Find the area of the quadrilateral with vertices A(1, 6), B(5, 2), C(12, 9), D(8, 13)

OR

- A) Find the equation of a line passing through the point of intersection of the lines $y = 2x + 1$ and $y = x + 2$ and which is parallel to $y = 4x + 7$
- B) Show that the vertices of a triangle (7, 9), (3, -7) and (-3, 3) form a right angled isosceles triangle.

OR

- B) Prove that $\frac{d[2x \tan^{-1} x - \log(1+x^2)]}{dx} = 2 \tan^{-1} x$

Q-6 Answer the following in detail. (Any 2)**[10]**

- A) If $y = 3\cos(\log x) + 4\sin(\log x)$ prove that $x^2 y_2 + x y_1 + y = 0$
- B) Evaluate : $\int \frac{dx}{x\sqrt{x^2+1}}$
- C) Evaluate : $\int_0^1 \frac{x(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx$