

# 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  
 A) 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  $\theta$  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 can we 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-to-one :  
 $f: z \rightarrow z, f(x) = x^2$   
 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 :  $\int_0^1 \frac{x(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx$