

## Question Bank (G scheme)

Name of subject: Applied Mathematics

Unit Test :II

Subject code: 17301

Course :CH/CM/EJ/IE/IF/IS/ME

Semester: III

### Chapter 1 (APPLICATION OF INTEGRATION)[8 MARKS]

#### **3 marks-**

- 1) Find the area bounded by the curve  $y = 3x - 2$  from  $x = 1$  to  $x = 3$ .
- 2) Find the area bounded by the parabola  $y = x^2 - 2x$  with  $x$ - axis.
- 3) Find the area bounded under the curve  $y = x^3 - 5x^2 + 4x$  from  $x = 0$  to  $x = 3$ .
- 4) Find the area bounded by the parabola  $y^2 = 4ax$  with its latus-rectum.

#### **4 marks-**

- 1) Find the area of the circle  $x^2 + y^2 = 25$  using integration.
- 2) Find the area of the ellipse  $9x^2 + 4y^2 = 36$  using integration.
- 3) Find the area bounded by the parabola  $y^2 = 4x$  and the line  $2x - y = 4$ .
- 4) Find the area of the circle  $y^2 - 2x = 0$  and  $y^2 + 4x - 12 = 0$ .
- 5) Find the area between the curves  $y = \sin x$  and  $y = \cos x$  for  $[0, 90^\circ]$ .

### Chapter- 2(DIFFERENTIAL EQUATION)[20 MARKS]

#### **3 marks:**

- 1) Find the order and degree of
  - i)  $\frac{d^2y}{dx^2} = \sqrt{1 + \left(\frac{dy}{dx}\right)^3}$
  - ii)  $x^2 \left(\frac{d^2y}{dx^2}\right)^2 + y \left(\frac{dy}{dx}\right)^3 + y^2 = 0$ ---- (3M Each)
- 2) Form a differential equation by eliminating constants from
  - i)  $xy = a^2$
  - ii)  $y^2 = 4ax$ . ---- (3M Each)
- 3) Solve  $\sec^2 x \cdot \tan y \, dx + \sec^2 y \cdot \tan x \, dy = 0$ .
- 4) Solve  $\frac{dy}{dx} = e^{3x-2y} + x^2 \cdot e^{-2y}$

#### **4 marks:**

- 1) Solve  $xy \log y \, dx + (1 + x^2)dy = 0$
- 2) Solve  $\frac{dy}{dx} = (4x + y + 1)^2$
- 3) Solve  $(x^2 + y^2)dx - 2xydy = 0$
- 4) Solve  $y^2 + x^2 \frac{dy}{dx} = xy \frac{dy}{dx}$

- 5) Solve  $x \log x \frac{dy}{dx} + y = 2 \log x$
- 6) Solve  $\frac{dy}{dx} + y \tan x = \cos^2 x$
- 7) Solve  $x \frac{dy}{dx} + y = \log x$
- 8) Solve  $\frac{dy}{dx} = \frac{x-2y}{2x-4y}$

### **Chapter 3 (PROBABILITY)[8 MARKS]**

#### **3 marks-**

- 1) If A & B are two events such that  $P(A) = 1/2$ ,  $P(B) = 1/3$  &  $P(A \cap B) = 7/12$  find  $P(A \cup B)$
- 2) If three coins are tossed simultaneously, find the probability of getting almost 2 heads.
- 3) Two dice are rolled. Find the probability of getting a prime number as the sum of numbers on the top of dices.

#### **4 marks-**

- 1) From a pack of 52 cards, find the probability of getting 1 queen and 1 ace if two cards are drawn randomly.
- 2) A room has three electronics lamps. From a collection of 15 bulbs, 10 are good, 3 are selected at random and put in lamps. Find the probability that the room is lightened by at least one bulb.
- 3) An urn contains 10 red, 5 white and 5 black balls. Two balls are drawn at random. Find the probability that they are not of same colour.

### **Chapter- 4 (PROBABILITY DISTRIBUTION)[12 MARKS]**

#### **3 marks:**

- 1) An unbiased coin is tossed 5 times, find the probability of getting at least 4 heads.
- 2) In poisson distribution, if  $P(3) = P(4)$ , find  $P(1)$ .
- 3) Fit a Poisson distribution to set of following observations

$x_i$	0	1	2	3	4
$f_i$	122	60	15	2	1

**4 marks:**

1) If 30% of the bulbs are defective, find the probability that out of 4 bulbs

Selected a) one is defective b) at the most two are defective.

2) Using poisson distribution, find the probability that the ace of spade will bedrown from a pack of cards at least once in 104 consecutive trials.

3) Assuming that 2 in 10 industrial accidents are due to fatigue, find the probability that exactly 2 out of 8 accidents will be due to fatigue.

4) A multiple choice test contains 20 questions. Each question has five choices for correct answer. What is the probability of making an 80% with randomguessing.

5) 95% of students at college are between 1.1 m and 1.7m fall. Find mean and S. D., assuming normal distribution.