

# QUESTION BANK (K- Scheme)

## APPLIED MATHEMATICS (AMS) ( 312301 )

### Unit Test-II

#### UNIT-II

#### DEFINITE INTEGRATION

(C02)

2- marks

- 1 ) Evaluate :  $\int_1^2 \frac{dx}{3x-2}$ .
- 2 ) Evaluate :  $\int_0^{\frac{\pi}{2}} \text{Sin}x . \text{Cos}x \, dx$
- 3 ) Evaluate :  $\int_1^5 \frac{dx}{4+ x^2}$
- 4 ) Evaluate :  $\int_0^{\frac{\pi}{2}} \frac{dx}{\sqrt{1- x^2}}$ .
- 5 ) Evaluate :  $\int_0^{\frac{\pi}{2}} e^{\text{sin}x} . \text{cos}x \, dx$
- 6) Evaluate :  $\int_0^1 x . e^x . dx,$
- 7) Evaluate :  $\int_{-1}^1 x^2 . dx$

#### Unit – III

#### DIFFERENTIAL EQUATIONS

(C03)

2- marks

- 1 ) Find the order & degree of the Differential Equation :

$$\frac{d^2y}{dx^2} = \sqrt{y - \frac{dy}{dx}}$$

- 2 ) ) Find the order & degree of the Differential Equation:

$$\frac{d^2y}{dx^2} = \left( y + \frac{dy}{dx} \right)^{\frac{3}{2}}$$

- 3 ) Solve the DE :  $x . dy - y . dx = 0$

- 4 ) Solve the DE :  $(1 + x^2) \frac{dy}{dx} = 1 + y^2$

- 5 ) Find the Integrating factor of the DE:  $\frac{dy}{dx} + y . \text{tan}x = \text{sin}2x.$

**Unit – V****PROBABILITY DISTRIBUTIONS****(C05)****2- marks**

- 1) An unbiased coin is tossed 5 times. Find the probability of getting three heads.
- 2) If a fair coin is tossed three times, then find probability of getting exactly two heads.
- 3) If  $P(X = 0) = 0.05$ , find  $m$  &  $P(X = 3)$ .
- 4) If a random variable shows Poisson's distribution such that  $P(3) = P(4)$ , find  $P(0)$  &  $P(1)$ .

**UNIT-II****DEFINITE INTEGRATION****(C02)****4 – marks**

1) Evaluate :  $\int_1^4 \frac{\sqrt[3]{9-x}}{\sqrt[3]{9-x} + \sqrt[3]{x+4}} .dx$

2) Evaluate :  $\int_0^{\frac{\pi}{2}} \frac{dx}{1 + \sqrt[3]{\tan x}}$  .

3) Evaluate :  $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin x . dx}{\sin x + \cos x}$  .

4) Evaluate :  $\int_{-3}^{\frac{1}{2}} \frac{dx}{4x^2 + 12x + 13}$  .

5) Evaluate :  $\int_5^{10} \frac{dx}{(x-1).(x-2)}$  .

6) Evaluate :  $\int_0^1 x . \tan^{-1} x . dx$

7) Evaluate :  $\int_0^1 x^2 . e^x . dx$

8) Evaluate :  $\int_0^{\pi} x . \sin^2 x . dx$

**Unit – III****DIFFERENTIAL EQUATIONS****(C03)****4-marks**

- 1) Form the differential equation by eliminating the arbitrary constants if

$$y = a \cos(\log x) + b \sin(\log x).$$

- 2) Solve the D.E :  $\frac{dy}{dx} + y \tan x = \cos^2 x$ .
- 3) Solve the DE :  $(x + 1) \frac{dy}{dx} - y = e^x \cdot (x + 1)^2$ .
- 4) Solve the DE :  $x(1 + y^2) dy + y(1 + x^2) dx = 0$ .
- 5) Solve the DE :  $x \cdot \frac{dy}{dx} - y = x^2$ .
- 6) Solve the DE :  $(1 + x^2) \frac{dy}{dx} = x^2 \cdot y$ .
- 7) Solve the DE :  $\frac{dy}{dx} = e^{3x-2y} + x^2 \cdot e^{-2y}$ .
- 8) Solve the DE :  $\sec^2 x \cdot \tan y dx + \sec^2 y \cdot \tan x dy = 0$
- 9) Solve the DE :  $(3x^2 + 6xy^2) dx + (6x^2y + 4y^2) dy = 0$
- 10) Solve the DE :  $(2xy + y - \tan y) dx + (x^2 - x \cdot \tan y + \sec^2 y) dy = 0$

## Unit – V

## PROBABILITY DISTRIBUTIONS

(C05)

### 4- marks

- 1) 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.
- 2) If 3% of the electric bulbs manufacture by a company are defective. Find the probability that in a sample of 100 bulbs. Exactly 5 bulbs are defective (Given  $e^{-3} = 0.0497$ ).
- 3) The number of road accidents met with by taxi drivers follow Poisson distribution with mean 2 out of 5000 taxi in the city, find the number of drivers.
  - i) Who does not meet an accident.
  - ii) Who met with an accidents more than 3 items. (Given  $e^{-2} = 0.1353$ ).
- 4) In a sample of 1000 cases, the mean of certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal find
  - i) How many students score between 12 and 15?
  - ii) How many students above 18? Given  $A(0.8) = 0.2881$ ,  $A(0.4) = 0.1554$   
 $A(1.6) = 0.4452$ .
- 5) If 20% of the bolts produces by a machine are defective. Find the probability that out of 4 bolts drawn.
  - i) One is defective
  - ii) at most two are defective.
- 6) If the probability of a bad reaction from the certain injection is 0.001, determine the chance that out of 2000 individuals more than two will get a bad reaction. (Given  $e^2 = 7.4$ ).

- 7) The probability that a bomb dropped from a Plane will strike the target is  $\frac{5}{1}$ . If six bombs are dropped, find the probability that exactly two will strike the target.
- 8) The probability that a man aged 65 will live to 75 is 0.65. What is the probability that out of 10 men which are now 65, 7 will live to 75.
- 9) A company manufacture electric motors. The probability that an electric motor is defective is 0.01. What is the probability that a sample of 300 electric motors will contains exactly 5 defective motors ? (Given  $e^{-3} = 0.0498$ ).
- 10) In a test on 2000 electric bulbs , it was found that the life of articular make was Normally distributed with average life of 2040 hours and Standard deviation of 60 hours Estimate the number of bulbs likely to burn for :
- a) Between 1920 hours and 2160 hours
  - b) More than 2150 hours.
- Given that  $A(2) = 0.4772$  ,  $A(1.83) = 0.4664$