# Applied Mathematic-II
### 2nd Exam/Common/2354/5422/2251/Nov'15

**Duration 3hrs.**                                                  **M. Marks 75**

## SECTION- A

**Q. 1 (A)**     **Choose the correct answer.**                            1x5=5

i) Differentiate $x^2$ w.r.t $x^3$ and value is

(a) $\frac{3x}{2}$    (b) $\frac{2}{3x}$   (c) $x$  (d) $2x$

ii) The equation of normal to curve y = sinx at (0,0) is

   (a) X = 0   (b) y = 0    (c) x+y = 0    (d) x-y = 0

iii) The probability that a card drawn at random from a pack of cards is a queen is

   (a) $\frac{4}{52}$   (b) $\frac{1}{2}$  (c) $\frac{1}{4}$  (d) ) $\frac{1}{13}$

(IV) Which one is a measure of dispersion

   (a) Mean  (b) Range    (c) Mode  (d) Median

(V) A square Matrix A is singular if │A│ is

   (a) 0  (b) 1   (c) 2   (d) 3

**B. State True or False**                                           1x5=5

  i) The square of standard deviation is called variance.

  ii) Derivative of $x^3$ is 3x

  iii) $\int e^x \, dx = e^x$

  iv) $\underset{\theta \to 0}{Lt} \frac{\sin 2\theta}{2\theta} = 1$

  v) The Transpose of a symmetric matrix is equal to itself

**(C) Fill in the blanks:**                                              1x5=5

  i) The probability of tossing a coin of getting a head is _____.

  ii) $\frac{d\,(\log x)}{dx} =$ _____.

  iii) Area of the region bounded by curve y = x- $x^2$ between x=0 & x=1 is _____.

 IV) Inverse of Matrix A is equal to _____.

 V) If $\begin{vmatrix} 8 & k \\ 4 & 5 \end{vmatrix} = 0$    then   k = _____.

## SECTION- B

**Q. 2.**   **Attempt any <u>Six</u> Questions**                                5x6=30

i)     Evaluate   $\int \frac{dx}{x^2-4x+8}$

ii) Using trapezoidal rule to find area under the curve whose ordinates are given below

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 0 | 2.5 | 3 | 4.5 | 5 | 7.5 |

iii) Using Cramer`s rule find the values of x & y from the system of equations:

2x −y = 1

7x-2y = -7

IV) A bag contains 6 red, 5 white & 4 black balls Two balls are drawn, find the probability that none of them is red.

V) Solve differential equation $\frac{dy}{dx} = (4x + y + 1)^2$

VI) Evaluate $\int \frac{sinx}{sinx - cosx} \, dx$

VII) Evaluate $\int_0^{\pi/2} \sin^5 x \cos^7 x dx$

VIII) If $y = A \cos nx + B \sin nx$ show that $\frac{d^2y}{dx^2} + n^2y = 0$

IX) If $x^y = y^x$ find $\frac{dy}{dx}$

## SECTION- C

**Q. 3.** **Attempt any <u>Three</u> Questions** 10x3=30

1) Solve the following equations by matrix method
$8x + 4y + 3z = 18$
$2x + y + z = 5$
$x + 2y + z = 5$

2) Evaluate $\int \frac{x^2 \tan^{-1} x}{1+x^2} \, dx$

3) Find standard deviation of the following

| $x$ | $0-10$ | $10-20$ | $20-30$ | $30-40$ | $40-50$ | $50-60$ | $60-70$ | $70-80$ |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|
| $y$ | 5 | 10 | 20 | 40 | 30 | 20 | 10 | 4 |

4) Find the maximum & minimum value of the function $f(x) = x^4 - 6x^2 + 8x + 11$

5) Differentiate $(tanx)^{logx} + x^x$ w.r.t. $x$