

**APPLIED MATHEMATICS-II**  
**2<sup>nd</sup> /EXAM/COMMON/2354/2251/5422/MAY'16**

**DURATION: 3Hrs**

**M.M. =75**

**SECTION A**

**All questions are compulsory.**

**A) Choose the correct answer:**

**1x5=5**

- i. Which one is the measure of dispersion?  
 a. Mean                      b. Median                      c. Mode                      d. Range
- ii. If  $y = \log(x^2)$  then  $\frac{dy}{dx}$  is  
 a.  $2 \log x$                       b.  $2x$                       c.  $\frac{2}{x}$                       d.  $\log 2x$
- iii. A square matrix A is singular if  $|A|$  is  
 a. 0                      b. 1                      c. 2                      d. 3
- iv. Order of differential equation  $(y''')^2 + 2y'' + 3y = x$  is  
 a. 1                      b. 2                      c. 3                      d. 4
- v. The equation of normal to curve  $y = \sin x$  at  $(0, 0)$  is  
 a.  $x=0$                       b.  $x+y=0$                       c.  $y=0$                       d.  $x-y=0$

**B) State whether the following statements are true or false:**

**1x5=5**

- i. If mean of 4, 3, 7, x, 10 is 6 then  $x=6$ .
- ii.  $\int \sin 4x \, dx$  is  $\cos 4x$ .
- iii.  $\lim_{x \rightarrow 0} \sin 2x/x$  is zero.
- iv. A function is even if  $f(-x) = f(x)$ .
- v. The square of standard deviation is variance.

**C) Fill in the blanks:**

**1x5=5**

- i. Probability of \_\_\_\_\_ is zero.
- ii. If AB is defined then  $(AB)^t =$  \_\_\_\_\_.
- iii. Derivative of  $\tan^{-1}x$  is \_\_\_\_\_.
- iv. Inverse of matrix A is equal to \_\_\_\_\_.
- v.  $\int e^{mx} \, dx =$  \_\_\_\_\_.

**SECTION – B**

**(Attempt any 6 questions.)**

**6x5=30**

**1. Solve by using Cramer's rule:**

$$3x - 2y = 5$$

$$x - 3y = -3$$

**2. Calculate median from following data:**

Class Interval	0-7	7-14	14-21	21-28	28-35	35-42
Frequencies	8	7	14	16	9	6

**3. Solve  $\sec^2 x \tan y \, dx + \sec^2 y \tan x \, dy = 0$**

**4. Find the equation of the normal to the curve  $y = 6x^2 - 5x + 3$  at  $(1, 4)$ .**

**5. Integrate  $\int \frac{2x}{x^2 + 2x - 3} \, dx$ .**

**6. If  $x = 5t - t^3$ ,  $y = t^2 + 4t$ . Find  $\frac{dy}{dx}$  at  $t = 1$ .**

7. Evaluate  $\lim_{x \rightarrow 0} \frac{\sqrt{2+3x} - \sqrt{2-5x}}{4x}$ .

8. Prove that  $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix} = x^2(x+a+b+c)$ .

9. A card is drawn from a well shuffled pack of playing cards. What is the probability that it is either a spade or an ace?

### SECTION -C

(Attempt any 3 questions.)

10x3=30

1. Solve by matrix method:

$$X+2y-3z=6$$

$$3x+2y-2z=3$$

$$2x-y+z=2$$

2. If  $y=(\sin^{-1}x)^2$ . Prove that  $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} = 2$ .

3. Evaluate  $\int_1^2 \frac{x^3}{\sqrt{x}-1} dx$ .

4. Calculate Mean and Standard Deviation.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	5	10	20	40	30	20	10	4

5. Find the maximum and minimum values of function  $f(x) = x^4 + 2x^3 - 3x^2 - 4x + 4$ .