

S.B. Roll No.....

**APPLIED MATHEMATICS-II**  
**2<sup>nd</sup> Exam/Common/2354/2251/5422/Nov'18**

**Duration: 3Hrs.**

**M.Marks:75**

**SECTION-A**

**Q1. a) Choose the correct answer.**

**15x1=15**

- i. If A is a non singular matrix, then  $A^{-1}$  is
  - a)  $|A| \operatorname{adj} A$
  - b)  $\frac{\operatorname{adj} A}{|A|}$
  - c)  $(\operatorname{adj} A)^T$
  - d)  $\frac{(\operatorname{adj} A)^T}{|A|}$
- ii.  $\int_0^1 \frac{1}{1+x^2} dx =$ 
  - a)  $\pi$
  - b)  $\frac{\pi}{2}$
  - c)  $\frac{\pi}{4}$
  - d)  $\frac{\pi}{6}$
- iii.  $\lim_{x \rightarrow 0} \frac{\sin x^\circ}{x} =$ 
  - a) 1
  - b)  $\pi$
  - c)  $\frac{\pi}{180}$
  - d)  $-\pi$
- iv. Order of differential equation  $(y''')^2 + 2y'' + 3y = x$  is
  - a) 3
  - b) 4
  - c) 1
  - d) 2
- v. The differential coefficient of  $\sin x^2$  w.r.t  $\cos x^2$  is
  - a)  $-\tan x^2$
  - b)  $-\cot x^2$
  - c)  $2x$
  - d)  $-2x$

**b) State True or False.**

- vi. The differential coefficient of a constant is one.
- vii.  $\int_{-a}^a f(x) dx = 0$  if  $f(x)$  is even.
- viii. Mean Deviation =  $\frac{5}{4}$  Standard Deviation
- ix. Volume of a sphere of radius 'a' is  $\frac{4}{3} \pi a^3$
- x.  $\cos 2A = \cos^2 A - \sin^2 A$

**c) Fill in the blanks**

- xi. The angles in trigonometric functions are supposed to be measured in \_\_\_\_\_.
- xii. A square matrix is said to be a diagonal matrix if all its non-diagonal elements are \_\_\_\_\_.
- xiii.  $\int \frac{g'(x)}{g(x)} dx$  is equal to \_\_\_\_\_.
- xiv. Central value of the set of observation is called \_\_\_\_\_.
- xv. The derivative of  $e^x$  is equal to \_\_\_\_\_.

**SECTION-B**

**Q2. Attempt any six questions.**

**6x5=30**

- a. In a class of 30 students with roll no. 1 to 30, a student is picked up at random to answer a question. Find the probability that the roll number of selected students is either a multiple of 4 or 7.
- b. If  $y = e^{x+y}$ , prove that  $\frac{dy}{dx} = \frac{y}{1-y}$
- c. Calculate by Simpson's rule an approximate value of  $\int_{-3}^3 x^4 dx$  by taking seven equidistant ordinates.
- d. Find the equation of the tangent to the curve  $y = x^2$ , whose slope is  $\frac{1}{2}$ .
- e. Evaluate  $\int \frac{dx}{5+4 \cos x}$
- f. Find the area bounded by the curve  $y = \log x$  between the  $x$ -axis and the ordinates  $x = 2$  and  $x = 3$ .
- g. If  $y = \tan^{-1} x$ , prove that  $(1 + x^2)y_2 + 2xy_1 = 0$
- h. Solve the equations by Crammer's rule
  - i.  $5x + 2y = 3$
  - j.  $3x + 2y = 5$
- k. Evaluate  $\int_1^3 \frac{\cos(\log x)}{x} dx$

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**SECTION-C**

**Q3. Attempt any three questions.**

**3x10=30**

- i. Solve the following equations by matrix method

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

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

$$x + 2y + z = 4$$

- ii. Find the maximum and minimum values of the function  $x^3 - 6x^2 + 9x + 15$   
iii. Find the standard deviation from the following data

Wages	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	12	18	35	42	50	45	20	8

- iv. Solve the differential equation

$$y^2(x^2 - 1) \frac{dy}{dx} - x^2(y^2 - 1) = 0$$

- v. Integrate  $x^2 \sin^2 x \, dx$