S.B. Roll No……………………………………………

Applied Mathematics-II

2nd Exam/common/2354/2251/5422/May-2015

Duration: 3 hours **Max marks -75**

Section-A

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

(1) $\lim\limits_{x\to 0} \dfrac{\sin x - x}{x}$

a) Does not exist b) Zero c) One d) Exist and is different from 0 and 1

(2) $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x\,dx$ is equal to

a) -1 b) 0 c) 1 d) 2

(3) If A is non –singular matrix then A^{-1} is

a) $|A|$ adj A b) $\dfrac{AdjA}{|A|}$ c) $(AdjA)^t$ d) $\dfrac{(AdjA)^t}{|A|}$

(4) The derivative of $\cos^2 x^2$ with respect to x is equal to

a) $2x\sin(2x^2)$ b) $2x\cos(2x^2)$ c) $-2x\sin(2x^2)$ d) $-2x\cos(2x^2)$

(5) The probability that a card drawn at random from a pack of cards is queen or heart is

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

Q2 **State true of false** **(1x5=5 Marks)**

1) Mean, median and mode are measure of central tendency
2) $\lim\limits_{x\to 0} \dfrac{\tan 2x}{\tan 3x} = \dfrac{2}{3}$
3) $\int \log x\,dx = x\log x - x + c$
4) The median of data 13,14,15,16,18,20 is 15
5) Slope of the tangent to the curve $x^2 - 2xy + y^2 + 3x + y + 2 = 0$ at the point (2, -1) is $\dfrac{-5}{3}$

Q3 **Fill in the blanks** **(1x5= 5 Marks)**

(1) f(x) is an _______ function if (f(-x)=f(x) for all x
(2) Area of the region bounded by the curve $Y=x-x^2$ between x=0 and x=1 is_______
(3) if $\begin{vmatrix} 1 & 2 & 3 \\ K & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix} = 0$ Then K = ___________
(4) Derivative is X^{10} w.r.t x^5 is ______
(5) The arithmetic mean of the numbers 9,7,0,x and 6 is 6 then the value of x is __________

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Section –B

Q4. **Attempt any six question** **(5x6=30 Marks)**

(i) If sin y = x Sin (a+y). prove that

$$\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$$

(ii) Evaluate $\int \sin^4 x\,dx$

(iii) Prove that

$$\begin{vmatrix} X & Y & Z \\ x^2 & y^2 & z^2 \\ y+z & z+x & x+y \end{vmatrix} = (x-y)(y-z)(z-x)(x+y+z)$$

(iv) Solve $\int_0^{\frac{\pi}{2}} \frac{sinx\,dx}{sinx+cosx}$

(iv) Find the dimensions of the rectangle of given area 50 sq.cm. whose perimeter is 30 cm.

(v) A problem in Mathematics is given to 3 students whose chances of solving are1/2, 1/3, 1/4. what is the prob. that the problem is solved?

(vi) Find the volume generated by the revolution of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about x-axis

(vii) If Y = √ (sin x)+ √ (sinx)+ √ sinx+………∞. Prove that $(2y-1)\frac{dy}{dx} = \cos x$

(ix) Evaluate $\int x^2 \sin^2 x\,dx$

Section-C

Q5. Use matrix method to solve the equation **(10x3=30 Marks)**

7x+5y-13z+4=0
9x+2y+11z-37=0
3x-y+z-2=0

Or

Differentiate $(\sin x)^{\cos x} + (\cos x)^{\sin x}$ w.r.t. x

Q6. Using trapezoidal rule, evaluate

$$\int_0^{2.5} \sqrt{(16-x^2)}\,dx$$ by taking six ordinates.

Or

Find the mean deviation of the following frequency distribution

Class	0-6	6-12	12-18	18-24	24-30
Frequency	8	10	12	9	5

Q7. Solve the differential

$$(2x-2y+5)\frac{dy}{dx} = x-y+3$$

Or

Show that x^x is minimum when $x = \frac{1}{e}$