S.B. Roll No.....

APPLIED MATHEMATICS-II

2nd Exam/Common/2354/2251/5422/Nov'17

Duration: 3Hrs. **M.Marks:75**

SECTION-A

Q1. Choose the correct answer. **5x1=5**

i. Which one is a measure of dispersion?
   a) Mean b) Median c) Mode d) Range

ii. Order of differential equation $(y''')^2 + 2y'' + 3y = x$
   a) 1 b) 2 c) 3 d) 4

iii. A square matrix A is singular if $|A|$ is
   a) 0 b) 1 c) 2 d) 3

iv. If $x = \sin 3t$, then acceleration at $\frac{\pi}{2}$ is (x stands for displacement at time t)
   a) -9 b) -3 c) 3 d) 9

v. The equation of the normal to the curve $y = \sin x$ at (0, 0) is
   a) $x = 0$ b) $y = 0$ c) $x + y = 0$ d) $x - y = 0$

Q2. State True or False. **5x1=5**

a. $\lim_{\theta \to 0} \frac{Sin\theta^\circ}{\theta}$ is equal to 1
b. $\int \sin 4x \ dx = \cos 4x$
c. If D≠0, then system has unique solution
d. If the mean of 4, 3, 7, x, 10 is 6 then $x = 6$
e. The integral of $\log x$ w.r.t x is $\frac{1}{x}$

Q3. Fill in the blanks. **5x1=5**

i. $\int e^{mx} \ dx$ is equal to -------.
ii. Area of trapezoid = $\frac{1}{2}$(sum of parallel side) x -------.
iii. If AB is defined then $(AB)^t$ = -------.
iv. Integration is defined as the ------ of differentiation.
v. The differential co-efficient of a constant is ------.

SECTION-B

Q4. Attempt any six questions. **6x5=30**

(i) If = $a(t + \frac{1}{t})$, $y = a(t - \frac{1}{t})$ where "a" is constant. Then prove that $\frac{dy}{dx} = \frac{x}{y}$

(ii) If $kx + y - z = 0; x - 2y + z = 3$ and $4x - 3y + z = 5$, and system is inconsistent, then find the value of k.

(iii) Evaluate $\int_0^{\pi/2} \frac{dx}{1+\cot x}$

(iv) If $y = (\sin^{-1} x)^2$, prove that $(1 - x^2)y_2 - xy_1 = 2$

(v) Evaluate $\int cos^4 x \ dx$

(vi) The probability of the horse A winning the race is 1/4 and the probability of horse B winning the race is 1/3, find the probability that one of the horse wins the race.

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(vii) Calculate the median of the following data:-

Class Interval	0-5	5-10	10-15	15-20	20-25	25-30	30-35
Frequency	12	15	25	40	42	14	8

(viii) Evaluate $\int x \tan^{-1} x \ dx$

(ix) Find the point on the curve $y = 10 + 2x - x^2$ where the curve has slope unity.

SECTION-C

Q5. Attempt any three questions. **3x10=30**

(i) Solve the following equations by matrix method
$x - y + z = 4,\ x - 2y - 2z = 9,\ 2x + y + 3z = 1$

(ii) Using Simpson's Rule, calculate the approximate value of $\int_0^1 \frac{1}{1+x^2}\ dx$ by dividing the interval 0 to 1 into four equal parts. Hence obtain the value of π correct to four places of decimals.

(iii) Solve the differential equation
$y^2(x^2 - 1)\frac{dy}{dx} - x^2(y^2 - 1) = 0$

(iv) a) Differentiate $e^{\tan x}$ w.r.t $\sin x$.
b) Determine the point of maxima of $f(x) = \sin x + \cos x$ in $0 \leq x \leq \frac{\pi}{2}$

(v) Find S.D and coefficient of variation of following data

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