

S.B. Roll No.....

APPLIED MATHEMATICS-II
2nd Exam/Common/2354/2251/5422/May'18

Duration: 3Hrs.

M.Marks:75

SECTION-A

Q1. Choose the correct answer

5x1=5

- i) If a square matrix A has two identical rows or columns, then det A =
 a) 0 b) 1 c) -1 d) none
- ii) $\frac{d}{dx}(\tan^{-1}(\cot x)) =$
 a) $-\operatorname{cosec}^2 x$ b) -1 c) $\sin^2 x$ d) 1
- iii) $\int \log x \, dx$ is equal to
 a) $\frac{1}{2}(\log x)^2$ b) $\frac{1}{x}$ c) $x \log x - x$ d) $2 \log x$
- iv) If $x = a \cos^3 t, y = a \sin^3 t$, then $\frac{dy}{dx}$ is equal to
 a) $\cot t$ b) $\cos t$ c) $\operatorname{cosec} t$ d) $-\tan t$
- v) Degree of $(\frac{d^2y}{dx^2})^2 = (1 + \frac{dy}{dx})^3$ is
 a) 2 b) 3 c) 1 d) 4

Q2. State True or False.

5x1=5

- a. $\frac{d}{dx}(x \sin x) = x \cos x$
- b. If $D = D_1 = D_2 = D_3 = 0$, system has infinite solution.
- c. $\frac{d}{dx}(\frac{1}{x}) = \log x$
- d. If tangent is parallel to x-axis, then slope of curve is zero.
- e. $\int e^{mx} \, dx = me^{mx}$

Q3. Fill in the blanks.

5x1=5

- i. If $S = \cos 2t$, then velocity is
- ii. The anti derivative of x^n is
- iii. $\int_{-a}^a f(x) \, dx = 0$ is an function.
- iv. Relationship between mean, median, and mode is
- v. The probability of an impossible event is

SECTION-B

Q4. Attempt any six questions.

6x5=30

- i) Solve by means of determinants the following equations
 $3x + 2y = 7$
 $11x - 4y = 3$
- ii) The velocity of a body moving in a straight line at different times is given below

t (sec)	0	1	2	3	4	5
v (m/sec)	4	3.98	3.87	3.55	2.83	0.61

Evaluate the distance in 5 sec.

- iii) Evaluate $\int_0^{\pi/6} \cos^5 3x \, dx$
- iv) Solve $3e^x \tan y \, dx + (1+e^x) \sec^2 y \, dy = 0$
- v) Find the equation of the normal to the curve $y = 6x^2 - 5x + 3$ at (1,4)
- vi) If $y = \tan(x + y)$, prove that $\frac{dy}{dx} = -\frac{1+y^2}{y^2}$.
- vii) Find $\frac{d^4y}{dx^4}$ if $y = x^3 \log x$
- viii) Evaluate $\int \frac{e^x}{e^{2x} + 6e^x + 5} \, dx$.

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ix) 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

Q5. Attempt any three questions.

3x10=30

i) Find the maximum or minimum values of the function $2x^3 - 21x^2 + 36x - 20$

ii) a) Evaluate $\int \frac{\cos x}{\cos 3x}$

b) Differentiate $\sin^n x^n$ w.r.t.x.

iii) Solve the following equations by matrix method

$$10x + 10y - z = -2$$

$$x + 5y + 2z = 0$$

$$x - 5y - z = 4$$

iv) Evaluate $\int \frac{(x^2+4)}{(x^2+1)(x^2+3)} dx$

v) Calculate the median and standard deviation from the following data

Class Interval	1-10	11-20	21-30	31-40	41-50	51-60
Frequency	3	16	26	31	16	8