

DAE/IA-2016/02 SECOND YEAR

(Common with Architecture, Automation, Auto-Mobile & Diesel,
Auto & Farm Machinery, Civil, Cast Metal & Foundry,
Foundry & Pattern Making, Land & Mine Surveying, Mechanical,
Mining, Mechatronics, Metallurgy & Welding, Q. Surveying,
Construction Machinery and Footwear Technologies.)

MATH-212 APPLIED MATHEMATICS - II**PART - B**

Time: 2:30 hours

Marks:80

SECTION - I

Q.1: Write short answer to any Twenty-Five (25) of the following questions: -

25 × 2 = 50

1	If $f(x) = 3x^2 - 7x + 4$, then find $f\left(\frac{1}{x}\right)$	2	Determine the function, $f(x) = 4x^2 - 7x + 6$ even, odd or neither
3	Evaluate the limit: $\lim_{x \rightarrow 3} \sqrt{25 - x^2}$	4	Evaluate the limit $\lim_{x \rightarrow 0} \frac{1 - \sin x}{\cos^2 x}$
5	If $y = x^3 + x^2 + 2x + 3$, find $\frac{dy}{dx}$	6	Differentiate $\frac{1}{\sqrt{a^2 - x^2}}$
7	Find $\frac{dy}{dx}$ at the given point if: $y = x^{2/3}$ at $x = 8$	8	Find $\frac{dy}{dx}$ if $x^3 + y^3 + 4 = 0$
9	Differentiate $x^3 + 8$ w.r.t. $x^2 + 4$	10	Find the value of $x \cot x$ w.r.t. 'x'.
11	Find the value of $\frac{d}{dx}(\sin^{-1} x + \cos^{-1} x)$	12	Find $\frac{d}{dx}(a^{x^2})$
13	Find the derivative of $\log(\cos^2 x)$	14	Find $\frac{dy}{dx}$ when $x = a \sin t$, $y = \cos at$
15	If $y = \ell n x$, find y_2	16	Find the turning point of the curve $y = x^2 - 3x + 3$
17	Find $\int \left(x + \frac{1}{x}\right)^2 dx$	18	Evaluate $\int (e^{3x} + e^{5x}) dx$
19	Evaluate $\int \frac{\sin 2x}{\sin x} dx$	20	Integrate $\int \frac{-2x}{\sqrt{4 - x^2}} dx$
21	Integrate $\int \frac{dx}{x \ln x}$	22	Integrate $\int \sin^2 x dx$
23	Evaluate $\int \frac{dx}{16 + 9x^2}$	24	Evaluate $\int x e^x dx$
25	Evaluate $\int_1^3 \frac{1}{x+1} dx$	26	Evaluate $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$
27	Calculate $\int_0^{\pi/4} \frac{dx}{\cos^2 x}$	28	Write distance formula between two points.
29	Find the coordinates of the mid-point of $P_1(3, 7)$, $P_2(-2, 3)$.	30	Find the coordinates of the point P which divide the segment $P_1(-2, 5)$ and $P_2(4, -1)$ of the ratio of $ \overline{AB} = \sqrt{(2-0)^2 + (3+1)^2}$
31	Reduce the equation $3x + 4y - 2 = 0$ into intercept form.	32	Find the distance from the point $(-2, 1)$ to the line $3x+4y-12=0$
33	Find the equation of the line passing through the point $(-2, 3)$ and having slope $-\frac{1}{2}$.	34	Find the equation of a line through the points $(-1, 2)$ & $(3, 4)$
35	Define Point Circle.	36	Write the equation of circle with, center at (h, k) and radius r .
37	Find the radius of the circle $x^2 + y^2 - 4x + y - 1 = 0$		

SECTION - IINote: *ATTEMPT ANY THREE QUESTIONS.* $3 \times 10 = 30$ Q.2: (a) Show that $\frac{e^x + 1}{e^x - 1}$ is an odd function of x .(b) Find the derivative $\sqrt{\frac{1+x}{1-x}}$ w.r.t 'x'Q.3: (a) Find the derivative of $\sin^2 x \cos^3 x$ w.r.t 'x'(b) Find the maximum and minimum values of the function $x^2 - 4x - 6$ Q.4: (a) Integrate $\int \frac{1}{\sqrt{1+x} - \sqrt{x}} dx$ (b) Find $\int \cos^3 x dx$ Q.5: (a) Evaluate $\int x^2 e^x dx$ (b) Find the point which is $\frac{7}{10}$ of the way from the point $(4, 5)$ to the point $(-6, 10)$ Q.6: (a) A line is parallel to the line $2x + 3y = 5$ and passes through $(-1, 3)$. Find an equation for the line.(b) Find which of the two circles $x^2 + y^2 - 3x + 4y = 0$ and $x^2 + y^2 - 6x - 8y = 0$ is greater.

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