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BOARD DIPLOMA SUPPLEMENTARY EXAMINATION, (C-14/C16/C-16S)

JUNE / JULY - 2020

III SEMESTER (COMMON) EXAMINATION

ENGINEERING MATHEMATICS-III

Time : 2 Hours] [Total Marks : 80

PART - A 5×6=30

Instructions : *(1) Answer any 06 questions.*
*(2) Each question carries **FIVE** marks.*
(3) Each answer should not exceed more than 1 page.

1 Evaluate : $\int \left(x^9 + 9^x + \frac{9}{x}\right) dx$.

2 Evaluate : $\int \frac{(2x-3)(x+1)}{x^2} dx$.

3 Integrate $\frac{\cos(\log x)}{x}$ with respect to x.

4 Evaluate : $\int \frac{1}{\sqrt{16-x^2}} dx$.

5 Evaluate : $\int_1^2 \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) dx$.

6 Evaluate : $\int_0^{\frac{\pi}{2}} \sqrt{1+\cos 2x}\, dx$

7 Find the differential equation for the primitive $y = Ae^{7x} + Be^{-7x}$.

8 Solve the differential equation $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$.

9 Solve $\frac{dy}{dx} + \frac{y}{x} = x$.

10 Verify that the differential equation $\left(x^3 - 3xy^2\right)dx + \left(y^3 - 3x^2y\right)dy = 0$ is an exact equation.

PART - B 10×5=50

Instructions : *(1) Answer any **FIVE** questions.*
*(2) Each question carries **TEN** marks.*
*(3) Each answer should not exceed more than **TWO** pages.*

11 (a) Evaluate : $\int x^2 \log x\, dx$.

(b) Evaluate : $\int e^x (\cot x + \log \sin x) dx$.

12 (a) Evaluate : $\int \frac{1}{x^2+3x+2} dx$.

(b) Integrate : $\int \frac{1}{4-3\sin x}$ with respect to x.

13 (a) Evaluate : $\int_0^{\pi/2} \log \cot x \ dx$.

(b) Find the area enclosed by the curve $y = x^2$ and the line $2x - y + 3 = 0$.

14 (a) Find the volume of the solid of revolution generated by revolving the area between the curve $y = x^2 - 4$ and x-axis about x-axis.

(b) Evaluate : $\int_0^{\pi/2} \cos 4x \cos 2x \ dx$

15 (a) Find the Root Mean Square value of $\sqrt{16 - 4x^2}$ from $x = -3$ to $x = 2$.

(b) Solve $\frac{dy}{dx} = (9x + y + 1)^2$.

16 Evaluate $\int_1^3 \frac{1}{1+x} dx$ using Trapezoidal rule by taking $n = 8$.

17 Solve $\frac{dy}{dx} = \frac{y^2}{xy + x^2}$.

18 (a) Solve $\frac{dy}{dx} = \frac{2x - y + 1}{x + 2y - 3}$.

(b) Solve the differential equation $\frac{dy}{dx} + 2y \tan x = y^2$.