



C09-A/AA/AEI/C/CM/EC/EE/CH/CHPP/
CHPC/CHOT/CHST/IT/M/MET/MNG/

PET/IT/-RAC-302
3202

BOARD DIPLOMA EXAMINATION, (C-09)
SEPTEMBER/OCTOBER - 2020
THIRD SEMESTER (COMMON) EXAMINATION

ENGINEERING MATHEMATICS—II

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

1. Evaluate $(x^2 + 2^x - 2x) dx$.

2. Evaluate $\frac{\sec^2 x}{\sqrt{1 - \tan^2 x}} dx$

3. Evaluate $\cos^3 x dx$.

4. Evaluate $(1 - x)(2 - 3x^2) dx$.

5. Evaluate $\sin(2x - 3) dx$

6. Find

$$\int_0^{\frac{\pi}{2}} \cos^2 x dx$$

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7. Find

$$\int_0^1 \frac{\cos^{-1} x}{\sqrt{1-x^2}} dx$$

8. Form the differential equation for $y = Ae^{2x} + Be^{-2x}$ where A and B are constants.

9. Solve the differential equation

$$\frac{dy}{dx} \sqrt{1-y^2} = 0$$

10. Solve :

$$\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 2y = 0$$

PART—B

10×5=50

Instructions : (1) Answer any **five** questions.

(2) Each question carries **ten** marks.

11. (a) Evaluate

$$\int \frac{x}{(x-2)(x-4)} dx$$

(b) Find

$$\int \frac{1}{3-5\cos x} dx$$

12. (a) Evaluate

$$\int \tan^{-1} x dx$$

(b) Evaluate $\int x^3 e^{-2x} dx$

13. (a) Find

$$\int_0^{\frac{\pi}{2}} \frac{\sin^3 x}{\sin^3 x + \cos^3 x} dx$$

(b) Find the area enclosed by the curve $y = x - x^2$ and the x -axis.

- * 14. (a) Find the volume generated by revolving the ellipse

$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

about its major axis.

- (b) Find the RMS value of $y = xe^x$ as x varies from $x = 1$ to $x = 4$.

15. Solve :

$$y^2 - (xy - x^2) \frac{dy}{dx} = 0$$

16. (a) Solve :

$$(x^3 - 3xy^2) dx + (3x^2y - y^3) dy = 0$$

- (b) Solve :

$$\frac{dy}{dx} = y \sec x - \tan x$$

17. (a) Solve $(D^3 - D^2 - D - 1)y = 0$.

- (b) Solve

$$\frac{d^2y}{dx^2} - 6 \frac{dy}{dx} + 9y = 3e^{5x}$$

18. (a) Solve $(D^2 - 9)y = \cos 2x$.

- (b) Solve $(D^2 - 4D - 3)y = x^2$
