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C16-C/CM/IT-301

6222

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

DCE - THIRD SEMESTER 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  $\int (\cos e^{2x} + a^x + \cos x) dx$ .

2. Evaluate  $\int \frac{1}{5x+7} dx$ .

3. Evaluate  $\int_{-4}^5 x^2 dx$ .

4. Find the area enclosed by the curve  $y = x^2$  by X-axis and the lines  $x = 3$  and  $x = 5$ .

5. Find  $L\{e^{2t} - 4t^3 + 2 \sin 3t\}$ .

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6. Find  $L^{-1}\left[\frac{6}{s^2+4} + \frac{1}{s-6} + \frac{1}{s^2}\right]$ .
7. Write down the formulae for finding Euler's constants of Fourier series in the interval  $(0, 2\pi)$ .
8. Find the differential equation to the family of curves  $y = Ae^{2x} + Be^{-2x}$  where  $A, B$  are arbitrary constants.
9. Solve  $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$ .
10. Solve  $(D^2 - 5D + 6)y = 0$ .

**PART—B**

10×5=50

- Instructions :** (1) Answer *any* **five** questions.  
(2) Each question carries **ten** marks.

11. (a) Evaluate  $\int \frac{1}{x^2 + 8x + 25} dx$ .

(b) Evaluate  $\int \sin^4 x \cos^3 x dx$ .

12. (a) Evaluate  $\int x^2 e^{2x} dx$ .

(b) Evaluate  $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\cos x}}{\sqrt{\cos x} + \sqrt{\sin x}} dx$ .

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13. (a) Find the RMS value of  $\sqrt{27 - 4x^2}$  from the range  $x = 0$  to  $x = 3$ .

(b) Find the volume generated by the revolution of the circle  $x^2 + y^2 = 25$ , about the X-axis.

14. (a) Obtain the value of  $\int_0^1 \frac{dx}{1+x^2}$  using simpson's rule by dividing the interval (0, 1) into 4 equal parts.

(b) Find  $L\{e^{2t} \cos 4t\}$ .

15. (a) Find  $L^{-1}\left(\frac{s}{(s+3)(s+2)}\right)$

(b) Find  $L^{-1}\left[\frac{s+1}{s^2+2s+5}\right]$ .

16. Find the Fourier series of  $f(x) = x^2$  in the interval  $(-\pi, \pi)$ .

17. (a) Solve :  $\frac{dy}{dx} + \frac{y}{x} = 5$ .

(b) Solve :  $(6x + y + 1)dx + (10y + x + 1)dy = 0$ .

18. (a) Solve :  $(D^2 + 4)y = \sin 3x$ .

(b) Solve :  $(D^2 + D - 6)y = e^x$ .

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