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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 $\int (\cos ec^2 x + a^x + \cos x) dx$.

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

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

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

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