C16-EE/CHPP/PET–301

6237

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

DEEE - 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 $\int \left(3x^2 + 2x + 5\right) dx$

2.   Evaluate $\int \dfrac{e^{\sin^{-1} x}}{\sqrt{1 - x^2}}\, dx$

3.   Evaluate $\int_0^1 \left(x^2 + 1\right) dx$

4.   Find the area bounded by the curve $y = x^2$ from $x = 2$ to $x = 3$.

5.   Find $L\left\{t^3 - 3t^2 + 2\right\}$.

6. Find $L^{-1}\left[\dfrac{1}{(s-1)^3}\right]$.

7. Find the value of a_0, if $f(x) = x^2$ in the interval $(-\pi, \pi)$ by Fourier series.

8. Find the differential equation to the family of curves $y = A\cos 2x + B\sin 2x$ where A, B are arbitrary constants.

9. Solve : $x^2 dx + y^2 dy = 0$

10. Solve : $\left(D^2 - 4D + 4\right)y = 0$

PART—B

10×5=50

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

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

11. *(a)* Evaluate $\int \cos 4x \cos 2x\, dx$

(b) Evaluate $\int \dfrac{dx}{5 + 4\cos x}$

12. *(a)* Evaluate $\int x^3 e^x dx$

(b) Evaluate $\int_0^{\frac{\pi}{2}} \log \tan x\, dx$

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13. (a) Find the RMS value of $\sqrt{8-4x^2}$ between $x=0$ to $x=2$.

(b) Find the volume generated by the revolution of the ellipse $\dfrac{x^2}{9} + \dfrac{y^2}{4} = 1$ about X-axis between the limits $x=1$ to $x=2$.

14. (a) Evaluate $\int_0^1 \dfrac{dx}{1+x^2}$ using Trapezoidal rule by taking 5 equal parts.

(b) Find $L\{t^3 e^{-3t}\}$

15. (a) Find $L^{-1}\left\{\dfrac{3s+13}{(s+1)(s+3)}\right\}$

(b) Find $L^{-1}\left[\dfrac{1+2s+s^2}{s^3} + \dfrac{s-1}{s^2+4}\right]$

16. Find the Fourier series of $f(x)=x$ in the interval $(0,2\pi)$.

17. (a) Solve : $\left(y^2 + 2xy\right)dx + \left(2xy + x^2\right)dy = 0$

(b) Solve : $\dfrac{dy}{dx} + \dfrac{2y}{x} = \dfrac{1}{x^2}$

18. (a) Solve : $\left(D^2 - 4D + 5\right)y = e^{3x}$

(b) Solve : $\left(D^2 + 9\right)y = \cos 2x$

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