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C16-EC/CHPC/PCT–301

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BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

DECE - 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 $\int\left(x^9+9^x+9x\right)dx$.

2. Evaluate $\int\frac{e^{\tan^{-1}x}}{1+x^2}dx$.

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

4. Find the area of the region bounded by the curve $y=x^2-x+1$ the $x-$axis and the ordinates $x=1$ and $x=3$.

5. Find $L\{3\sin 4t-4\cos 3t\}$.

6. Find $L^{-1}\left\{\frac{1}{s-3}+\frac{1}{s}+\frac{s}{s^2-4}\right\}$.

7. Define the Fourier series of $f(x)$ in the interval $(c, c+2\pi)$.

8. Find the differential equation to the family of curves $y = A\cos 3x + B\sin 3x$ where A, B are arbitrary constants.

9. Solve $xdx + ydy = 0$.

10. Solve $\left(D^2 - 5D + 4\right)y = 0$.

PART—B

10×5=50

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

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

11. *(a)* Evaluate $\int \frac{1}{x^2+2x+10}dx$

(b) Evaluate $\int \sin 5x \cos 2x dx$

12. *(a)* Evaluate $\int x^2 e^{5x} dx$

(b) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\tan x}}{\sqrt{\tan x}+\sqrt{\cot x}}dx$

13. *(a)* Find the RMS value of $\sqrt{x}$ over the range $x = 1$ and $x = 3$.

(b) Find the volume of the solid formed by revolving the area enclosed by the curve $x^2 + y^2 = 25$, the X-axis and the lines $x = 2$ and $x = 3$ about the X-axis.

14. *(a)* Evaluate $\int_0^1 \frac{1}{1+x} dx$ using Trapezoidal rule by taking number of intervals $n = 4$

(b) Find $L\{e^{2t} \sin 3t\}$.

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

(b) Find $L^{-1}\left\{\frac{s+2}{s^2+4s+13}\right\}$.

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

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

(b) Solve : $(9x + 5y - 9)dx + (5x + 7y - 4)dy = 0$

18. *(a)* Solve : $(D^2 + 1)y = 3\cos 4x$

(b) Solve : $(D^2 + 2D + 1)y = e^{2x}$

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