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C16–EE–301/C16–CHPP–301/
C16–PET–301

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BOARD DIPLOMA EXAMINATION, (C–16)

JUNE—2019

DEE—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 $\int \sec x(\sec x + \tan x)dx$.

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

3. Evaluate $\int_{-1}^{1}(x^2 - 3x + 2)dx$.

4. Find the RMS value of $f(x) = \sqrt{8 - x^2}$ over the interval (0, 2).

5. Find $L\{t^2 + \sinh 2t + 2\sin 2t\}$.

6. Find $L^{-1}\left\{\frac{s^4 - 4s^2 + 4}{s^5}\right\}$.

7. Write the Euler's formula for the Fourier series expansion of a function $f(x)$ in the interval $(0, 2\pi)$.

8. Solve $\frac{dy}{dx} = (x+1)(y+1)$.

9. Solve $(D^2 - 2D + 10)y = 0$, where $D = \frac{d}{dx}$.

10. Form differential equation for the family of curves $y = A\sin 4x + B\cos 4x$.

PART—B

10×5=50

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

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

11. *(a)* Evaluate $\int \sin 5x \cdot \cos 3x \; dx$.

(b) Evaluate $\int \frac{1}{\sqrt{x^2 + 2x + 3}} dx$.

12. *(a)* Evaluate $\int x^3 \sin 7x \; dx$.

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

13. *(a)* Find the area enclosed between the parabolas $y^2 = 4x$ and $x^2 = 4y$.

(b) If the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ is rotated about x-axis, find the volume of the solid so generated.

14. *(a)* Evaluate $\int_1^5 \frac{1}{1+x} dx$ using trapezoidal rule by taking $n = 4$.

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

15. *(a)* Find $L\left\{\dfrac{\cos 2t - \cos 3t}{t}\right\}$.

(b) Find $L^{-1}\left\{\dfrac{s}{(s-2)(s-3)}\right\}$.

16. Expand the function $f(x) = x - x^2$ as a Fourier series in the interval $(-\pi, \pi)$.

17. *(a)* Solve $\dfrac{dy}{dx} + y \tan x = \sec x$.

(b) Solve $(2x + y + 1)dx + (2y + x + 8)dy = 0$.

18. *(a)* Solve $(D^2 - 5D + 6)y = e^{2x} + e^{3x}$, where $D = \dfrac{d}{dx}$.

(b) Solve $(D^2 - 1)y = x^2$, where $D = \dfrac{d}{dx}$.

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