



C16-EE-301/C16-CHPP-301/C16-PET-301

6237

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2018

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

2. Evaluate $\int \sec^2(2x - 3) dx$.

3. Evaluate $\int_1^{\sqrt{1-x^2}} \frac{1}{\sqrt{1-x^2}} dx$.

4. Find the RMS value of xe^{2x} over the interval (0, 1).

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

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

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7. Find a_0 in the Fourier series expansion of $F(x) = x$ in the interval $(0, 2\pi)$.

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

9. Solve $(D^2 - 6D + 9)y = 0$.

10. Form differential equation for the family of curves $y = A \sin 2x + B \cos 2x$.

PART—B

10×5=50

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

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

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

(b) Evaluate $\int \frac{1}{5 - 4 \sin x} dx$.

12. (a) Evaluate $\int x^3 e^{2x} dx$.

(b) Evaluate $\int_0^{\pi/2} \frac{1}{1 + \cot x} dx$.

13. (a) Find the area bounded by the parabola $y^2 = 4x$, Y-axis between $y = 2$ and $y = 5$.

(b) Find the volume of the solid generated when the area bounded by the curve $y = x(1 - x)$ and X-axis is rotated about X-axis.

14. (a) Evaluate $\int_4^8 \frac{1}{x} dx$ approximately by dividing the interval [4, 8] into 4 equal parts using Trapezoidal rule.

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

15. (a) Find $L^{-1} \frac{1}{s^2 - 4s + 20}$.

(b) Find $L^{-1} \frac{s}{(s-1)(s-2)}$.

16. Expand the function $f(x) = x^2$ as a Fourier series in the interval $(-\pi, \pi)$ and hence deduce $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots = \frac{2}{12}$.

17. (a) Solve $\frac{dy}{dx} - \frac{y}{x} = \cos^2 \frac{y}{x}$.

(b) Solve $e^y dx - (xe^y - 2y) dy = 0$.

18. (a) Solve $(D^2 - D - 6)y = 1 - e^{3x}$, where $D = \frac{d}{dx}$.

(b) Solve $(D^2 - 3D - 2)y = \sin 3x$, where $D = \frac{d}{dx}$.
