



C16-M-301/C16-CHOT-301/C16-RAC-301

6242

BOARD DIPLOMA EXAMINATION, (C-16)
OCT/NOV—2017
DMET—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 :

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

2. Evaluate :

$$\frac{1}{\sqrt{9-x^2}} dx$$

3. Evaluate :

$$\int_0^{\sqrt{3}} \frac{1}{1+x^2} dx$$

4. Find the mean value of $y^2 = 4x$ from $x = 0$ to $x = 4$.

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

6. Find $L^{-1}\left\{\frac{3S-2}{S^2-9}\right\}$

7. Find the Fourier coefficient a_0 in $f(x)$ x in the interval $(0, 2)$.

8. Find the differential equation of the family of curves $y = A \cos 5x + B \sin 5x$, where A, B are arbitrary constants.

9. Solve :

$$\frac{dy}{dx} = e^x y$$

10. Solve :

$$\frac{d^2y}{dx^2} - 4y = 0$$

PART—B

10×5=50

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

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

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Evaluate :

$$\int \frac{1}{x^2 - 6x + 13} dx$$

(b) Evaluate :

$$\int \cos^3 x \sin^6 x dx$$

12. (a) Evaluate :

$$\int x^3 \sin 5x dx$$

(b) Evaluate ^{*} :

$$\int_0^{\pi/2} \log \cot x \, dx$$

13. (a) Find the volume of the solid generated by revolving the area bounded by the circle $x^2 + y^2 = 16$ about x -axis.

(b) Find the RMS value of $f(x) = xe^x$ from $x = 1$ to $x = 3$.

14. (a) Evaluate

$$\int_0^6 \frac{1}{1+x^2} \, dx$$

using Simpson's rule by taking $n = 6$.

(b) Find

$$L\{e^{-2t}(3 \sin 4t + 4 \cos 4t)\}$$

15. (a) Find

$$L^{-1} \frac{5S - 1}{(S - 2)(S - 1)}$$

(b) Using convolution theorem, find

$$L^{-1} \frac{1}{S(S^2 - 4)}$$

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

17. (a) Solve :

$$\frac{dy}{dx} - \frac{y}{x} = \tan \frac{y}{x}$$

(b) Solve :

$$\frac{dy}{dx} = y \cot x - \operatorname{cosec} x$$

18. (a) Solve : *

$$(D^2 - 4)y = \sin 2x$$

(b) Solve :

$$(D^2 - 3D - 2)y = x$$

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