



C16-A-301/C16-AA-301/C16-AEI-301/C16-CH-301/
C16-CHST-301/C16-MET-301/C16-MNG-301/
C16-TT-301/C16-BM-**301**

6201

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2018

THIRD SEMESTER (COMMON) 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 :

$$\int (x^5 - 5^x - 5x) dx$$

2. Evaluate :

$$\int \frac{(\cos^{-1} x)}{\sqrt{1-x^2}} dx$$

3. Evaluate :

$$\int_1^{\sqrt{3}} \frac{1}{1+x^2} dx$$

* 4. Find the mean value of $y = x^2$ between the lines $x = 2$ and $x = 3$.

5. Find :

$$L\{\sin 2t \sin 3t\}$$

6. Find :

$$L^{-1} \frac{1}{(s-a)^3}$$

7. Write down the formula for finding Fourier coefficients in Fourier series expansion of $f(x)$ in the interval $(0, 2\pi)$.

8. Find the differential equation of the family of parabola $y^2 = 4ax$, where a is arbitrary constant.

9. Solve :

$$\frac{dy}{dx} = \frac{1-y^2}{1+x^2}$$

10. Solve :

$$\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 4y = 0$$

PART—B

10×5=50

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

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

11. (a) Evaluate :

$$\int \frac{1}{x^2 + 6x + 25} dx$$

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(b) Evaluate :

$$\frac{1}{4} \int_0^{\pi/2} \frac{1}{5 \cos x} dx$$

12. (a) Evaluate :

$$\int_0^1 x^2 e^{2x} dx$$

(b) Evaluate :

$$\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x} \sqrt{\cos x}} dx$$

13. (a) Find the RMS value of $x^2 e^x$ over the interval $0 \leq x \leq 1$.

(b) Find the volume generated by the revolution of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$ about the major axis.

14. (a) Evaluate

$$\int_1^{11} x^2 dx$$

using trapezoidal rule by taking $n = 10$.

(b) Find :

$$L\{e^{4t} \sin 2t \cos t\}$$

15. (a) Show that

$$L^{-1} \left\{ \frac{1}{s(s^2 + a^2)} \right\} = \frac{1}{a^2} \cos at$$

(b) Using convolution theorem, find the inverse Laplace transform of

$$\frac{1}{(s-1)(s-2)}$$

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

17. (a) Solve :

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

(b) Solve :

$$(6x - y - 1)dx + (10y - x - 1)dy = 0$$

18. (a) Solve :

$$(D^2 - D - 6)y = e^{3x} - e^{-3x}$$

(b) Solve :

$$(D^2 - D - 1)y = 2 \sin 3x$$

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