



C16-EC-301/C16-CHPC-301/C16-PCT-301

6232

BOARD DIPLOMA EXAMINATION, (C-16)

JUNE—2019

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 :

$$\int (\sin x + e^x + \operatorname{cosec}^2 x) dx$$

2. Evaluate :

$$\int \frac{\sin(\log x)}{x} dx$$

3. Evaluate :

$$\int_0^{\pi} \sin 3x dx$$

4. Find the area bounded by the curve $y = \sin x$, the x-axis and the lines $x = 0$ and $x = \pi$.

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

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

7. Write the Fourier cosine series for a function $f(x)$ in $(-\pi, \pi)$.
8. Find the differential equation of the family of curves $y = Ae^{3x} + Be^{-3x}$, where A and B are arbitrary constants.
9. Solve $\frac{dy}{dx} = (x+1)(y+1)$.
10. Solve $(D^2 - 18D + 77)y = 0$.

PART—B

10×5=50

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

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

11. (a) Evaluate :

$$\int \sin^7 \theta \cos^2 \theta \, d\theta$$

- (b) Evaluate :

$$\int \frac{1}{x^2 + 8x + 20} \, dx$$

12. (a) Evaluate :

$$\int \frac{x}{(x+1)(x+2)} \, dx$$

- (b) Show that

$$\int_0^{\pi/2} \frac{1}{1 + \tan x} \, dx = \frac{\pi}{4}$$

13. (a) Find the volume of the solid obtained by revolving the ellipse $9x^2 + 25y^2 = 225$ about Y-axis.
- (b) Find the RMS value of $f(x) = xe^{2x}$ from $x = 0$ to $x = 1$.
14. (a) Obtain the value of $\int_0^6 \frac{1}{1+x^2} dx$ by taking $n = 6$ using Simpson's $\frac{1}{3}$ rule.
- (b) Find $L\{e^{4t} \sin 2t \cos t\}$.
15. (a) Find $L^{-1}\left(\frac{4s+5}{(s-1)(s+2)}\right)$.
- (b) Using convolution theorem, find $L^{-1}\left\{\frac{1}{(s-1)(s-2)}\right\}$.
16. Obtain the Fourier series for the function $f(x) = x^2$ in the interval $(-\pi, \pi)$.
17. (a) Solve $(x+y-2)dx + (x-y+4)dy = 0$.
- (b) Solve $\frac{dy}{dx} + \frac{y}{x} = 2x^3$.
18. (a) Solve $(D^2 - 3D + 2)y = e^{2x}$.
- (b) Solve $(D^2 + 4)y = \sin 3x$.
