BOARD DIPLOMA EXAMINATION, (C–16)

MARCH/APRIL—2018

DCE—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

$$\sqrt{1 \quad \sin 2x}\, dx$$

2. Evaluate

$$\frac{e^{m \tan^{1} x}}{1 \quad x^2}\, dx$$

3. Evaluate

$$\int_0^1 (x^3 \quad 1) dx$$

4. Find the area bounded by the parabola $y^2 \quad x^2$ and the line $x \quad 2$.

5. Find $L\{t^3 \quad 3t \quad 5\}$.

6. Find

$$L^{-1}\left\{\frac{6}{s^4 - 4} - \frac{1}{s - 6} - \frac{1}{s^2}\right\}$$

7. Find the value of a_1, in Fourier series expansion of $f(x) = x$ in the interval of $(0, 2\pi)$.

8. Find the differential equation of the family of curves $y = A\cos^3 x + B\sin^3 x$, where A, B are arbitrary constants.

9. Solve

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

10. Solve

$$\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 12y = 0$$

PART—B

10×5=50

Instructions : (1) Answer *any* **five** questions.
(2) Each question carries **ten** marks.

11. *(a)* Evaluate

$$\int \frac{1}{5 - 3\cos x}\, dx$$

(b) Evaluate

$$\int \frac{3x - 1}{(x - 1)(x - 2)}\, dx$$

12. *(a)* Evaluate

$$\int x^2 \cos 3x\, dx$$

(b) Evaluate

$$\int_0^{\pi/2} \frac{\sin^8 x}{\cos^8 x + \sin^8 x}\, dx$$

[*Contd...*

13. *(a)* Find the RMS value of $\sqrt{8 \quad 4x^2}$ between $x \quad 0$ and $x \quad 2$.

(b) Find the volume generated when the area bounded by $y^2 \quad x^3$ and $x \quad 4$ revolves about X-axis.

14. *(a)* Evaluate $\int_0^1 \frac{1}{1 \quad x^2}\,dx$ using Simpson's rule by dividing the interval $[0, 1]$ into eight equal intervals.

(b) Find

$$L\left\{\frac{e^{at} \quad \cos bt}{t}\right\}$$

15. *(a)* Find

$$L^{1}\left\{\frac{1}{s(s^2 \quad 9)}\right\}$$

(b) Using convolution theorem, find

$$L^{1}\left\{\frac{s}{(s^2 \quad 1)^2}\right\}$$

16. Find the Fourier series of $f(x) \quad x \quad x^2$ in the interval $(\quad , \quad)$.

17. *(a)* Solve

$$(e^{y} \quad 1)\cos x\,dx \quad e^{y}\sin x\,dy \quad 0$$

(b) Solve

$$\frac{dy}{dx} \quad \frac{y}{x} \quad \frac{y^2}{x^2}$$

18. *(a)* Solve

$$(D^2 \quad 4D \quad 4)y \quad e^{x} \quad \cos 2x$$

(b) Solve

$$(D^2 \quad 1)y \quad x$$

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