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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)**

**OCT/NOV—2017**

**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 :

$$\int (e^{9x} - 6x^2 + \frac{3}{x}) dx$$

2. Evaluate :

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

3. Evaluate :

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

4. Find the mean value of

$$f(x) = x^2 \quad \text{5 from } x = 0 \text{ to } x = 5$$

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5. Find the value of  
 $L(\cos^2 t)$

6. Find the value of  
 $L \left[ \frac{s^2 - 3s + 4}{s^3} \right]$

7. Find the value of  $a_0$  in the Fourier series expansion of  $f(x) = x^2 - x$  in  $(0, 2)$ .

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

9. Solve :

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

10. Solve :

$$(D^2 - 4D + 4)y = 0$$

**PART—B**

10×5=50

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

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

11. (a) Evaluate :

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

(b) Evaluate :

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

12. (a) Evaluate :

$$\int x^2 \cos \frac{n x}{7} \, dx$$

(b) Evaluate :

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

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13. (a) Find the area enclosed by the curve  $y = x^2 - 5x + 6$  and  $x$ -axis.

(b) Find the volume of the solid formed by revolving the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ about } x\text{-axis, where } a > b.$$

14. (a) Evaluate

$$\int_0^{\infty} e^{-2t} t \sin 3t dt$$

using laplace transformations.

(b) A curve is drawn passing through the points given by the following table :

$x$	1	1.5	2	2.5	3	3.5	4
$y$	3	3.4	3.7	2.8	2.7	2.6	2.1

Calculate the area bounded by the curve  $x$ -axis and the lines  $x = 1, x = 4$  using trapezoidal rule.

15. (a) Find the value of  $L(e^{4t} \sin 2t \cos t)$ .

(b) Find the value of

$$L^{-1} \left( \frac{s-1}{s^2-6s+7} \right)$$

16. Find the Fourier series for the function  $f(x) = x \sin x$  in  $(-\pi, \pi)$ .

17. (a)  $\frac{dy}{dx} = y \cot x + y \operatorname{cosec} x$

(b) Solve :

$$(9x^2 - 5y - 9)dx + (5x^2 - 7y - 4)dy = 0$$

18. (a) Solve :

$$(D^2 - 4D - 3)y = e^{2x}$$

(b) Solve :

$$(D^2 - 5D - 4)y = x$$

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