C14–A–301/C14–AA–301/C14–AEI–301/
C14–CH–301/C14–CHST–301/C14–CHPC–301/
C14–CHPP–301/C14–CHOT–301/C14–PET–301/
C14–PCT–301/C14–C–301/C14–CM–301/C14–EC–301/
C14–EE–301/C14–IT–301/C14–M–301/C14–RAC–301/
C14–MET–301/C14–MNG–301//C14–TT–301/

C14–BM–**301**

# 4201

## BOARD DIPLOMA EXAMINATION, (C–14)
## 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 :

$$\int \sqrt{1 + \sin 2x}\, dx$$

3. Evaluate :

$$\int \frac{1}{36 + x^2}\, dx$$

**4.** Evaluate :

$$\int_{0}^{\pi/4} \tan^2 \theta \, d\theta$$

**5.** Evaluate :

$$\int_{0}^{1} \frac{x}{1+x} \, dx$$

**6.** Form the differential equation by eliminating the arbitrary constants *A, B* from the equation $y = Ae^x + Be^{-x}$.

**7.** Solve :

$$(1 + e^x)\frac{dy}{dx} = e^x \, y$$

**8.** Solve :

$$y \, dx - x \, dy = 0$$

**9.** Find the mean of first ten natural numbers.

**10.** Find the median of the following items :

12, 15, 40, 23, 20, 17, 69, 75

<br>

**PART—B**     10×5=50

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

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

**11.** *(a)* Evaluate :

$$\int e^x[\cot x + \log(\sin x)] \, dx$$

*(b)* Evaluate :

$$\int \sqrt{26 - 2x - x^2} \, dx$$

**12.** *(a)* Evaluate :

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

(b) Evaluate :

$$\int \frac{x+7}{(x+3)(x+2)}\,dx$$

**13.** (a) Evaluate :

$$\int x\tan^{-1}x\,dx$$

(b) Show that

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

**14.** (a) Evaluate :

$$\int_0^1 \frac{x^3}{1+x^8}\,dx$$

(b) Find the area enclosed by the ellipse $4x^2 + 9y^2 = 36$.

**15.** (a) Find the RMS value of $xe^x$ between $x = 0$ and $x = 1$.

(b) Find the volume of a sphere of radius $r$ using integration.

**16.** (a) Solve :

$$\frac{dy}{dx} = e^{3x+2y} + x^2 e^{2y}$$

(b) Solve :

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

**17.** Solve :

$$(x^3 + 3xy^2)\,dy = (y^3 + 3x^2y)\,dx$$

**18.** (a) Compute the standard deviation of the following data :

| Item (x) | 2 | 5 | 6 | 8 | 10 | 12 |
|----------|---|---|---|---|----|----|
| Frequency (f) | 2 | 8 | 10 | 7 | 8 | 5 |

(b) Calculate the coefficient of correlation between $X$ and $Y$ for the following data :

| X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Y | 3 | 2 | 5 | 4 | 6 |

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