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C14–EC–301/C14–CHPC–301/C14–PCT–301

4237

BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2016

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 :

$$\int \left(e^{x} \quad 8\sin x \quad \frac{6}{\sqrt{1 \quad x^2}}\right) dx$$

2. Evaluate :

$$\int \frac{8x \quad 14}{4x^2 \quad 14x \quad 5} dx$$

3. Evaluate :

$$\int \frac{(\tan^{1} x)^2}{1 \quad x^2} dx$$

4. Evaluate :

$$\int_{\frac{1}{2}}^{1} \frac{1}{\sqrt{1 \quad x^2}} \, dx$$

5. Find the area of region bounded by the parabola $y \quad x^2$, x-axis and the line $x \quad 4$.

6. Find the differential equation of family of curves $y \quad Ae^x \quad Be^{\ x}$, where A, B are arbitrary constants.

7. Solve :

$$\frac{dy}{dx} \quad \sqrt{\frac{1 \quad y^2}{1 \quad x^2}} \quad 0$$

8. Solve :

$$\frac{dy}{dx} \quad \frac{y}{x} \quad 8$$

9. Find the arithmetic mean and mean deviation from the mean of 14, 16, 19, 20, 21, 27, 23.

10. Find the quartile deviation of the monthly income of 7 workers are given in rupees as 350, 840, 650, 710, 980, 575, 290.

PART—B

10×5=50

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

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

11. *(a)* Evaluate :

$$\int \frac{1}{x^2 \quad 2x \quad 5} \, dx$$

(b) Evaluate :

$$\int \frac{1}{5 \quad 4\sin x} \, dx$$

12. *(a)* Evaluate :

$$\frac{x}{x^2 \quad 3x \quad 2}\,dx$$

(b) Evaluate :

$$e^x(\tan x \quad \log \sec x)dx$$

13. *(a)* Evaluate :

$$x^2 e^{\ 4x}\,dx$$

(b) Evaluate :

$$\int_0^{/2} \log \tan x\,dx$$

14. *(a)* Find the area enclosed by the ellipse

$$\frac{x^2}{a^2} \quad \frac{y^2}{b^2} \quad 1$$

(b) Find the volume of the solid formed by revolving the area enclosed by the curve $y \quad x^3$, the y-axis and the lines $y \quad 8, y \quad 0$ about y-axis.

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

(b) Calculate the approximate value of $\int_{\ 3}^{3} x^4\,dx$ using Simpson's rule by dividing $[\ 3, 3]$ into six equal parts.

16. *(a)* Solve :

$$\frac{dy}{dx} \quad \sin(x \quad y)$$

(b) Solve :

$$(x^3 \quad 3xy^2)dx \quad (3x^2y \quad y^3)dy \quad 0$$

17. *(a)* Solve :

$$\frac{dy}{dx} \quad y \tan x \quad \sec x$$

(b) Solve :

$$y^2 dx \quad (xy \quad x^2) dy \quad 0$$

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

Size of Item	10	11	12	13	14	15	16
Frequency	2	7	11	15	10	4	1

(b) Find the rank correlation coefficient of the following data :

x	22	15	17	19	20	24
y	76	84	81	77	80	78

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