C14–EC–301/C14–CHPC–301/C14–PCT–**301**

4237

BOARD DIPLOMA EXAMINATION, (C–14)
OCT/NOV—2016
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 :

$$\sqrt{1-\sin 2\theta}\ d\theta$$

2. Evaluate :

$$\frac{e^{\tan^{-1} x}}{1+x^2}\,dx$$

3. Evaluate :

$$x^2 e^x\,dx$$

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* **4.** Evaluate :

$$\int_0^1 (x^{10} - 1)\,dx$$

5. Find the area enclosed by the curve $y = x^2$, the x-axis and the lines $x = 3$ and $x = 5$.

6. Find the differential equation for $y = A\cos 3x + B\sin 3x$, where A and B are constants.

7. Solve :

$$x^6 dy + y^6 dx = 0$$

8. Solve :

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

9. Find the median and mean of 46, 64, 87, 41, 58, 77 and 35.

10. Calculate the variance of 1, 5, 6, 4, 7 and 13.

<div align="center">PART—B</div>

10×5=50

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

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

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

$$\int \cos 7x \cos 2x \, dx$$

(b) Evaluate :

$$\int \sin^5 x \cos^3 x \, dx$$

12. *(a)* Evaluate :

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

(b) Evaluate :

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

13. *(a)* Evaluate :

$$\int x \sin 2x \, dx$$

(b) Prove that

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

14. *(a)* Find the area enclosed between the two parabolas $y^2 = 4x$ and $x^2 = 4y$.

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

15. *(a)* Find the RMS value of $\sqrt{27 - 4x^2}$ from $x = 0$ and $x = 3$.

(b) A curve is drawn to pass through the points given in 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 $x = 1$ and $x = 4$ using Simpson's rule.

16. Solve :

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

17. *(a)* Solve :

$$(x - y - 2)dx - (x - y - 4)dy = 0$$

(b) Solve :

$$\frac{dy}{dx} + y \tan x = \sec x$$

18. Find the quartile deviation and also mean deviation from mean for the following data :

x	4	8	11	17	20	24	32
f	3	5	9	5	4	3	1

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