C14–C–301/C14–CM–**301**

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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 :

$$\int (\sec^2 x - e^x - \sin x)\, dx$$

2. Evaluate :

$$\int \frac{1}{x(\log x)^2}\, dx$$

3. Evaluate :

$$\int \frac{1}{9 - x^2}\, dx$$

4. Evaluate :

$$\int_1^2 (x^2 - 1)\, dx$$

5. Find the mean value of $y = x^2$ between $x = 2$ and $x = 3$.

6. Solve :
$$\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$$

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

8. Solve :
$$\frac{dy}{dx} + \frac{y}{x} = 5$$

9. Write the formulas to find the arithmetic mean of—

(a) ungrouped distribution;

(b) grouped frequency distribution.

10. Find the mean deviation from arithmetic mean of 6, 7, 10, 8, 17, 11.

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PART—B   10×5=50

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

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

11. *(a)* Evaluate :
$$\int \sin^{3x} \cos x \, dx$$

(b) Evaluate :
$$\int \sin^6 x \cos^3 x \, dx$$

12. *(a)* Evaluate :
$$\int \frac{1}{5+4\cos x} dx$$

(b) Evaluate :
$$\int \frac{1}{(x+1)(x+2)} dx$$

13. *(a)* Evaluate :

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

(b) Prove that

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

14. *(a)* Find the area bounded by the circle $x^2 + y^2 = a^2$ using integration.

(b) Find out volume of solid of the revolution generated by revolving the area enclosed between the curve $y = x^2 + 1$ and x-axis about x-axis.

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

(b) Evaluate

$$\int_0^1 \frac{1}{1 + x} dx$$

using trapezoidal rule by taking $n = 4$.

16. Solve :

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

17. *(a)* Solve :

$$(ax + hy + g)dx + (hx + by + f)dy = 0$$

(b) Solve :

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

18. Find the quartile deviation and coefficient of quartile deviation of the following data :

Age in Years	:	10	15	20	25	30	35	40
Number of Persons	:	5	10	16	20	14	8	4

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