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

4201

BOARD DIPLOMA EXAMINATION, (C–14)

SEPTEMBER/OCTOBER - 2020

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 :

$$(e^x \quad \sin x \quad x \ ) \, dx$$

2. Evaluate :

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

3. Evaluate :

$$\frac{1}{\sqrt{9 \quad x^2}} dx$$

4. Evaluate :

$$\int_0^{\frac{1}{2}} \frac{1}{1 \quad x^2} dx$$

5. Find the area bounded by the curve $y^2 \quad 4x$ between $x \quad 0$ and $x \quad 3$.

6. Find the differential equation of the family of curves $y \quad A\cos 3x \quad B\sin 3x$, where A and B are arbitrary constants.

7. Solve :

$$x^3 dy \quad y^3 dx \quad 0$$

8. Find the integrating factor of $\frac{dy}{dx} \quad 2y\tan x \quad \sin x$.

9. Find the median of the following numbers :

110, 90, 40, 50, 125, 65, 100

10. Find the quartile deviation of the daily wages (in ₹) of 7 persons given below :

12, 7, 15, 10, 19, 17, 25

PART—B

10×5=50

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

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

11. *(a)* Evaluate :

$$\sin^3 x\cos^4 x\, dx$$

(b) Evaluate :

$$\frac{1}{\sqrt{x^2 \quad 2x \quad 3}}\, dx$$

12. *(a)* Evaluate :

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

(b) Evaluate :

$$\frac{1}{(x^2 \quad 36)(x^2 \quad 25)}\, dx$$

13. *(a)* Evaluate :

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

(b) Evaluate :

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

14. *(a)* Find the enclosed area between the curve $y \quad x^2$ and the straight line $y \quad 3x \quad 4$.

(b) Find the volume of a right circular cone of height h and base radius r using integration.

15. *(a)* Find the r.m.s. value of $\sqrt{\log x}$ over the range $x \quad 1$ to $x \quad e$.

(b) Obtain the value of $\int_0^1 \frac{dx}{1 \quad x^2}$ using Simpson's rule by dividing the interval (0, 1) into four equal parts and hence find approximately the value of .

16. Solve :

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

17. *(a)* Solve :

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

(b) Solve :

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

18. *(a)* Find the mean, variance and standard deviation for the following data :

x	6	10	14	18	24	28	30
f	2	4	7	12	8	4	3

(b) The following table shows the marks obtained by six students in Chemistry and Physics :

Marks in Chemistry	9	16	18	15	21	12
Marks in Physics	14	17	13	13	16	15

Calculate the correlation coefficient.

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