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C16–EE–**102**

5148

BOARD DIPLOMA EXAMINATION, (C–16)

MARCH/APRIL—2018

DEEE—FIRST SEMESTER EXAMINATION

ENGINEERING MATHEMATICS—I

Time : 3 hours] [*Total Marks* : 80

PART—A 2×15=30

Instructions : (1) Answer *any* **fifteen** questions.
(2) Each question carries **two** marks.

1. Find the value of $\log_7 343$.

2. Define proper fraction and give an example.

3. Resolve $\frac{1}{(x \quad 2)(x \quad 3)}$ into partial fractions.

4. State any four types of matrices.

5. If $A \begin{matrix} 2 & 3 & 1 \\ 0 & 1 & 5 \end{matrix}$ and $B \begin{matrix} 1 & 2 & 6 \\ 0 & 1 & 3 \end{matrix}$, then find $A \quad B$.

6. Define symmetric matrix and give an example.

7. If $A \begin{matrix} i & i \\ i & i \end{matrix}$, then find det A.

8. If $A \begin{matrix} 7 & 8 \\ 9 & 1 \end{matrix}$, then find A^2.

9. Write the formulae for $\sin(A \quad B)$ and $\cos(A \quad B)$.

10. Find the value of $\cos^2 15 \quad \sin^2 15$.

11. If $\tan x \quad 2$, then find $\sin 2x$.

12. Find the value of $4\cos^3 10 \quad 3\cos 10$.

13. Show that $\dfrac{\sin 2}{1 \quad \cos 2} \quad \cot$.

14. Convert $\sin 6A \quad \sin 2A$ as product.

15. State any four properties of inverse trigonometric functions.

16. State the sine rule and cosine rule.

17. State the projection rule.

18. Define any two hyperbolic functions.

19. Find the modulus of $\dfrac{5}{3 \quad 4i}$.

20. If $z \quad 2 \quad 3i$, then find $z\bar{z}$ and $z \quad \bar{z}$.

PART—B

10×5=50

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

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

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

21. *(a)* Resolve $\frac{x}{(x \quad 1)(x \quad 2)^2}$ into partial fractions.

(b) Prove that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} \quad (a \quad b)(b \quad c)(c \quad a)$.

22. *(a)* Find the adjoint of matrix $\begin{matrix} 2 & 2 & 4 \\ 2 & 3 & 2 \\ 1 & 1 & 1 \end{matrix}$.

(b) Solve the equations

$x \quad y \quad z \quad 9, \; 2x \quad 5y \quad 7z \quad 52, \; 2x \quad y \quad z \quad 0$

by using Cramer's rule.

23. *(a)* Show that $\frac{\cos 37 \quad \sin 37}{\cos 37 \quad \sin 37} \quad \cot 8$.

(b) If $\tan A \quad \frac{5}{6}$ and $\tan B \quad \frac{1}{11}$, then show that $A \quad B \quad \frac{}{4}$.

24. *(a)* Show that $\sin x \sin(60 \quad x)\sin(60 \quad x) \quad \frac{1}{4}\sin 3x$.

(b) Prove that $\cos^2 A \quad \cos^2(60 \quad A) \quad \cos^2(60 \quad A) \quad \frac{3}{2}$.

25. *(a)* Prove that $\frac{\cos 3A \quad \cos 5A}{\sin 3A \quad \sin 5A} \quad \tan A$.

(b) If $\cos x \quad \cos y \quad \frac{3}{5}$ and $\cos x \quad \cos y \quad \frac{2}{7}$, then show that

$$21 \tan \frac{x \quad y}{2} \quad 10 \cot \frac{x \quad y}{2} \quad 0$$

26. *(a)* If $A \quad B \quad C$, then show that

$$\sin 2A \quad \sin 2B \quad \sin 2C \quad 4 \sin A \sin B \sin C$$

(b) If $\tan^{1} x \quad \tan^{1} y \quad \tan^{1} z$, then prove that $x \quad y \quad z \quad xyz$.

27. *(a)* Show that $\tan^{1} \frac{1}{5} \quad \tan^{1} \frac{1}{7} \quad \tan^{1} \frac{6}{17}$.

(b) Solve :

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

28. *(a)* Find additive inverse and multiplicative inverse of $\frac{50}{3 \quad 4i}$.

(b) Express $1 \quad i\sqrt{3}$ in modulus-amplitude form.

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