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C14–EE–102/C14–CHPP–**102**

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BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2016

DEEE—FIRST YEAR EXAMINATION

ENGINEERING MATHEMATICS—I

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

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

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

1. Resolve $\frac{1}{(x \quad 5)(x \quad 7)}$ into partial fractions.

2. If $A \begin{matrix} 1 & 2 \\ 3 & 4 \end{matrix}$, $B \begin{matrix} 3 & 8 \\ 7 & 2 \end{matrix}$ and $2X \quad A \quad B$, then find X.

3. Using Laplace's expansion, evaluate $\begin{vmatrix} p & q & r \\ r & p & q \\ q & r & p \end{vmatrix}$

4. Show that $\frac{\cos 12 \quad \sin 12}{\cos 12 \quad \sin 12} \quad \tan 57$

5. Prove that $\frac{\sin 2A}{1 \quad \cos 2A}$ $\tan A$.

6. Find the modulus of the complex number $\frac{3 \quad 4i}{5 \quad 7i}$.

7. Find the perpendicular distance of the point (3, 2) from the line $4x \quad 5y \quad 6 \quad 0$.

8. Find the centre and radius of the circle $x^2 \quad y^2 \quad 6x \quad 4y \quad 12 \quad 0$.

9. Evaluate $\underset{0}{\text{Lt}} \frac{\tan a}{\sin b}$.

10. If $y \quad e^{8x} \sec x$, then find $\frac{dy}{dx}$.

PART—B

10×5=50

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

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

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

(b) Find the inverse of the matrix $\begin{matrix} 1 & 0 & 2 \\ 3 & 4 & 5 \\ 2 & 3 & 1 \end{matrix}$.

12. *(a)* Prove that $\frac{\sin 8A \quad \sin 6A}{\cos 8A \quad \cos 6A}$ $\tan 7A$.

(b) Prove that $\tan^{1} \frac{1}{5} \quad \tan^{1} \frac{1}{7} \quad \tan^{1} \frac{6}{17}$.

13. *(a)* Solve $2\cos^2 \quad 3\cos \quad 1 \quad 0$.

(b) In any triangle ABC, prove that $a\sin(B \quad C) \quad 0$.

14. *(a)* Find the equation of the parabola whose focus is at (1, 1) and directrix is $x \quad y \quad 2 \quad 0$.

(b) Find the equation of the hyperbola whose foci are (3, 0) and $e \quad 6$.

15. *(a)* Find $\frac{dy}{dx}$ if $x \quad a(\quad \sin \ ), y \quad a(1 \quad \cos \ )$.

(b) If $y \quad x^{x^{x\cdots}}$ then prove that $\frac{dy}{dx} \quad \frac{y^2}{x(1 \quad y\log x)}$.

16. *(a)* If $y \quad a\cos(\log x) \quad b\sin(\log x)$, prove that $x^2y_2 \quad xy_1 \quad y \quad 0$.

(b) If $u \quad \sin^{1}\frac{x^2 \quad y^2}{x \quad y}$, then prove that $x\frac{u}{x} \quad y\frac{u}{y} \quad \tan u$.

17. *(a)* Find the equations of tangent and normal to the curve $y \quad x^2 \quad 2x \quad 1$ at (1, 2).

(b) A particle is moving along a straight line according to the law $s \quad 2t^3 \quad 3t^2 \quad 15t \quad 18$ (t is in secs). Find its velocity when its acceleration is zero.

18. *(a)* The sum of two numbers is 24. Find the numbers when the sum of their squares is a minimum.

(b) The time T of a complete oscillation of a simple pendulum of length l is given by the equation $T \quad 2\sqrt{\frac{l}{g}}$, where g is a constant. Find the approximate percentage error in the calculated value of T corresponding to an error 2% in the value of l.

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