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C09–A–102/C09–AA–102/C09–AEI–102/C09–BM–102/
C09–C–102/C09–CM–102/C09–CH–102/C09–CHPC–102/
C09–CHPP–102/C09–CHOT–102/C09–CHST–102/
C09–EC–102/C09–EE–102/C09–IT–102/C09–M–102/
C09–MET–102/C09–MNG–102/ C09–PET–102/
C09–TT–102/C09–RAC–102

3002

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2017

FIRST YEAR (COMMON) 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. Express of 3 $2x$ x^2 in the form of A^2 B^2

2. If p $2a$ $3b$, q $3b$ $4c$. r $5a$ $2b$, Find $3p$ $2q$ $5r$.

3. Resolve $\frac{4}{x\ 2\ x\ 5}$ into partial fractions.

4. If A B C 90 , prove that $\cot A$ $\cot B$ $\cot C$ $\cot A \cot B \cot C$.

5. Find the Modulus of $\frac{5\ l2i}{2\ 3i}$

6. If $\sin A$ $\frac{4}{5}$, *Find* $\cos 2A$ *and* $\sin 2A$

7. Find the Equation of the Circle with (–5,1) and (3,–7) as end points of a diameter.

8. Find the angle between the straight lines $x \quad 5y \quad 7 \quad 0$ and $x \quad 3y \quad 18 \quad 0$.

9. Evalute $\underset{x \quad 1}{Lt} \dfrac{x^2 \quad 3x \quad 2}{x^2 \quad 4x \quad 3}$

10. Differentiate $\dfrac{1 \quad \sin x}{1 \quad \sin x}$ w.r.t.x.

PART—B

10×5=50

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

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

11. *(a)* Show that

$$\begin{matrix} 1 & 1 & & 1 \\ 1 & 1 & a & b \\ 1 & 1 & 1 & b \end{matrix}$$

(b) Find the inverse of the matrix

$$\begin{matrix} 1 & 1 & 1 \\ 4 & 1 & 0 \\ 8 & 1 & 1 \end{matrix}$$

12. *(a)* Solve $Tan^2 \quad 1 \quad \sqrt{3} \; Tan \; |\sqrt{3} \quad 0$

(b) Solve the ABC if a = 2, $c \quad \sqrt{3} \quad 1, B \quad 60$.

13. *(a)* If A+B+C=180° prove that $\sin 2A \quad \sin 2B \quad \sin 2C \quad 4 \sin A \sin B \sin C$.

(b) Show that $\tan^{\;1} \dfrac{3}{4} \quad \tan^{\;1} \dfrac{5}{12} \quad \tan^{\;1} \dfrac{56}{33}$

14. *(a)* Find the equation of parabola whose focus is (–1,1) and directrix x+y+1=0

(b) Find the centre, vertices, eccentricitym, foci, equations of directries and lengths of latusrectum of the of the ellipses represented by the equation $16x^2 \quad 9y^2 \quad 144$

15. *(a)* Find the centre, length of the Transverse axis, equations of the axes, of the hyperbola represented by the equation $4x^2 \quad 25y^2 \quad 100$.

(b) Find the mid point of the line joining the points (7,2,9) and 9,–6,–3).

16. *(a)* Differentiate $Tan^{\ 1}\dfrac{3x \quad x^3}{1 \quad 3x^2}$ with respect to $\sin^{\ 1}\dfrac{2x}{1 \quad x^2}$

(b) If $u \quad \sin^{\ 1}\dfrac{x^2 \quad y^2}{1 \quad 3x^2}$, Show that $x\dfrac{u}{x} \quad y\dfrac{u}{y}$ = Tanu

17. *(a)* Find the Equations of Tangent and normal to the curve $y \quad x^2 \quad 2x \quad 3$ at the point (0,–3).

(b) A ladder of 5m long is placed against a vertical wall. Foot of the ladder is slipping away from the wall at rate of 5cm/sec. Find the rate of descending of its top if the foot of the ladder is 3m away from the wall.

18. *(a)* Find the maximum and minimum values of the function $y \quad \sin x$ in the interval 0.2 .

(b) Time of oscillation of a simple pendulum of variable length 'I' is given by $T \quad 2\sqrt{\dfrac{1}{g}}$.

If the length is increased by 1%, find approximate percentage increase in its time of oscillation where 'g' is constant.

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