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3022

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV-2014

DCME—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.
- (3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. If
$$x = \frac{1}{x}$$
 4, find the value of $x^2 = \frac{1}{x^2}$.

- **2.** Find the value of ${}^{10}P_5$.
- 3. Show that

$$\frac{1}{x \ 2} \ \frac{1}{x \ 2} \ \frac{2x}{x^2 \ 4}$$

4. Show that

$$\tan \frac{-}{4} \quad A \quad \tan \frac{-}{4} \quad A \quad 1$$

5. Show that

$$\frac{\sin 2A}{1 \cos 2A} \quad \tan A$$

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- **6.** Find the modulus of $(3 \quad 4i) (4 \quad 3i)$.
- **7.** Find the centre and radius of the circle x^2 y^2 12x 6y 11 0.
- **8.** Find the angle between the straight lines 3x 5y 1 0 and 2x 3y 8 0.
- **9.** Differentiate $2e^x$ $3\cos x$ tan 1x w.r.t. x.
- 10. Evaluate :

 $Lt _{x = 0} \frac{\tan 37x}{\sin 11x}$

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.
- **11.** (a) Find the value of

2	3	1
1	2	0
4	5	3

(b) Find the adjoint of the matrix

1	2	3
2	1	4
3	2	1

12. (a) Solve $(2 \sin 1) (\sin 1) 0$.

(b) In any ABC, prove that $\sin A \sin B \sin C \frac{s}{R}$.

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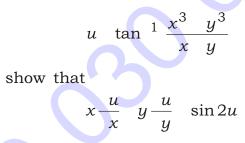
13. (*a*) Show that

$$\frac{\sin 17A \quad \sin 7A}{\cos 17A \quad \cos 7A} \quad \tan 12A$$

(b) Show that

$$\tan \frac{12}{3} \cot \frac{14}{3} \tan \frac{117}{6}$$

- **14.** (a) Find the equation of parabola whose focus is (-1, 1) and directrix $x \ y \ 1 \ 0$.
 - (b) Find the centre, vertices, eccentricity, foci, equations of directrices of the ellipse $4x^2$ 9y 36.
- **15.** (a) Find the equation of the conic whose focus is at (1, 2) and directrix $2x \ y \ 1 \ 0$ with eccentricity 3.
 - (b) Find the centroid of the triangle formed by the points (1, 1, 1), (1, -1, 1) and (-7, -3, -5).
- **16.** (a) Differentiate $\sin(\log x)$ with respect to $\log(\sin x)$.
 - (b) If



- **17.** (*a*) The sum of two numbers is 32. Find them so that their product is maximum.
 - (b) If an error of 0.2 is made in measuring a length 10 cm, find the relative error and percentage error.
- **18.** (a) Find the angle between the curves $x^2 y^2$ 1 and xy 2 at (2, 1).
 - (b) A man of 2 m tall is approaching a lamppost at the rate of 0.5 m/sec. If the lamp is situated at a height of 8 m, find the rate at which the length of the shadow is decreasing.

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