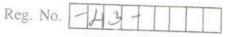
Mathematics
2010 December
Technology BCA
Semester 1
University Exam
Mangalore University

shaalaa.com



BCACAC 103

Credit Based First Semester B.C.A. Degree Examination, Nov./Dec. 2010 (New Syllabus) MATHEMATICS

Time: 3 Hours

Max. Marks: 80

PART - A

1. Answer any ten questions from the following:

 $(2 \times 10 = 20)$

- a) Define partial fraction, give one example.
- b) Find the value of x, if $\log_{16}256 = x$.
- c) Find n, if ${}^{2n}P_3 = 2$. ${}^{n}P_4$
- d) Convert:
 - a) $\frac{9\pi}{5}$ radians into degrees
 - b) 30 seconds into radian
- e) Determine the signs of the following trigonometric functions
 - (a) $\tan \frac{13\pi}{3}$
- b) sec (-280°)
- f) Prove that $\frac{\sin \theta}{\csc \theta} + \frac{\cos \theta}{\sec \theta} = 1$
- g) Find the value of:
 - a) sin 120

- b) cos (-225)
- h) Find the coordinates of any points lying on x-axis and origin.
- i) If the centroid of a triangle is (0, 3) and two of its vertices are (2, -2) and (-4, 6). Find the third vertex.

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BCACAC 103

-2-



(5+5+5)

- j) Evaluate lim $\theta \rightarrow 0 \frac{\sin 3\theta}{\sin 2\theta}$
- k) Find the length of the tangent from (-3, 1) to the circle $3x^2 + 3y^2 5x 6y 12 = 0$
- I) In an ellipse the major and minor axes are in the ratio 5: 3, what is the eccentricity?

PART - B

Answer one full question from each unit.

UNIT - I

- 2. a) Resolve $\frac{x^2-10x+13}{(x+1)(x^2-5x+6)}$ into partial fractions.
 - b) Prove that $\log \frac{81}{8} 2 \log \frac{2}{3} + 3 \log \frac{2}{3} + \log \frac{3}{4} = 0$
 - c) Find the term independent of x in $\left(\frac{4x^2}{3} + \frac{3}{2x}\right)^2$
- 3. a) Resolve $\frac{3x^2+2x-2}{(x-1)^2(2x-1)}$ into partial fractions. (5+5+5)
 - b) Find the middle terms in the expansion of $\left(3x \frac{2x^2}{3}\right)^7$
 - c) Using logarithms, find the value of
 - a) $\frac{71370 \times 82 \times 17}{365 \times 400}$
- b) (1.035)⁻¹²



-3-

BCACAC 103

UNIT - II

4. a) Define radian, and also prove that radian is a constant.

(5+5+5)

- b) If $\sec \theta = \frac{6}{5}$, Find the values of the trigonometric functions of θ .
- c) Prove that

1

i)
$$\tan (315)$$
. $\cot (-405) + \cot 495$. $\tan (-585) = 2$

ii)
$$\frac{1 - \tan^2 A}{1 + \tan^2 A} = 1 - 2 \sin^2 A$$

- a) Find in radian measure the angle between the hour hand and minute hand of a clock at 10 40 AM.
 - b) Simplify, $\frac{\sec 60.\tan^2 45.\cos^2 30.\tan^2 30}{\sec 60.\csc^2 30 \sin 30.\sin^2 60.\tan^2 30}$
 - c) Solve triangle ABC, given $a = 2\sqrt{3}$, b = 2, $C = 30^{\circ}$. (5+5+5)

UNIT - III

- 6. a) Show that the points (1, 1), (-1, 1) and $(-\sqrt{3}, \sqrt{3})$ are the vertices of an equilateral triangle and also find its area.
 - b) In what ratio is the line segment joining the points (2, -3), (5, 6) is divided by the x-axis? y-axis?
 - c) Find the equations of straight line passing through (4, 5) and
 - i) parallel to
- ii) perpendicular to 4x 3y + 7 = 0

(5+5+5)

BCACAC 103

7. a) Find the perimeter of the triangle formed by the points (5, 0), (4, -2) and (2, -1).

- b) Find the equation to the bisector of AB where A (-4, 6) and B (8, 8).
- c) Find the value of k, if the line joining P(2, 3) and Q(5,7) is perpendicular to the line joining A (5, k) and B (3, 2).
- d) Find the equation of the sides of the triangle formed by the points A (2, 4), B (4, 6) and C (3, -6).

8. a) Evaluate:

(5+4+6)

- i) $\lim_{x \to a} \frac{x^n a^n}{x a} = n.a^{n-1}$, if n is positive integer.
- ii) $\lim_{x\to 3} \frac{x^4-81}{x-3}$
- b) Find the equation of the tangent to the carcle, $5(x^2 + y^2) + 4x + 2y 60 = 0$ at (1, 3).
- c) Find the focus, directrix, vertex, axis, the end points of latus rectum, and the length of latus rectum of the parabola $y^2 = 16x$.
- 9. a) i) Find the length of tangent drawn from the point (6, -1) to the circle $x^2 + y^2 + 2x 4y + 11 = 0$ (4+6+5)
 - ii) Find centre and radius of the circle, $4x^2 + 4y^2 + 80x + 12y + 265 = 0$.
 - Find the centre, vertices, lengths of major axis and minor axis, the length of a LR, eccentricity foci, and end points of latus rectum of the ellipse,

$$\frac{x^2}{16} + \frac{y^2}{9} = 1$$

- c) Evaluate: i) $\lim_{x\to 0} \frac{\sin 2x \cdot \tan 4x}{x^2}$
 - ii) $\lim_{\theta \to 0} \frac{\sin 3\theta \cdot \tan 4\theta}{\theta \cdot \sin 5\theta}$