

Mathematics
2010 December
Technology BCA
Semester 1
University Exam
Mangalore University

shaalaa.com



Reg. No.

-H3-

--	--	--	--	--

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 :

(2×10=20)

- a) Define partial fraction, give one example.
- b) Find the value of x, if $\log_{16} 256 = x$.
- c) Find n, if ${}^{2n}P_3 = 2 \cdot {}^n P_4$
- 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) $\sec (-280^\circ)$
- f) Prove that $\frac{\sin \theta}{\operatorname{cosec} \theta} + \frac{\cos \theta}{\operatorname{Sec} \theta} = 1$
- 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.

P.T.O.



- 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 $3x^2 + 3y^2 - 5x - 6y - 12 = 0$
- l) 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 - 1

2. a) Resolve $\frac{x^2 - 10x + 13}{(x+1)(x^2 - 5x + 6)}$ into partial fractions. (5+5+5)
- 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 $\left(\frac{4x^2}{3} + \frac{3}{2x}\right)^9$
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) $(1.035)^{-12}$



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

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

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

1. 5. a) Find in radian measure the angle between the hour hand and minute hand of a clock at 10 : 40 AM.

b) Simplify, $\frac{\sec 60 \cdot \tan^2 45 \cdot \cos^2 30 \cdot \tan^2 30}{\sec 60 \cdot \operatorname{cosec}^2 30 - \sin 30 \cdot \sin^2 60 \cdot \tan^2 30}$

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)



7. a) Find the perimeter of the triangle formed by the points (5, 0), (4, -2) and (2, -1).
(4+4+4+3)
- 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).

UNIT - IV

8. a) Evaluate : (5+4+6)

i) $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = n \cdot a^{n-1}$, if n is positive integer.

ii) $\lim_{x \rightarrow 3} \frac{x^4 - 81}{x - 3}$

- b) Find the equation of the tangent to the circle, $5(x^2 + y^2) + 4x + 2y - 60 = 0$ 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 (4+6+5)
 $x^2 + y^2 + 2x - 4y + 11 = 0$
- ii) Find centre and radius of the circle, $4x^2 + 4y^2 + 80x + 12y + 265 = 0$.
- b) 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) $\lim_{x \rightarrow 0} \frac{\sin 2x \cdot \tan 4x}{x^2}$

ii) $\lim_{\theta \rightarrow 0} \frac{\sin 3\theta \cdot \tan 4\theta}{\theta \cdot \sin 5\theta}$