

Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND
ECONOMICS, PONDA-GOA

B.C.A. (SEMESTER-I) EXAMINATION, OCTOBER 2013
BCA104 BASIC MATHEMATICS

Duration: 2 hours

Marks: 50

Instructions:

1. All questions are compulsory. However, internal choice has been provided from Q.2 to Q.5.
2. Figures to the right indicate full marks.
3. Use of calculators is NOT allowed.
4. Graph papers and Log books will be provided when asked.

Q.1. Fill in the blanks:

(10 x 1 = 10)

- a) If $\log 2 = 0.3010$ then $\log 8 =$ _____.
- b) If $5^a = 3125$, then $5^{a+1} =$ _____.
- c) If $a + b = 9$ and $a^2 + b^2 = 29$, then $ab =$ _____.
- d) $i^{42} - 5i^{18} - 4i^{24} =$ _____.
- e) The LCM of two numbers is 7700 and HCF is 11, if one of the numbers is 275 then the other is _____.
- f) If $\log 27 = 1.431$ then $\log 9 =$ _____.
- g) 0.125125125... expressed as a rational number is _____.
- h) 15:18::x:24, then $x =$ _____.
- i) $(16)^{0.16} \times (16)^{0.09} =$ _____.
- j) If $z = -2 - 3i$, then $|z| =$ _____.

Q.2.

- A. Check whether the vectors $\vec{a} = 2\mathbf{i} + 3\mathbf{j} + 6\mathbf{k}$ and $\vec{b} = 3\mathbf{i} + 6\mathbf{j} + 2\mathbf{k}$ are perpendicular to each other. (2)
- B. Find the area and perimeter of a square whose diagonal is $6\sqrt{2}$ cm. (3)
- C. Solve the following system of equations by Cramer's rule:
$$5x + 3y + z = 16, 2x + y + 3z = 19, x + 2y + 4z = 25$$
 (5)

OR

Q.II.

- a. Find the area of the parallelogram whose adjoining sides are given by the vectors $\mathbf{i} - 4\mathbf{j} - \mathbf{k}$ and $-2\mathbf{i} - \mathbf{j} + \mathbf{k}$. (2)
- b. Find the area of a sector when its arc is 4cm and radius is 5cm. (3)
- c. Solve the following system of equations by using matrix inversion method:

$$2x - y + 4z = 18, -3x + z = -2, -x + y = 0 \quad (5)$$

Q.3.

- A. If vectors $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$ are represented by $3\mathbf{i} + 2\mathbf{j}$ and $\mathbf{b} = 2\mathbf{i} + \mathbf{j} - \mathbf{k}$ respectively, find the vector perpendicular to both $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$. (2)
- B. Find the fifth term and the infinite sum of the sequence $-2, 1, -1/2, \dots$ (3)
- C. Evaluate: $\lim_{x \rightarrow \infty} (\sqrt{x^2 + 5x + 4} - \sqrt{x^2 - 3x + 4})$

$$x \rightarrow \infty \quad (5)$$

OR

Q.III.

- a. Find $|\vec{\mathbf{AB}}|$ where $A = (3, 4, 5)$ and $B = (4, 3, 2)$. (2)
- b. Find three terms in A.P. whose sum 45 is and product is 3240. (3)
- c. Discuss the continuity of the function $f(x)$ at $x = 2$, where

$$f(x) = \begin{cases} x^2 - 4 & 0 \leq x \leq 2 \\ 3x + 2 & 2 < x \leq 4 \end{cases} \quad (5)$$

Q.4.

- A. Using Trigonometry, prove the identity $\tan^2\theta + 1 = \sec^2\theta$. (3)
- B. Find the square roots of $\sqrt{3} + i$. (3)
- C. If $(0, 3)$ is the intersection of the lines $x + 2y = 6$ and $3x - ky = 3$, find k . (4)

OR

Q.IV.

- a. Using Trigonometry prove the identity $\sin^2\theta + \cos^2\theta = 1$. (3)
- b. Use De Moivre's theorem to find an expression for $\cos 2\theta$ and $\sin 2\theta$ in terms of $\cos\theta$ and $\sin\theta$. (3)

c. What is the equation of the circle with the point (2, -2) as the centre and radius 5 units? (4)

Q.5.

A. If $y = \sin x - 15x^2 + e^{2x}$, find y' and y'' . (5)

B. If $\int_1^2 (3x^2 + 2x + k) dx = 8$, find k . (5)

OR

Q.V.

a. Differentiate w.r.t. x : $f(x) = 5x^3 + 3/x + 2\log x + 9^x$. (5)

b. Integrate w.r.t. x : $\int (\cos x + e^x - 12x^3) dx$. (5)

-----ALL THE BEST!-----