Goa Vidyaprasarak Mandal's

GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS, PONDA-GOA

B.C.A (SEMESTER-I) EXAMINATION, OCTOBER 2018

BCA 104 BASIC MATHEMATICS

Duration : 2 hours Marks: 50

Instructions: (1) Attempt all the questions.

(2) Figures to right indicate full marks.

Q.1 Fill in the blanks: (10x1 = 10)

a) $log_a(mn)$ = ………… where, m,n,a >1and a ≠ 1.

b) If 5^a= 125 then, a = …………

c) Area of a circle of radius 5 cm is given by ……….cm^2

d) If a, b, c are in arithmetic progression, then b = …………..

e) Let $z = 3 + 4i$, then $\bar{z}$ = ………………

f) If $f(x) = \frac{4x-1}{x-1}$, then $f(3x)$ =…………

g) If 4:7::x:35, then x =………

h) The factors of $x^2 + 3x + 2$ are ……….. and …………..

i) The greatest common divisor (g.c.d) of 37 and 249 is………

j) If log 2 = 0.3010, then log 8 = ………

Q.2

A. Prove that the vectors $\vec{a} = \hat{i} + 2\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + \hat{j} + 3\hat{k}$ are perpendicular to each other. (2)

B. The diameter of cone is 14m and its slant height is 9m. Find its curved surface area and total surface area. (3)

C. If $A = \begin{bmatrix} 2 & 1 \\ 2 & 4 \end{bmatrix}$ $and\ B = \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}$. Find A^2-3B+2I (5)

OR

Q.II

a. Find the area of the parallelogram whose adjacent sides are given by vectors $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$ and $\vec{b} = 3\hat{i} - 2\hat{j} + \hat{k}$ (2)

b. The side of a square field is 89 meters. By how much square meter does its area fall short of hectare? (Given: A hectare = 10000mt^2) (3)

c. Solve the following system of equations by using Cramer's rule. (5)

5x + 3y + z = 16

2x + y + 3z = 19

x + 2y + 4z = 25

Q.3

A. Find $\vec{a} \times \vec{b}$ if $\vec{a} = 2\hat{\imath} + 3\hat{\jmath} + 6\hat{k}$ and $\vec{b} = 3\hat{\imath} - 6\hat{\jmath} + 2$ (2)

B. If for an A.P. d=10 and S_{30}=4500, find a and T_{30}. (3)

C. Evaluate the following limit

$\lim_{x \to 2} \frac{x^5 - 32}{x^2 - 4}$ (5)

OR

Q.III

a. Find a unit vector perpendicular to both the vectors $\vec{a} = 4\hat{\imath} - \hat{\jmath} + 3\hat{k}$ and $\vec{b} = -2\hat{\imath} + \hat{\jmath} - 2\hat{k}$ (2)

b. If a, b, c are in A.P, prove that $3a^2 - 4b^2 + c^2 = 2a(a - c)$. (3)

c. Discuss the continuity of the following function at x=1.

$f(x) = \begin{cases} 2x + 3, & 0 \le x < 1 \\ 3x + 2, & 1 \le x < 2 \end{cases}$ (5)

Q.4

A. Using trigonometry, prove the identity (3)

$$\frac{cot\theta + cosec\theta}{1 + cos\theta} = cosec\theta$$

B. Use De Moivre's theorem to prove the following (3)

$\sin 2\theta = 2 \sin\theta \cos\theta$

C. Find the coordinates of P dividing AB externally in the ratio 5:2 where A=(0,-5) and B=(7,9) (4)

OR

Q.IV

a. Using trigonometry, prove the following identity (3)

$\cos 2\theta = 1 - 2\sin^2\theta$

b. Use De Moivre's theorem to prove the following (3)

$\cos 3\theta = 4\cos^3\theta - 3\cos\theta$

c. Find the equation of the line through the point of intersection of x + 2y - 4 =0, x – 3y + 1 =0 and also through the mid-point of the segment joining (2,5) and (4,3) (4)

Q.5

A. If $f(x) = a\sin(logx)$,prove that $x^2f''(x) + xf(x) + f(x) = 0$ (5)

B. Evaluate $\int_0^{log 3} \frac{e^x}{1+e^x}\, dx$ (5)

OR

Q.V

a. Examine the function $f(x) = x^2 + 2x$ for maxima or minima. (3)

b. Differentiate $y = (x^2 - 3x + 5)^{10}$ with respect to x. (2)

c. Evaluate $\int_0^2 (sinx - 2^x)dx$.(5)

xxxxxxxxxxxxxx