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GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS, PONDA-GOA
B.C.A. (SEMESTER-I) SUPPLEMENTARY EXAMINATION
MAY/JUNE 2017

BCA 104 BASIC MATHEMATICS

Duration : 2 hours Marks : 50

Q.1. Fill in the blanks: (10×1=10)

a) If $\sin\theta = \frac{5}{13}$, then $\cos\theta =$_____.

b) If $f(x) = x^4 + x$, then $\int_2^3 f(x)dx =$_____.

c) If $y = x\log x$, then $y' =$_____.

d) Prime factorisation of 900 is _____ .

e) $lcm(186,54) =$ _____.

f) $\lim_{x\to 0} \frac{sinx}{x} =$_____.

g) Let $\log_3 x = 5$, then $x =$_____.

h) In a G.P. $a = 3$ and $r = 2$, then $S_6 =$ _____.

i) The centre of the circle $x^2 + y^2 + 6x - 8y + 10 = 0$ is _____.

j) Let $z_1 = -2 + 3i$ and $z_2 = 7 - 8i$, then $z_1\bar{z}_2 =$_____.

Q.2.

a) Find the area of a parallelogram whose adjacent sides are $\hat{\imath} - 2\hat{\jmath} + 3\hat{k}$ and $\hat{\imath} - 4\hat{\jmath} + 5\hat{k}$. (3)

b) Use De Moivre's theorem to prove that $cos2\theta = 2\cos^2\theta - 1$. (2)

c) Solve the following system of equations by using matrix method (5)
$3x - 4y + 5 = 0$, $7x + 3y + 6 = 0$

OR

d) Find unit vector perpendicular to $\hat{\imath} - 3\hat{\jmath} + 2\hat{k}$ and $-\hat{\imath} + 2\hat{\jmath} - 3\hat{k}$. (3)

e) Let $z = 3 - 2i$, verify $z\bar{z} = |z|^2$. (2)

f) Solve the following system of equations by using Cramer's Rule. (5)
$3x - 4y - 8 = 0$, $x - 6y - 4 = 0$

Q.3.

a) Check whether the vectors $a = 3\hat{\imath} - 3\hat{\jmath} - 5\hat{k}$ and $b = \hat{\imath} + 6\hat{\jmath} - 3\hat{k}$ are perpendicular. (2)

b) The diameter of a cylinder is 4cm and height is 10cm. Find its lateral surface area, total surface area and volume. (3)

c) In a bag, there are coins of 25p, 10p and 5p in the ratio 1:2:3. If there is ` 30 in all, how many 10p coins are there? (5)

OR

d) Find angle between the two vectors $a = -\hat{\imath} + 2\hat{\jmath} + \hat{k}$ and $b = -3\hat{\imath} - 6\hat{\jmath} + \hat{k}$. (2)

e) The diameter of a cone is 9m and its slant height is 5m. Find its total surface area. (3)

f) The sum of three numbers is 98. If the ratio of the first to second is 5:8 and that of the first to the third is 3:2, then find the three numbers. (5)

Q.4.

a) Let $z_1 = -3 + 4i$ and $z_2 = 2 + 5i$. Verify $z_1 z_2 = z_2 z_1$. (2)

b) Find the three numbers in A.P. whose sum is 39 and product is 1560. (3)

c) Check whether (2,1), (6,5) and (4,7) are the vertices of a right angled triangle. (5)

OR

d) Write $z = \sqrt{3} + i$ in polar form. (2)

e) Find the three numbers in G.P. whose sum is 78 and product is 5832. (3)

f) Check whether the points (-1,5), (-2,7) and (1,6) are collinear. (5)

Q.5.

a) Let $f(x) = e^x$ and $g(x) = logx$. Find $(f \bullet g)(x)$. (2)

b) Let $f(x) = \frac{x^2-6x+9}{x^2-9}$, find $\lim_{x\to 3} f(x)$. (2)

c) Examine the function $f(x) = x^2 - 6x$ for maxima or minima. (3)

d) Evaluate $\int_0^1 2x^2 + sinx\ dx$. (3)

OR

e) Check whether $f(x) = \begin{cases} x^2 & x \le 2 \\ -x^2 & x > 2 \end{cases}$ is continuous. (2)

f) Find $\lim_{x\to 3} \frac{x^3-27}{x-3}$. (2)

g) Examine the function $f(x) = 3x^3 - x$ for maxima or minima. (3)

h) Evaluate $\int_0^2 \sin x - 2^x\, dx$. (3)

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