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GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND
ECONOMICS, PONDA-GOA
B.C.A. (SEMESTER-I) EXAMINATION, OCTOBER 2017
BCA 104 BASIC MATHEMATICS

Duration : 2 hours

Marks : 50

Q.1. Fill in the blanks:

(10×1=10)

- a) If $\tan \theta = \frac{5}{12}$, then $\operatorname{cosec} \theta =$ _____.
- b) If $f(x) = 4x^3 - 1$, then $\int_2^3 f(x)dx =$ _____.
- c) If $y = x \tan x$, then $y' =$ _____.
- d) Prime factorisation of 880 is _____.
- e) $\operatorname{gcd}(210,49) =$ _____.
- f) $\lim_{x \rightarrow 0} \frac{\tan x}{x} =$ _____.
- g) Let $\log_2 x = 4$, then $x =$ _____.
- h) In a H.P. $a = \frac{1}{2}$ and $b = \frac{1}{3}$, then $t_4 =$ _____.
- i) The centre of the circle $x^2 + y^2 - 4x - 7y + 10 = 0$ is _____.
- j) Let $z_1 = -\sqrt{3} + 3i$ and $z_2 = \sqrt{3} - i$, then $z_1 \bar{z}_2 =$ _____.

Q.2.

- a) Find the area of a triangle whose sides are $2\hat{i} + 3\hat{j} - 2\hat{k}$ and $3\hat{i} - \hat{j} + 2\hat{k}$. (3)
- b) Let $z = 5 - 2i$, verify $z\bar{z} = |z|^2$. (2)
- b) Solve the following system of equations by using matrix method (5)
 $4x - 3y - 11 = 0$, $3x + 7y + 1 = 0$
- OR**
- d) Find unit vector perpendicular to $2\hat{i} - \hat{j} + 2\hat{k}$ and $10\hat{i} - 2\hat{j} + 7\hat{k}$. (3)
- e) Use De Moivre's theorem to prove that $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$ (2)
- f) Solve the following system of equations by using Cramer's Rule. (5)
 $5x + 2y - 7 = 0$, $6x - 5y - 38 = 0$

Q.3.

- a) Check whether the vectors $a = 3\hat{i} + 2\hat{j} + \hat{k}$ and $b = \hat{i} + \hat{j} + 3\hat{k}$ are perpendicular. (2)
- b) The diameter of a cylinder is 0.4m and height is 10cm. Find its curved surface area, total surface area and volume. (3)
- c) Mother divided the money among Joy Maria and Julie in the ratio 2:3:5 respectively. If Maria got `150, then find the total amount of money and the money received by Joy and Julie. (5)
- OR**
- d) Find angle between the two vectors $a = -\hat{i} + 2\hat{j} + \hat{k}$ and $b = -3\hat{i} - 6\hat{j} + \hat{k}$. (2)
- e) The diameter of a cone is 0.9m and its slant height is 5cm. Find its lateral surface area total surface area and volume. (3)
- f) The sum of three numbers is 120. If the ratio of the first to second is 3:4 and that of the first to the third is 3:5, then find the three numbers. (5)

Q.4.

- a) Let $z_1 = -1 + 3i$ and $z_2 = 2 + 3i$. Verify $z_1 z_2 = z_2 z_1$. (2)
- b) Find the three numbers in G.P. whose sum is 35 and product is 1000. (3)
- c) Check whether $(-1,3)$, $(2,5)$ and $(6,-1)$ 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 A.P. whose sum is 33 and product is 1320. (3)
- f) Check whether the points $(-1,5)$, $(-2,7)$ and $(1,6)$ are collinear. (5)

Q.5.

- a) Let $f(x) = \frac{x^2-9}{x-3}$ then find $\lim_{x \rightarrow 3} f(x)$. (2)
- b) Let $f(x) = x^2 + 2$ and $g(x) = 3x + 2$. Find $(f \circ g)(x)$. (2)
- c) Show that $yy'' - y' \cos x + 1 = 0$ if $y = \sin x$ (3)
- d) Evaluate $\int_0^\pi \sin 3x + \cos 3x \, dx$. (3)

OR

- e) Check whether $f(x) = f(x) = \begin{cases} \frac{e^{2x}-e^{3x}}{x} & x \neq 0 \\ -1 & x = 0 \end{cases}$ is continuous at $x=0$ (2)

- f) Find $\lim_{x \rightarrow 3} \frac{x^3-27}{x-3}$. (2)
- g) If $y = \tan x$ then show that $y'' - 2yy' = 0$ (3)
- h) Evaluate $\int_0^2 (x^2 - 2^x) dx$. (3)

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