

Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND
ECONOMICS, PONDA-GOA
B.C.A. (SEMESTER-I) SUPPLEMENTARY EXAMINATION,
MAY/JUNE 2018
BCA 104 BASIC MATHEMATICS

Duration : 2 hours

Marks : 50

Q.1. Fill in the blanks: (10×1=10)

- a) If $\cos \theta = \frac{5}{12}$, then $\cot \theta =$ _____.
- b) If $f(x) = \sec^2 2x$, then $\int_0^\pi f(x) dx =$ _____.
- c) If $y = xe^{2x}$, then $y' =$ _____.
- d) Prime factorization of 760 is _____.
- e) $LCM(255,60) =$ _____.
- f) $\lim_{x \rightarrow 0} \frac{e^{2x}-1}{x} =$ _____.
- g) Let $\log_{10} x = 2$, then $x =$ _____.
- h) In a A.P. $a = 10$ and $d = 2$, then $T_{17} =$ _____.
- i) The center of the circle $x^2 + y^2 - 8x + 10y - 17 = 0$ is _____.
- j) Let $z_1 = 2 + 3i$ and $z_2 = 3 - 2i$, then $z_1 \bar{z}_2 =$ _____.

Q.2.

- a) Find the area of a parallelogram whose adjacent sides are $\hat{i} + 2\hat{j} + 2\hat{k}$ and $\hat{i} + \hat{j} + 2\hat{k}$ (3)
- b) Solve the following system of equations by using matrix method (5)
 $2x + y - 5 = 0$, $5x - 2y - 8 = 0$
- c) If $\log_{10} y + \log_{10}(y - 3) = 1$ then find the value of y (2)
- OR**
- d) Find unit vector perpendicular to $2\hat{i} - \hat{j} + \hat{k}$ and $3\hat{i} + 4\hat{j} - \hat{k}$. (3)
- e) Solve the following system of equations by using Cramer's Rule (5)
 $x + 2y - 8 = 0$, $x - 3y + 7 = 0$
- f) Use De Moivre's theorem to prove that $\sin 2\theta = 2 \sin \theta \cos \theta$ (2)

Q.3.

- a) Check whether the vectors $a = \hat{i} + \hat{j} + \hat{k}$ and $b = 3\hat{i} - 2\hat{j} - \hat{k}$ are perpendicular. (2)
- b) The diameter of a cylinder is 20 cm and height is half its radius. Find its total surface area and volume. (3)
- c) If ` 370 is divided into three parts such that second part is $\frac{1}{4}$ th of the third part and the ratio between the first and the third part is 3:5. Then find each part. (5)
- OR**
- d) Find angle between the two vectors $a = \hat{i} + \hat{j} - 3\hat{k}$ and $b = 7\hat{i} - 4\hat{j} + \hat{k}$. (2)
- e) The diameter of a cone is 9m and its slant height is 5m. Find its total surface area and volume. (3)
- f) The sum of three numbers is 34. If the ratio of the first to second is 3:4 and that of the first to the third is 2:5, then find the three numbers. (5)

Q.4.

- a) If $z_1 = 3 + 5i$ and $z_2 = 2 + 3i$. Then show that $\overline{z_1 \cdot z_2} = \bar{z}_1 z_2$ (2)
- b) Find the three numbers in G.P. whose sum is 49 and product is 2744. (3)
- c) Check whether (3,-1), (-1,2) and (2,6) are the vertices of a right angled triangle. (5)

OR

- d) Find the cube roots of unity. (2)
- e) Find the three numbers in A.P. whose sum is 45 and product is 3315. (3)
- f) Check whether the (3,8), (5,4) and (8,-2) are collinear. (5)

Q.5.

- a) Let $f(x) = \frac{x^3-8}{x-2}$ then find $\lim_{x \rightarrow 2} f(x)$. (2)
- b) Let $f(x) = \sec x$ and $g(x) = x^2 + 2x - 1$. Find $(g \circ f)(x)$. (2)
- c) Show that $x^2 y'' - xy' = 0$ if $y = \log x$ (3)
- d) Evaluate $\int_0^2 \frac{x^2+2x}{x^3+3x^2+12} dx$. (3)

OR

- e) Check whether $f(x) = \begin{cases} \frac{\tan 3x - \sin 2x}{x} & x \neq 0 \\ 1 & x = 0 \end{cases}$ is continuous at $x=0$ (2)
- f) Find $\lim_{x \rightarrow 3} \frac{x^2-6x+9}{x-3}$. (2)
- g) If $y = \cos x$ then show that $y'' + y = 0$ (3)
- h) Evaluate $\int_0^2 (e^{3x} - 3^x) dx$. (3)

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