

Vidya Vikas Mandal's
Shree Damodar College of Commerce & Economics, Margao – Goa
FYBCA, Semester I, End Semester Examination October 2017
BASIC MATHEMATICS (BCA101)

Duration: 2 Hours

Max. Marks: 50

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate maximum marks.
3. Start each question on fresh page.

Q.1 Attempt the following

A. Match the following

Marks (1X5)

A

B

- i. Volume of a sphere
- ii. Area of a circle
- iii. Area of a rhombus
- iv. Total surface area of a cone
- v. Area of a trapezium

- a) $\frac{1}{2}b(h_1 + h_2)$
- b) $\frac{1}{2}(d_1 \times d_2)$
- c) $\pi r(r + l)$
- d) πr^2
- e) $4\pi r^2$
- f) $\frac{4}{3}\pi r^3$

B. Answer the following

Marks (1X5)

- a. Use root test to show that 41 is a prime number
- b. Find $\gcd(23, 24)$
- c. Find $\text{lcm}(25, 3)$
- d. Find $\begin{vmatrix} 1 & 2 & 3 \\ 3 & 1 & 3 \\ 2 & 4 & 6 \end{vmatrix}$
- e. Find adjoint of $\begin{bmatrix} -1 & 3 \\ 2 & -1 \end{bmatrix}$

Q.2 Answer the following questions (any two)

Marks (5X2)

A. Evaluate the following integrals

- i. $\int \frac{1}{4-9x^2} dx$
- ii. $\int \frac{3x^2+5}{x^3+5x+9} dx$

B. Find volume and total surface area of a cuboid whose sides are 3m, 4m and 5m

C. Find three numbers in A.P such that their sum is 60 and the sum their squares is 1400

Q.3 Answer the following (any two)

Marks (5X2)

A. Prove that

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

ii. $\sin 2\theta = \frac{2 \tan \theta}{1 + \tan^2 \theta}$

B. Find x and y if $\begin{bmatrix} x & 2 \\ -1 & 2y \end{bmatrix} + \begin{bmatrix} 3y & 1 \\ 3 & 4x \end{bmatrix} = \begin{bmatrix} 4 & 3 \\ 2 & 6 \end{bmatrix}$

C. Find the product $\begin{bmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix} \begin{bmatrix} -1 & 2 \\ 0 & 1 \\ 3 & -2 \end{bmatrix}$

Q.4 Answer the following (any two)

Marks (5X2)

A. Evaluate the following limits

i. $\lim_{x \rightarrow 2} \frac{\log x - \log 2}{x - 2}$

ii. $\lim_{x \rightarrow 0} \left[\frac{4^x - 3^x}{x} \right]$

B. Let $z_1 = 2 - 7i$ and $z_2 = 3i$, prove that $\overline{z_1 + z_2} = \overline{z_1} + \overline{z_2}$ and $\overline{z_1 z_2} = \overline{z_1} \overline{z_2}$

C. Discuss the continuity of the following function at $x = \pi/4$ and $x = \pi/2$

$$f(x) = \begin{cases} \sin x & , 0 \leq x \leq \pi/4 \\ \tan x & , \pi/4 < x \leq \pi/2 \\ \cos x & , x > \pi/2 \end{cases}$$

Q.5 Answer the following (any two)

Marks (5X2)

A. Find derivatives the following with respect to x

i. $\frac{2x+5}{3x-2}$

ii. $(3x+5)(x-2)$

B. Solve $7 + 77 + 777 + \dots$ up to n^{th} term

C. If $\vec{a} = \hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = 4\hat{i} + \hat{j} - 2\hat{k}$ find $\vec{a} \times \vec{b}$ and $\vec{a} \cdot \vec{b}$.

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