



41122/A 220

Reg. No.

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I Semester B.C.A.4 Degree Examination, Nov./Dec. 2018
MATHEMATICS – I (Regular/Repeater)

Time : 3 Hours

Max. Marks :80

- Instructions :** a) Answer **all** Sections as per instructions.
 b) Use of simple calculator is **allowed**.

SECTION – A

I. Answer **all** questions.

(10×2=20)

- 1) a) Express $\frac{3+4i}{3-4i}$ in the form $x + iy$.
- b) Simplify $\frac{(\cos \theta + i \sin \theta)^{10}}{(\cos 2\theta - i \sin 2\theta)^{-4}}$
- c) Find 20th term of the sequence 5, 8, 11,
- d) If a, b, c are in G. P. then find G. M. between a and c.
- e) Expand using Binomial Theorem $(a + b)^3$.
- f) The angle of elevation of the top of tower at a distance of 100 metres is 30°, find its height.
- g) Find the unit vector in the direction of the vector $\vec{a} = i + j + k$.
- h) Find the projection of \vec{a} on \vec{b} if $\vec{a} = 2i + 3j + 5k$ and $\vec{b} = 2i - j + 2k$.
- i) Find the co-ordinates of the midpoint of the line joining the points (4, 7) and (6, 9).
- j) Find the co-ordinate of the point which divides internally the line joining points (1, 3) and (2, 7) in the ratio 3 : 4.

SECTION – B

II. Answer **any four** questions.

(4×5=20)

- 2) Find the conjugate of the complex number and express it in the form

$$x + iy. Z = \frac{2-i}{2+i} + \frac{1+3i}{1-3i}$$

- 3) Find the sum of
- $7 + 77 + 777 + \dots$
- to 'n' terms.

- 4) Find the 7
- th
- term in expansion of
- $\left(3x^2 - \frac{y}{3}\right)^9$

- 5) In any Triangle ABC prove that
- $a(\sin B - \sin C) + b(\sin C - \sin A) + c(\sin A - \sin B) = 0$
- .

- 6) Show that the points (2, -3), (-6, 5) and (-8, 7) are collinear.

SECTION – C

III. Answer **any four** of the following.

(4×10=40)

- 7) a) Simplify =
- $\frac{[\cos 3\theta + i \sin 3\theta]^5 \cdot [\cos 2\theta - i \sin 2\theta]^3}{[\cos 4\theta + i \sin 4\theta]^2 \cdot [\cos 5\theta - i \sin 5\theta]^4}$

- b) Express
- $\left(\frac{2+i}{3+i}\right)^2$
- in the form
- $x + iy$
- .

(5+5)

P.T.O.



- 8) a) Find the Three Numbers in A. P. whose sum of three Numbers is 21 and their product is 280.
b) Insert five geometric means between 3 and 192. **(5+5)**
- 9) a) Find the middle term in the expansion of $\left(x + \frac{2}{x}\right)^8$
b) If α and β are the roots of the equation $3x^2 + 5x + 1 = 0$ then find the values of $\frac{1}{\alpha} + \frac{1}{\beta}$. **(5+5)**
- 10) a) Find the cosine of the angle between the pairs of vectors $\vec{a} = i + j + k$ and $\vec{b} = 2i + 3j - 4k$.
b) Find the area of parallelogram whose adjacent sides are $3i + 2j + k$ and $5i + 3j - 4k$. **(5+5)**
- 11) a) Find the equation of the straight line passing through $(-1, 5)$ and having slope $\frac{2}{7}$.
b) Find the point of intersection of the lines $2x + 3y + 7 = 0$ and $3x - 5y + 1 = 0$. **(5+5)**
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