41122/A 220

Reg. No. | | | | | | | | |

I Semester B.C.A. 4 Degree Examination, November/December 2017
(Regular)
MATHEMATICS – I

Time : 3 Hours Max. Marks : 80

***Instruction** : Answer **all** Sections.*

SECTION – A

I. Answer **any ten** of the following questions : **(10×2=20)**

1) a) Express $\frac{3+4i}{3-4i}$ in the form x + iy.

b) Simplify $\frac{(\cos 4\theta + i\sin 4\theta)^3}{(\cos 2\theta - i\sin 2\theta)^4}$.

c) If the first term of an A.P. is 5 and seventh term is –7, then find the common difference.

d) Find the Geometric mean of a, G, b.

e) If α and β are the roots of equation $2x^2 + 4x - 5 = 0$. Find the value of $\alpha+\beta$ and $\alpha\,\beta$.

f) Expand using Binomial theorem $(a + b)^3$.

g) P.T. $\sin\theta\ \sec\theta\ \cot\theta = 1$.

h) If $\vec{a} = i - j + 3k$ and $\vec{b} = 2i + j + k$, find $\vec{a}.\vec{b}$.

i) S.T. the pairs of vectors are perpendicular to each other 7i – j + 2k and 2i + 6j – 4k.

j) Find the distance between the points (5, 2) and (9, 5).

k) Find the equation of the line with slope of 2 and cutting off an intercept 3 on y-axis.

l) Find the coordinates of midpoint of line joining the points P(3, 5) and Q (–1, 8).

P.T.O.

SECTION – B

II. Answer **any four** questions : **(4×5=20)**

2) Express $\frac{1-2i}{3+4i}+\frac{i-3}{i}$ in the form x + iy.

3) Find the sum of 7 + 77 + 777 + . . . to n terms.

4) Find the 12^{th} term in expansion of $\left(x+\frac{1}{x}\right)^{13}$.

5) P.T. $\frac{\tan\theta}{\sec\theta-1}+\frac{\tan\theta}{\sec\theta+1}=2\ \text{cosec}\ \theta$.

6) Find cosine of angle between vectors 2i – 3j + k and 5i + j – k.

7) Find the coordinates of the point which divides (i) internally and (ii) externally the line joining the points (–3, 6) and (4, –7) in ratio 5 : 7.

SECTION – C

III. Answer **any four** of the following : **(4×10=40)**

8) a) If x = Cis α y = cis β P.T. $\frac{x^2}{y^3}+\frac{y^3}{x^2}=2\cos(2\alpha-3\beta)$.

b) Simplify $\frac{(\cos6\theta-i\sin6\theta)^3(\cos2\theta+i\sin2\theta)^{-7}}{(\cos5\theta+i\sin5\theta)^{-4}(\cos\theta+i\sin\theta)^8}$. **(5+5=10)**

9) a) In a A.P. the seventh term is 20 and thirteenth term is 38. Find the fourteenth term.

b) Find the sum to ∞ of $4-\frac{8}{3}+\frac{16}{9}-\frac{32}{27}+\ldots$ **(5+5=10)**

10) a) Find the middle term in the expansion of $(3 - x)^{11}$.

b) If α and β are the roots of $x^2 + px + q = 0$ then find the values of $\alpha^2 + \beta^2$. **(5+5=10)**

11) a) In any triangle ABC P.T.

$a(\sin B - \sin C) + b(\sin C - \sin A) + c(\sin A - \sin B) = 0$.

b) Find the area of parallelogram whose adjacent sides are $i + j - k$ and $2i - j + k$. **(5+5=10)**

12) a) Find the equation of the line passing through the point of intersection of $2x - y + 5 = 0$ and $x + y + 1 = 0$ and the points $(5, -2)$.

b) Find the equation of a straight line which passes through $(3, -4)$ and $(-2, 5)$. **(5+5=10)**

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