



41122/A220

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I Semester BCA 4 Degree Examination, Nov./Dec. - 2019**MATHEMATICS-I****(Regular)****Paper - (BCA 4)****Time : 3 Hours****SECTION - A****Maximum Marks : 80**Answer **ALL** of the following questions:**(10×2=20)**

1. a) Express $\frac{2-5i}{2+5i}$ in the form $x+iy$.
- b) Simplify $\frac{[\cos A + i\sin A]^5}{[\cos 2A - i\sin 2A]^{-3}}$
- c) If the fourth term of A.P. is 15 and whose common difference is -2. Find the 8th term of A.P.
- d) Find the Tenth term of the G.P. 5, 25, 125,.....
- 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) State Binomial Theorem.
- g) $P.T. \tan A + \cot A = \sec A \operatorname{cosec} A$
- h) If $\vec{a} = 2\vec{j} - 3\vec{j} - k$ and $\vec{b} = 6\vec{i} - j + 2k$
- i) Find the distance of the point (3,-4) from the origin.
- j) Find the equation of straight line given its intercept on axes (3,4).

SECTION - BAnswer any **FOUR** Questions:**(4×5=20)**

2. Find the conjugate of the complex number and express it in the form $a+ib$ $\frac{2-i}{2+i} + \frac{1+3i}{1-3i}$.
3. The Third term of G.P. is 12 and the sixth term is 96. Find the sum of 9 terms.
4. Find the 8th Term in the expansion of $\left(2x^2 - \frac{3}{x}\right)^{12}$.

P.T.O.



5. Find the area of the parallelogram whose adjacent sides are $\vec{a} = 2i + 3j - 5k$ and $\vec{b} = i + 2j + k$.
6. Find the equation of the straight line which passes through $(3, -4)$ and $(-2, 5)$.

SECTION - C

Answer any **FOUR** Questions:

(4×10=40)

7. a) Simplify: $\frac{(\cos 3\theta + i\sin 3\theta)^5 (\cos 2\theta - i\sin 2\theta)^3}{(\cos 4\theta + i\sin 4\theta)^2 (\cos 5\theta - i\sin 5\theta)^4}$
- b) Express the complex numbers in the polar form and hence find their modules and amplitude
 $z = 1 + i$. (5+5=10)
8. a) In a A.P. the seventh term is 20 and the Thirteenth term is 38. Find the Fourteenth term.
- b) Find the sum of $5+55+555+\dots$ to n terms. (5+5=10)
9. a) Find the middle term in the expansion of $\left(\frac{x}{a} - \frac{a}{x}\right)^{14}$.
- b) If α and β are the roots of $3x^2 - 2x + 1 = 0$ find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$. (5+5=10)
10. a) Prove that $\sqrt{\frac{1 - \sin \theta}{1 + \sin \theta}} = \sec \theta - \tan \theta$.
- b) In any Triangle ABC, prove that $2[bc\cos A + ca\cos B + ab\cos C] = a^2 + b^2 + c^2$. (5+5=10)
11. a) Show that the points $A(2, -4)$ $B(4, -2)$ and $C(7, 1)$ are collinear.
- b) Find the co-ordinates of the point which divides
- Internally
 - Externally the line joining the points $(2, 3)$ and $(4, 5)$ in the ratio 1:2. (5+5=10)