BCA(Sem-II) —
Math (203) GE – 2

2018

Time : $1\frac{1}{2}$ hours

Full Marks : 40

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Sections as directed.

Section – A

Answer any **four** questions of the following :

6×4 = 24

1. Show that the four fourth roots of unity is an abelian group w. r. t multiplication.

2. If H_1 and H_2 are two subgroup of a group G, then $H_1 \cap H_2$ is also a subgroup of G.

3. If V(F) is a finite dimensional vector space, then any two bases of V have the same number of elements.

(Turn over)

4. The necessary and sufficient condition for a non-empty subset W of a vector space V(F) to be a subspace of V is a, b, $\in$ F and α, $\beta \in$ W.

$$\Rightarrow a\alpha + b\beta \in W.$$

5. The rank of the transform of a matrix is same as that of the original matrix.

6. Find the adjoint of the matrix $A = \begin{bmatrix} -2 & 5 & 4 \\ 5 & 7 & 5 \\ 4 & 5 & -2 \end{bmatrix}$

and verify the theorem $A(a\partial j\, A) = (a\partial jA)A = |A|I$.

Section – B

Answer any **four** questions of the following :

4×4 = 16

7. If G is a group, then prove that :

$$(ab)^{-1} = b^{-1}a^{-1} \vee a, b \in G.$$

8. If R is a ring, then for all a, b $\in$ R, prove that :

(a) $a0 = 0a = 0$

(b) $a(-b) = -(ab) = (-a)b$

9. Show that the vectors (1, 2, 1), (2, 1, 0), (1, −1, 2) form a basis of R^3.

10. Define vector space with example.

11. Find the rank of the matrix :

$$A = \begin{bmatrix} 3 & 5 & 7 \\ 2 & 1 & 3 \\ 1 & 4 & 4 \end{bmatrix}.$$

12. Find the eigen value of the matrix $A = \begin{bmatrix} 3 & 0 & 3 \\ 0 & 3 & 0 \\ 3 & 0 & 3 \end{bmatrix}$.