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KBE-5403 Seat No._____

B. C. A. (Sem. II) Examination

April/May – 2012

BCA - 203 : Discrete Mathematics

(New Course)

Time : **3** Hours] [Total Marks : **70**

1 (a) Define following with example : (any three) **6**

(i) Infinite set

(ii) Universal set

(iii) Power set

(iv) Partitions sets

(b) If A = {a, b, c, d, e} , B = {b, c, e, f, g} and C = {d, e, g, h, i} then find **6**

A-B, B-C, C-A, A - $(B \cap C)$, B-$(C \cap A)$

(c) Prove that $(A \cap B)' = A' \cup B'$ **6**

OR

(c) Prove that $A \cap (B \cap C) = (A \cap B) \cap C$

2 (a) Define following terms with example (any three) **6**

(i) One-one function

(ii) Inverse Function

(iii) Remainder Function

(iv) Recursive function

(b) Attempt any two : **6**

(i) Let a and b integers and suppose

$$Q(a,b)=\begin{cases}0 if\ (a<b)\\ Q(a-b,b)+1 if\ (a\geq b)\end{cases}$$

Find Q (12,5), Q(7,12)

(ii) If F:N $\rightarrow$ N, f(x) = x+1, Does f^{-1} exist ? Why ?

(iii) The function f and g be defined by

f(x) = 2x-1 and g (x) = x^2,

then find fog and gof

(c) Attempt the following : **5**

(i) ABS (0.09)

(ii) INT (-2.05)

(iii) $(4\times3)^2$

(iv) $\log_4 64$

(v) 19 (mod 3)

3 (a) Define following terms with example. **6**

(i) Transpose of matrix

(ii) Scalar matrix

(iii) Unit matrix

(b) Find the inverse of **6**

$$A=\begin{bmatrix}1 & 3 & 2\\ -2 & 0 & 1\\ -3 & 2 & 1\end{bmatrix}$$

(c) Evalute $A^2 - 2A + 2I$

Where

$$A = \begin{bmatrix} -2 & 1 & 4 \\ 3 & 5 & 0 \\ -1 & 0 & 6 \end{bmatrix}$$

OR

(c) if $A = \begin{bmatrix} 2 & -1 & 3 \\ 5 & 4 & 8 \\ 7 & 4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 10 & 3 \\ -1 & 4 & 7 \\ 5 & 2 & 8 \end{bmatrix}$

Then prove that $(A + B)^T = A^T + B^T$

4 (a) Define following terms **2**

(i) Finite sequence

(ii) Arithmetic series

(b) $1^2 + 2^2 + 3^2 + \ldots n^2 = \frac{n(n+1)(2n+1)}{6}$ **5**

OR

(b) $2+7+12+\ldots\ldots (5n-3) = \frac{1}{2}\ n\ (5n-1)$

(c) 5, 25, 125, 625,.....(40^{th} term) **5**

(d) How many different words can be formed by using all letters of the word COMMON. **5**