Sl. No. 100003

No. of Printed Pages : 2

GS-745

II Semester B.VOC. (Information Technology) Examination, May/June 2019

B.VOC. IT

201 : DISCRETE MATHEMATICAL STRUCTURES

(CBCS) (F+R) (2016-17 & Onwards)

Time : 3 Hours

Max. Marks : 70

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

SECTION - A

10x2=20

Answer **any ten** quetions :

1. Define sets with an example.
2. Define venn diagram.
3. Define Tautology.
4. Write the following in tabular for :
   (i) $A=\{ x : x \text{ is multiple of } 7, x \in N \}$
   (ii) $B=\{ y : y \text{ is a divisor of } 28 \}$
5. If $A=\{ 2, 3 \}$ and $B=\{ 4, 5 \}$ find (i) $A \times B$ (ii) $B \times A$
6. Define function with an example.
7. What is homomorphisms.
8. Define cyclic group.
9. If $f : R \to R$ and $g : R \to R$ defined by $f(x)=x$ and $g(x)=5x+8$ find fog and gof.
10. Explain characteristic functions.
11. If $A=\{2, 3, 4, 5\}$ and $B=\{4, 5, 9, 25\}$ and $R : A \to B$ defined by aRb, if $b=a^2$. Find the domain and Range.
12. Write any two aspects of coding theory.

P.T.O.

SECTION - B

Answer **any five** questions : **5x10=50**

13. (i) State and prove Addition theorem.

(ii) If A and B are two sets such that $n(A)=25$, $n(B)=37$ and $n(A\cup B)=50$ find $n(A\cap B)$.

14. Prove that (i) $(p \rightarrow q)\leftrightarrow(\sim q \rightarrow \sim p)$ is tautology.

(ii) $p\wedge(q\vee r) \equiv (p\wedge q)\vee(p\wedge r)$.

15. (i) Explain basic connectives and truth values.

(ii) Write any five rules of Inference.

16. Explain the principle of mathematical induction. Using mathematical induction P.T. sum of the first 'n' (+)ive odd integers is n^2.

(i.e) $1+3+5+ \ldots . + (2n-1)=n^2$

17. (i) Prove that $G=\{2, 4, 6, 8\}$ forms an abelian group under multiplication modulo 10

(ii) Write the properties of a relations with an example.

18. Explain the various types of functions with an examples.

19. (i) Show that the function $f : R\rightarrow R$ defined by $f(x)=6x+7$ is invertible. Find the inverse of f.

(ii) Explain the steps of Hasse diagram.

20. (i) Explain the hamming metric.

(ii) Find the number of 4-digit number that can be formed using the digits 4, 5, 6, 7, 8 if no digit is repeated. How many of these will be even.

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