This question paper contains 4+1 printed pages]

5710

M.A./M.Sc. (Sem. II) Examination, 2018

MATHEMATICS

Paper – MATH 2C(v)

(Discrete Mathematics)

Time Allowed : Three Hours

Max. Marks : 70

Min. Pass Marks : 28

This question paper will be divided into ***three*** *sections as under :*

Section-A ***Max. Marks-10***

will carry ***10*** *marks with* ***1*** *compulsory question comprising* ***10*** *short answer type questions (maximum* ***20*** *words answer) taking* ***two*** *questions from each unit. Each question shall be of* ***one*** *mark.*

Section-B ***Max. Marks-25***

will ***10*** *questions,* ***2*** *questions from each unit (answer about in* ***250*** *words). Students are instructed to attempt* ***five*** *questions by selecting* ***one*** *question from each unit.*

Section-C ***Max. Marks-35***

will carry ***35*** *marks with five long answer type questions comprising one compulsory question (question no.* ***12****) of* ***15*** *marks and four questions of* ***10*** *marks each. Students are instructed to attempt total* ***three*** *questions with* ***one*** *compulsory question (answer about in* ***500*** *words) and any* ***two*** *more questions (answer about in* ***400*** *words) out of remaining four questions.*

Section A

1. (*i*) Define proposition.

   (*ii*) Define principle of inclusion and exclusion.

   (*iii*) Define validity of statement.

   (*iv*) Define existential quantifier.

   (*v*) Define min term in Boolean algebra.

   (*vi*) Draw AND and OR gates.

   (*vii*) Define planar graph.

   (*viii*) Define directed graph.

http://www.uokonline.com
http://www.uokonline.com
http://www.uokonline.com
http://www.uokonline.com

(ix) Define principle of duality.

(x) Define complemented lattice.

Section B

UNIT-I

2. How many letters one must choose from the set of 15A's, 20B's and 25C's so that 12 identical letters will always be included in the selection ?

3. Find the number of integers from 1 to 250 that are divisible by any one of the integers 2, 3 and 7.

UNIT-II

4. Test the validity of the following argument :

'If my brother stands first in the class, I will give him a watch. Either he stands first or I was out of station, I did not give my brother a watch this time. Therefore I was out of station.'

5. Use a proof by case to show that $|xy| = |x||y|$, where x and y are real numbers.

http://www.uokonline.com

http://www.uokonline.com

UNIT-III

6. For any Boolean algebra B, prove that $\forall\ a, b, c \in B$:

$$(a + b)\cdot(b + c)\cdot(c + a) = a\cdot b + b\cdot c + c\cdot a.$$

7. Prepare the circuit of the DNF $x\cdot y' + x'\cdot y' + x'\cdot y$ and after writing it in CNF also prepare circuit for the new form.

UNIT-IV

8. Show that a simple graph with n vertices and k components can have at most $\frac{1}{2}(n-k)(n-k+1)$ edges.

9. Show that a connected graph G is an Euler graph iff all vertices of G are of even degree.

UNIT-V

10. Let N^+ be the set of positive integers and the relation '$\leq$' in N^+ be $x|y$ *i.e.*, "x divides y". Show that N^+ is a lattice where join ($\vee$) and meet ($\wedge$) are respectively defined as $a \vee b = \text{LCM}(a, b)$ and $a \wedge b = \text{HCF}(a, b)$.

http://www.uokonline.com

11. In a distributive lattice, show that if an element has a complement then this complement is unique.

SECTION C

12. (a) Prove that the number $(2+\sqrt{3})^n + (2-\sqrt{3})^n$ is an integer for each natural number n. 7

(b) Show that in any Boolean algebra the order relation '$\leq$' ($a \leq b \Leftrightarrow a.b' = 0$) is a partial order relation. 8

13. Let A be any non-empty set. Then show that $|A| < |P(A)|$, where P(A) is power set of A.

14. State and prove hypothetical syllogism.

15. For a connected simple planar graph with $n \geq 3$ vertices, e edges and f regions, show that $3f \leq 2e$ and $e \leq 3n - 6$.

16. Show that dual of a complemented lattice is complemented.

Whatsapp @ 9300930012
Your old paper & get 10/-
पुराने पेपर्स भेजे और 10 रुपये पायें,
Paytm or Google Pay से

http://www.uokonline.com
http://www.uokonline.com
https://pyqlelo.com