17U122 (Pages:2) Name: ………………………

Reg. No…………………..

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2017

(Regular/Supplementary/Improvement)

(CUCBCSS-UG)

CC15UMAT1B01– FOUNDATIONS OF MATHEMATICS

(Mathematics - Core Course)

(2015 Admission Onwards)

Time : Three Hours   Maximum : 80 Marks

I. Answer *all* questions.

1. If =, find.

2. Find if =, =.

3. What is the cardinality of .

4. Let == find the characteristic function of A.

5. Let defined by . Find .

6. Find 3! + 4!.

7. Find.

8. If , , find .

9. Find the domain of the real valued function

10. State whether the statement "Stick No Bills" is a proposition.

11. Write the converse of

12. Write the truth table for **.**

(12x1=12 marks)

II. Answer *any nine* questions.

13. Find *x* and *y* if

14. Find and if = and   =

15. If *A*and *B* are sets, show that = .

16. Find all partitions of =

17. Find (i)   and (ii)

Turn over

18. A relation R is defined on set . Prove or disprove that R is a function.

19. Graph the function

20. If .

21. If and . Find .

22. Determine whether ( ))is a tautology.

23. Write dual of .

24. What is the negation of ?.

(iv) Does exist? If so what is it? If not, why?

36.   If n is an integer, show that the following statements are equivalent.

is even

is odd

 is even

(9x2 = 18 marks)

(2x10=20 marks)

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III. Answer *any six* questions.

25. Let A be a set of nonzero integers and let be a relation on defined as whenever Prove that is an equivalence relation.

26. Show that set of rational numbers is denumerable.

27. If A = and B = , write all functions from A to B.

28. Find (i) and (ii) .

29. Show that = for any function .

30. Find .

31. Among 120 students, 40 take Mathematics, 50 take English, 15 take both. Find the number of students taking neither Mathematics nor English.

32. Express the statement using quantifiers.

33. Translate the following quantification into English statement if the domain consists of all real numbers. ''**.**

(6x5=30 marks)

IV. Answer *any two* questions.

34. Let defined by. Show that R is an equivalence relation. Find the equivalence classes determined by this relation.

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35.   Let

        (i)   Find , and

        (ii) Does exist? If so what is it? If not, why?

        (iii) Find and .