Registra[redacted] 22231MTH151

Course Code:MTH401

Course Title: DISCRETE MATHEMATICS

Paper Code: A

Time Allowed: 01:30 hrs.

Max. Marks: 30

Read the following instructions carefully before attempting the question paper.

1. Match the Paper Code shaded on the OMR Sheet with the Paper code mentioned on the question paper and ensure that both are the same.

2. This question paper contains 30 questions of 1 mark each. 0.25 marks will be deducted for each wrong answer.

3. All questions are compulsory.

4. Do not write or mark anything on the question paper and or on rough sheet(s) which could be helpful to any student in copying except your registration number on the designated space.

5. Submit the question paper and the rough sheet(s) along with the OMR sheet to the invigilator before leaving the examination hall.

Q1) What is the negation of the statement "Sam is rich and happy"?

(a) Sam is poor and unhappy.
(b) Either Sam is poor or happy
(c) Either Sam is poor or unhappy
(d) Sam is not rich and happy.

CO1, L2

Q2) $(\neg q \wedge (p \rightarrow q)) \rightarrow \neg p$ is a

(a) Contingency (b) Tautology (c) Contradiction (d) none of these

CO1, L2

Q3) $\neg p \leftrightarrow q$ is logically equivalent to

(a) $p \leftrightarrow \neg q$ (b) $p \leftrightarrow q$ (c) $p \wedge \neg q$ (d) $p \vee \neg q$

CO1, L2

Q4) Contrapositive of the statement "If you are honest, then you are respected."

(a) If You are honest then he is not respected.
(b) If You are not respected than you are not honest.
(c) If you are not honest then you are not respected.
(d) If you are respected then you are honest.

CO1, L2

Q5. Converse of the statement "If you are honest, then you are respected."

(a) If You are honest then he is not respected.
(b) If You are not respected than you are not honest.
(c) If you are not honest then you are not respected.
(d) If you are respected then you are honest.

CO1, L2

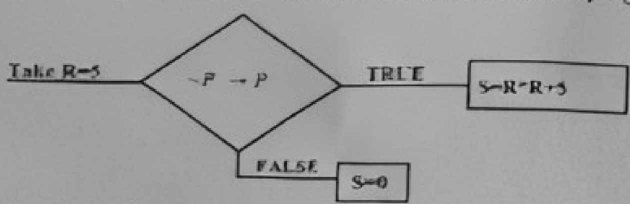
Q6) Inverse of the statement "If Sahir is a poet, then he is poor"

(a) If Sahir is rich then he is not poet
(b) If Sahir is not a poet then he is not poor
(c) If Sahir is not poor then he is a poet
(d) If Sahir is not a poet then he is not poor

CO1, L2

Q7. Let P Dogs can fly

And consider the following flow chart of a computer program



Then the value of S is

CO1, L2

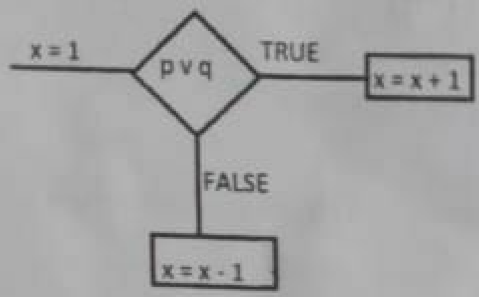
(a) 30 (b) 20 (c) 0 (d) 10

Q8. Determine which conditional statement is false.

(a) If $1 + 1 = 2$, then $2 + 2 = 5$.
(b) If $1 + 1 = 3$, then $2 + 2 = 4$.
(c) If $1 + 1 = 3$, then $2 + 2 = 5$.
(d) If monkeys can fly, then $1 + 1 = 3$

CO1, L2

Q9. What is the value of x after the statement is encountered in a computer program, when p:1+1=3, q : 2 + 2 = 3.



CO1, L2

(a) 2 (b) 1 (c) 0 (d) cannot be determined

Q10) Determine the truth value of the statement if the domain consists of all integers.
$\exists n(2n = 3n)$

(a) True (b) False (c) cannot be determined (d) information incomplete CO1, L2

Q11) Which of the following is a linear recurrence relation?

$(i)\ a_n = a_{n-2} - 2(a_{n+1})^2 + 3a_{n-2}$ $(ii)\ a_n = a_{n-2} - 4a_{n+1} + 3a_{n-2}$

$(iii)\ a_n = 6a_{n-2} - 5(a_{n+1})^3 + 3a_{n-2}$

(a) (i) and (ii) only (b) (i) and (iii) only (c) (ii) and (iii) only (d) (ii) only

Q12) Which of the following is a homogeneous recurrence relation? CO2, L2

$(i)\ a_n = a_{n-2} - 2(a_{n+1})^2 + 3a_{n-2}$ $(ii)\ a_n = a_{n-2} - 4a_{n+1} + 3$

$(iii)\ a_n = 6a_{n-2} - 5(a_{n+1})^3 + 3n$

(a) only (i) and (ii) (b) only (i) (c) only (ii) and (iii) (d) only (i) and (iii)

Q13) Which of the following is a recurrence relation with constant coefficients? CO1, L1

$(i)\ a_n = na_{n-2} - 2(a_{n+1})^2 + 3a_{n-2}$ $(ii)\ a_n = a_{n-2} - 4n^2a_{n+1} + 3a_{n-2}$

$(iii)\ a_n = 6a_{n-2} - 5 + 3a_{n-2}$

(a) only (i) and (ii) (b) only (ii) and (iii) (c) only (ii) (d) only (iii) CO1, L1

Q14) Which of the following recurrence relation has degree=4?

$(i)\ a_n = a_{n-2} - 4a_{n-1} + 5na_{n-3} - 4$ $(ii)\ a_n = n^2a_{n-3} - 4a_{n-1} + 5a_{n-4} - 2n$ $(iii)\ 3a_n = (a_{n-1}) - 3a_{n-1}$

(a) only (ii) (b) only (i) (c) only (iii) (d) only (i) and (ii) CO1, L1

Q15) ***Which of the following is the solution of the recurrence relation:*** $a_n = a_{n-1} + 2a_{n-2}$?

(a) $a_n = c_1(-2)^n + c_2(-3)^n$ (b) $a_n = c_1(2)^n + c_2(3)^n$

(c) $a_n = c_1(-3)^n + c_2(1)^n$ (d) $a_n = c_1(2)^n + c_2(-1)^n$

Q16) Which of the following is the solution of the recurrence relation : $a_n+8a_{n-1}+16a_{n-2}=0$? CO2, L2

(a) $a_n = c_1(-4)^n + c_2(-3)^n$ (b) $a_n = c_1(-4)^n + c_2 n(-3)^n$.

(c) $a_n = c_1(-4)^n + c_2 n(-4)^n$ (d) $a_n = c_1(3)^n + c_2(4)^n$

Q17) *If* $h = 1$ *then* $\Delta^3 x^{(3)} = ?$

(a) 1 (b) 0 (c) 3! (d) 2! CO2, L2

Q18) Which of the following is the particular solution of the recurrence relation:

$a_{n+2} = 2a_{n+1} + a_n + (3)^n$?

(a) $3^n/2$ (b) $3^n/7$ (c) $(3)^n/10$ (d) $3^n/4$ CO2, L2

Q19) *Which of the following is the particular solution of the recurrence relation:* $a_{n+2} = -5a_n + \cos 4n$?

(a) $\frac{1}{2}\left[\frac{e^{4in}}{e^{2i}+5} + \frac{e^{-4in}}{e^{2i}+5}\right]$ (b) $\frac{1}{2}\left[\frac{e^{4in}}{e^{2i}+5} + \frac{e^{-4in}}{e^{-2i}+5}\right]$

CO2, L2

(c) $\frac{1}{2}\left[\frac{e^{4in}}{e^{2i}+5} - \frac{e^{-4in}}{e^{-2i}+5}\right]$ (d) $\frac{1}{2}\left[\frac{e^{4in}}{e^{-2i}+5} + \frac{e^{-4in}}{e^{2i}+5}\right]$

Q20) The Solution of the recurrence relation $a_n=5a_{n-1}$ is

(a) $a_n=c_1 5^n$ (b) $a_n=c_1 5^{-n}$ (c) $a_n=c_1$ (d) Non e of these CO2, L2

Q21) A Drawer contains 12 red and 12 blue socks, all unmatched. A person takes socks out at random in the dark. How many socks take out to be sure that he has at least two blue socks?

(a) 14 (b) 18 (c) 16 (d) 20 CO3, L3

Q22 **How many numbers must be selected from the set {1, 2, 3, 4, 5, 6} to guarantee that at least one pair of these numbers add up to7?**

(a) 4 (b) 1 (c) 2 (d) 5 CO3, L3

Q23) **How many friends are there in a group of 267 people, who have an identical number of friends in the group?**

(a) 266 (b) 268 (c) 2 (d) 138 CO3, L3

Q24) The number of relations from A to B, there n(A)=3and n(B)=3

(a) 9 (b) 6 (c) 512 (d) None of these CO3, L3

Q25) The number of subsets of $A \times A$ is

(a) 2^n (b) 2^{n^2} (c) n^2 (d) n^3 CO3, L3

Q26) Compute, if $(a, a) \in R \; \forall \; a \in A$, then R is called

(a) Symmetric (b) Transitive (c) Reflexive (d) Anti-symmetric CO3, L3

Q27) Use n elements in the set, then no. of symmetric relations is

(a) $2^{\frac{n(n+1)}{2}}$

(b) $2^{\frac{n(n-1)}{2}}$

(c) $2^{n(n-1)}$

(d) $2^{n(n+1)}$ CO3, L3

Q28) If relation R is anti-symmetric, transitive and reflexive, then R is called

(a) Partial Order relation (b) Anti-symmetric

(c) Equivalence relation (d) None of these CO3, L3

Q29. The $A \times B = \emptyset \; iff$ CO3, L3

(a) $A = \emptyset \; or \; B = \emptyset$

(b) $A \neq \emptyset \; or B = \emptyset$

(c) $A = \emptyset \; or B \neq \emptyset$

(d) $A \neq \emptyset \; or B \neq \emptyset$

Q30. In the poset $(Z^+, |)$ the integers 3 and 9 are

(a) Incomparable (b) Symmetric (c) Reflexive (d) Comparable CO3, L3

--End of the Question Papers--