Note : i) Right indicates full marks.

ii) All questions are compulsory.

Q.1. *Solve any 2 :* [10]

1) *Find the solution of R.R. if*

$a_n = g_{an\text{-}1} \cdot 26_{an\text{-}2} + 24_{an\text{-}3}$

with initial condition

$a_0 = 0 \quad a_1 = 1 \quad \& \quad a_2 = 10$

2) *Find the solution of Non-homogenous R.R.*

if $a_n = 7_{an\text{-}1} \cdot 16_{an\text{-}2} + 12_{an\text{-}3} + n(4)^n$

3) *Using G.F. find solution of R.R.*

$a_n = 2_{an\text{-}1} + 3_{n\text{-}1}$ *for* $n \geq 2$

with $a_o = 2$

Q.2. *Solve any 2 :* [10]

1) *Prove that (A, R) is a poset then*

prove that (A, R^{-1}) *is also poset)*

2) *If R =* {(1, 1) (1, 2) (1, 4) (2, 1) (2, 2), (2, 4)
(2, 3) (3, 3) (3, 2) (3, 5) (4, 1)
(4, 2) (4, 3) (4, 4) (4, 5) (5, 2)
(5, 3) (5, 5)}

& S = {(1, 1) (1, 4) (1, 5) (2, 2) (2, 3) (3, 1)
(3, 2) (3, 5) (4, 1) (4, 3) (4, 4)
(5, 1) (5, 2) (5, 3) (5, 4) (5, 5)}

Find MR, MS In deg of R & S out deg of R & S

$M_{RUS} \quad M_{RnS} \quad R^{-1}, \overline{R}, S^{-1}, S^C$

$(M_{RnS})^C$ *Draw Hasse's dipraph of R.*

3) *Use Warshall's Algorithm to compute the transitive closure. If*

$$M_R = \begin{bmatrix} 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 \end{bmatrix}$$

(P.T.O.)

[10]

Q.3. *Solve any 2 :*

1) *P.T. if function $F : A \to B$ is invertible iff F is bijective.*

2) a) *P.T.* $f_{A \oplus B} = f_A + f_B = 2f_A \cdot f_B$.

b) *P.T.* $f(x) = \frac{2x+3}{3x+2}$ *is bijective f°.*

3) *Find following value*

if

$f(a) = a - 1$ & $g(b) = b^2$

i) $(fog)_{(2)}$

ii) $(gof)_{(2)}$

iii) $(gof)_{(x)}$

iv) $(fog)_{(x)}$

v) *State the pigeonhole principal with suitable example.*

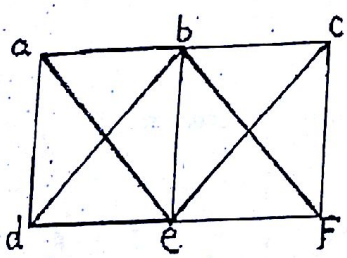
[10]

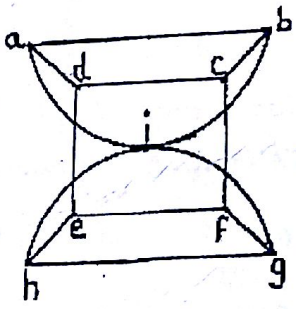
Q.4. *Solve any 2 :*

1) a) *Construct Algebric structure & also find the value.*

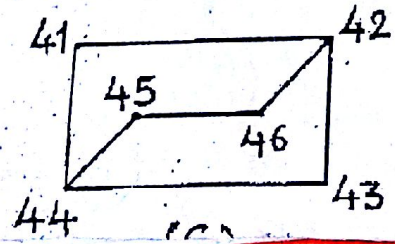
$(3-(2-(11-(g-4))))+(2+(3+(4+7)))$

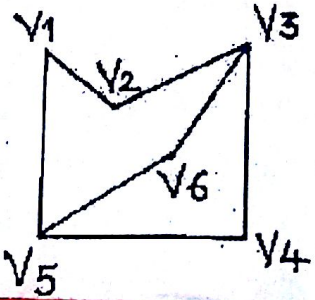
b) *Draw planner graph.*



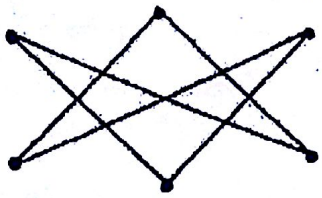


2) a) *Show that given graph is an Isomorphic graph.*



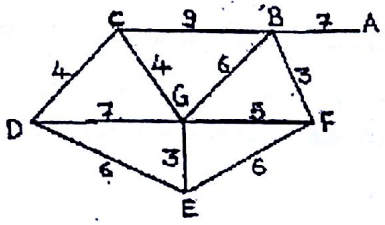


b) Check given graph are Euler's graph circuit and path. Similarly Hamilton graph and Circuit.

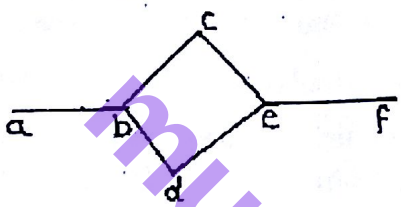


3) Find the value of minimal spanning

a) tree by using prims Algorithm.



b) Draw all possible spanning tree.



[10]

Q.5. Solve any 2 :

a) i) State and prove Addition principle.

ii) Solve with the help of Truth table.

b) If A, B & C be three set then prove that

$A \times (B \cup C) = (A \times B) \cup (A \times C)$

c) Solve with the help of Mathematical Induction.

$$1+2+3+.....n = \frac{n(n+1)}{2}$$

[10]

Q.6. Solve any 2 :

1) P.T. $a+b\sqrt{2}$ is a group.

2) P.T. $f(e) = e1$ if $(S *)$ & $(T *')$ be a monoid with identity e & e' if $F : S \to T$ be an isomorphism.

3) P.T. Every Field is an integral domain and converse is not true also P.T. every cyclic group is an abalian group.

— THE END —

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