Total No. of questions : 7]   Roll No. ....]

B.Tech(CS/ CS(Cyber Security)/ CS (DS & ML)), Third Semester

End-Term Examination, December, 2021

DISCRETE STRUCTURE AND LINEAR ALGEBRA
(MAL0305)

Time : 3:00 hours   Max. Marks : 40

Note: *Attempt all the questions.*

$1+0+0=1$

1. Very short answer type questions.   1X5=5

$((1+0).1)=1$

(i) Define Injective Function.

(ii) Define Coset.

(iii) Define graph.

(iv) Define Eigen Vector of a Matrix

(v) Define Vector Subspace.

2 Define Composition Mapping and If $f: R \to R$, defined by $f(x)=x^2 \forall x \in R$ and $g: R \to R$, definedby $g(x)=\sin x \forall x \in R$ then find gof and fog and show that $(gof)x \neq (fog)x$.   **5**

OR

(4) Prove that the relation "a divides b", if there exists an integers c such that ac=b and is denoted by a I b, on the set of all positive integers N is a Partial ordered relation.   ***5***

3 Replace the switch circuit to the simpler one and draw?   ***5***

F(x,y,z)x.y.z+x.y'.z+x'.y'.z

OR

If H_1 and H_2 are two subgroups of a group G, then $H_1 \cap H_2$ is also a subgroup of G.   **5**

$\Sigma \deg(v) = 2e$

4. Find the eigen value of a matrix A= $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ **5**

V

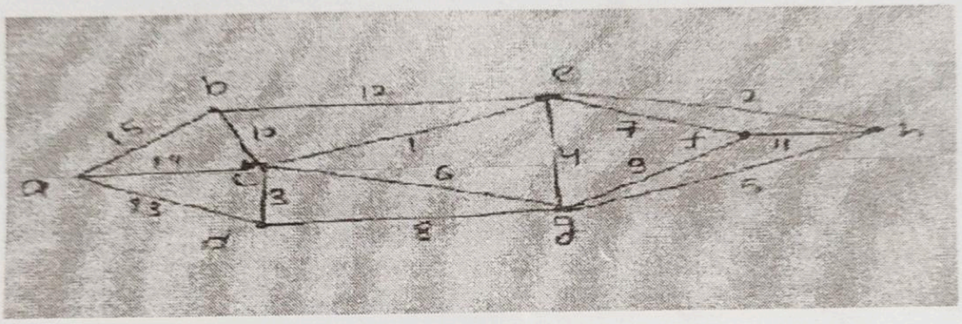
OR

5 Find the rank of a matrix A= $\begin{bmatrix} 1^2 & 2^2 & 3^2 & 4^2 \\ 2^2 & 3^2 & 4^2 & 5^2 \\ 3^2 & 4^2 & 5^2 & 6^2 \\ 4^2 & 5^2 & 6^2 & 7^2 \end{bmatrix}$ 5

5. The sum of the degrees of all vertices in a graph is equal to twice the number of edges. 5

OR

5 Find the minimum spanning tree for the graph shown in fig.



6. Prove that the four vectors α_1=(1,2,3), α_2=(1,0,0), α_3=(0,1,0) and α_4 =(0,0,1) in $V_3(R)$ form a linearly dependent set. *5*

OR

Show that the set W{(a,b,0):a,b$\in$ F} is a subspace of $V_3(R)$. *5*

7. Draw Hasse Diagram of A{1,2,3,4,6,8,9,12,18,24} and In a group of athletic teams in a college, 21 are in basketball team, 26 in hockey team and 29 in football team. If 14 play basketball and hockey, 12 play basketball and football, 15 play hockey and football and 8 play all the three games. Find the number of players there are in all. 10

5

OR

Find that for what values of λ, μ of the equations 10

x+y+z=6, x+2y+3z=10, x+2y+λ z= μ have

(i) No solution,

(ii) An unique solution,

(iii) Infinite many solution
