

Q1 -: For p,q with truth values(T,T,F,F) and (T,F,T,F) respectively, the truth table $(p \leftrightarrow q) \leftrightarrow \neg(p \oplus q)$ has the truth values.

T,T,F,T

Tautology

T,T,T,F

Contradiction

Ans:- Tautology

Q2:- Which of the following is true for the domain of all integers?([] stand for greatest integer function)

Ans:- $\exists x([x] \leq x)$

Q3:- $\frac{1}{E^3} \sin(2n) = \cos(2n)/8$

Q4:- Particular solution for the recurrence relation $A_{n+3} - A_{n+2} - 8A_{n+1} + 12A_n = 2^n$ is

Ans:- $(n^2 - n)2^n/40$

Q5:- Number of paths of length 2 in K_4 from any vertex a to itself is

Ans:- 0

Q6:- Which of the following degree sequence is possible for undirected simple graph?

Ans:- 4,4,4,4,4,0

Q7:- Find the third closet vertex to U in the following graph using DIJKSTRA's Algorithm is



u-y:- 2 ,u-v:-6 ,

Ans:- X

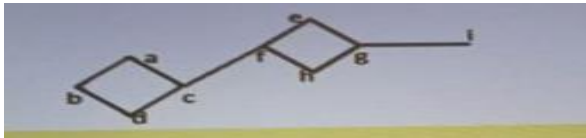
Q8-: Sum of entries in a column of incidence matrix of simple undirected graph with n vertices is equal to

Ans-: 2

Q9-: Number of edges in W_{20}

Ans-: 40

Q10-: How many cut vertices are there in the following graph?

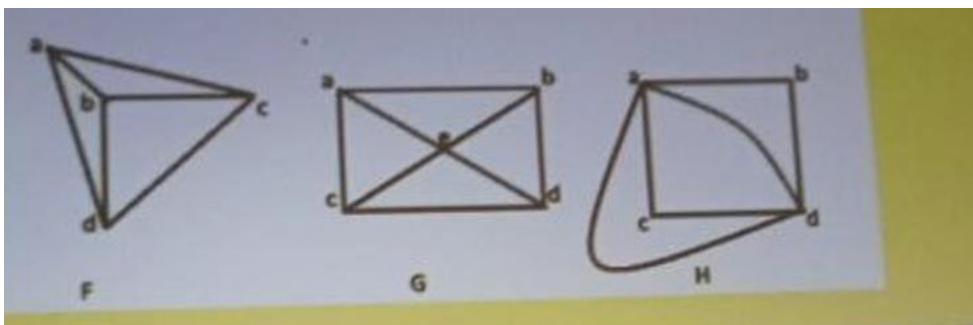


Ans-: 3

Q11-: Which of the following is not a regular graph?

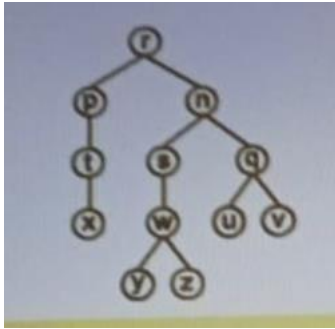
Ans-: W_4

Q12-: Which of the following graph is isomorphic to K_4



Ans-: Only F

Q13-: Which of the following is not descendent of vertex ' n '?

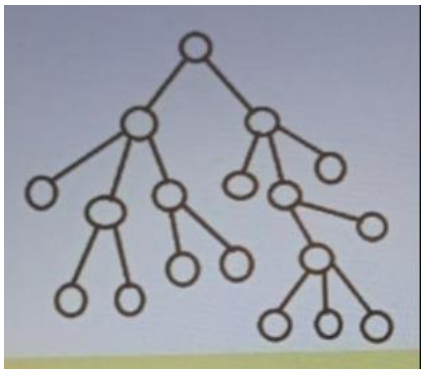


Ans:- t

Q14:- Value of postfix notation $521 \mid ^ - 384 - + *$ is

Ans:- 21

Q15:- For the given tree, which of the following statement is true ?



Height of the tree is 5

It is full 3-ary tree.

There are 7 internal vertices in tree

All of the above

Q16:- The generating function of the sequence 1,-2,4,-8,16,-32 is

Ans:- $1/(1+2x)$

Q17:- $X(G)$ for a wheel with odd no.of vertices is

Ans:- 4

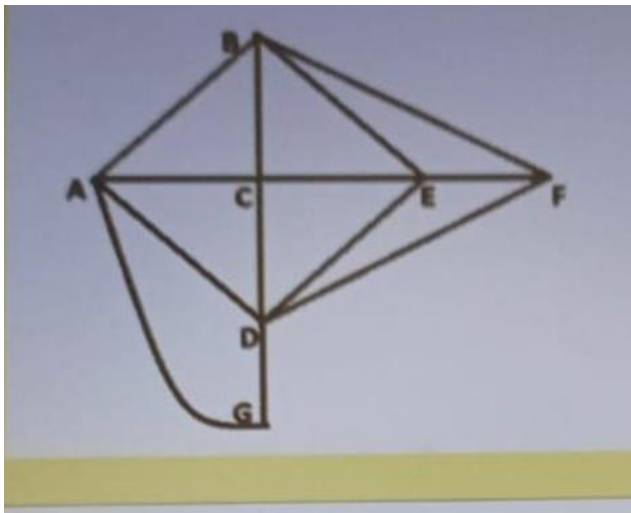
Q18:- What is the number of regions in a connected planar simple graph with 15 vertices each with degree of 4?

Ans:- 17

Q19:- Value of prefix notation $^*46+|^*3413$ is

Ans:- 9

Q20:- Chromatic number of the following graph is



Ans:- 3

Q21:- $(p \leftrightarrow q) \text{ xor } (p \leftrightarrow r)$ equivalent

Ans:- $q \text{ xor } r$

Q22:- Let P: I will feel calm whenever I will do yoga; Q: I will perform better at work if I will feel calm. Now if P is true and Q is false then which of the following is not possible

I will not do yoga

I will not perform better at work

I will not feel calm

I will not feel calm and I will not do yoga

Q23-: Let $A = \{1,2,3\}$ and $B = \{1,2,3,4\}$. The relations $R1 = \{(1, 1), (2,2), (3,4)\}$ and $R2 = \{(1,1), (3, 2), (1,3), (2,4)\}$, then $R1 - R2 =$

Ans-: $\{(2,2), (3,4)\}$

Q24-: Which of the following simple graph doesn't have euler circuit?

Ans-: W5

Q25-: If G is a connected planar simple graph with 8 vertices and has a circuit with length 3, then which of the following must be true for no. of edges e of G ?

Ans-: $e \leq 18$

Q26-: Which of the following is not true for simple connected planar graph $G = (V, E)$

Ans-: Chromatic no. is more than 4

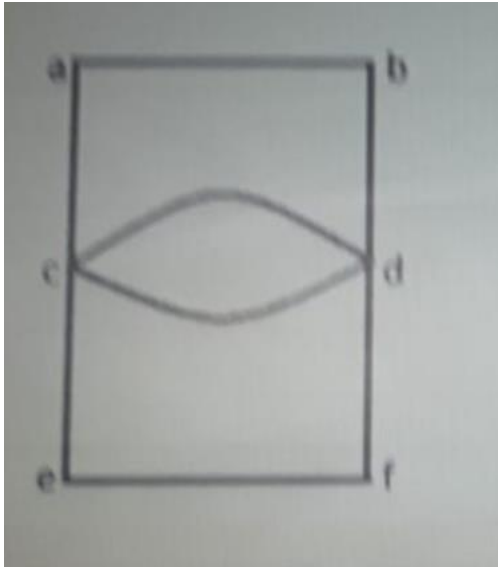
Q27-: Let $G = (V, E)$ be an undirected simple graph, then which of the following is possible for G ?

Ans-: 6 VERTICES each of degree 5

Q28-: Suppose $H(x)$ is "x is honest" and $D(x)$ is "x is dedicated" and $E(x)$ is "x is employee in your company" and let the domain be of all people. Then the statement, "Not all employees are honest and dedicated both" is expressed as

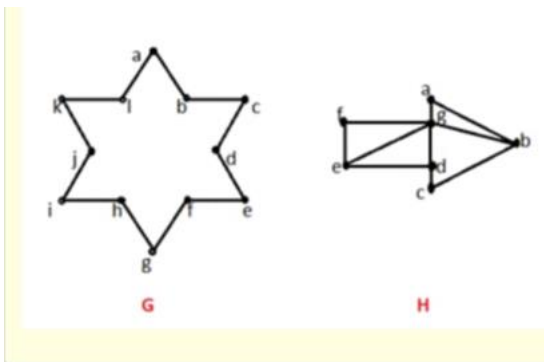
Ans-: $C \rightarrow \exists x [E(x) \rightarrow (\neg H(x) \text{ and } \neg D(x))]$

Q29-: Which of the following is true for the following graph?



Ans:- It has no Euler path

Q30:- Which of the following is bipartite



Ans:- Only G

Q31:- Let G be an undirected graph with following adjacency matrix, then degree of vertex c is

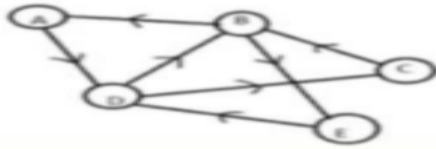
	a	b	c	d
a	0	3	0	2
b	3	0	1	1
c	0	1	1	2
d	2	1	2	0

Ans:- 4

Q32:- Sum of degree of all vertices in K_5 is $\frac{n(n-1)}{2}$

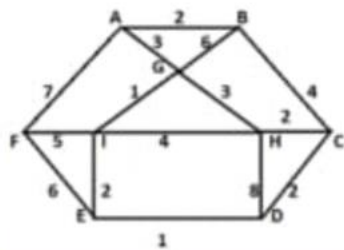
Ans:- 210

Q33:- Number of strongly connected component in the following directed graph is



Ans:- 4

Q34:- Which of the following edge will be added at 6th place while finding the minimum spanning tree of given graph by prim's algorithm

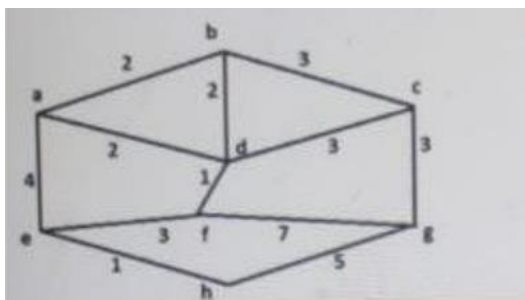


Ans:- {A,G}

Q35:- How many edges need to be removed to form spanning tree for Q3?

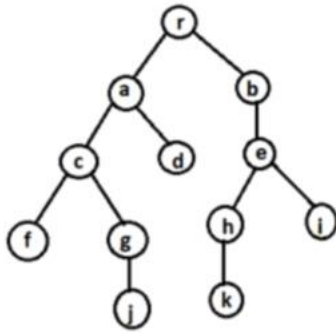
Ans:- 5

Q36:- Weight of minimum spanning tree for the following graph using kruskal's algorithm is



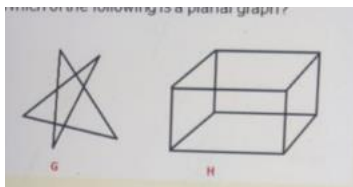
Ans:- 15

Q37:- No. of internal vertices in the graph are



Ans:- 7

Q38:- Which of the following is a planar graph?



Ans:- Both G and H

Q39:- In a full 4-ary tree, if the total no. of vertices is n , how many internal vertices and leaves are there?

Ans:- $\frac{n-1}{3}, \frac{2n-1}{3}$

Q40:- Which of the following set of integers is not pairwise relatively prime

Ans:- 36, 41, 45

Q41:- If $\gcd(9888, x) = 12$ and $\text{lcm}(9888, x) = 4993440$ then value of x is

Ans:- 6060

Q42:- Secret message produced by "MEET" using encryption function $f(p) = (p+14) \bmod 26$ is

Ans:- ASSH

Q43:- Bezout's identity for the pair of integer 123, 21 is given as

Ans:- $3 = 21(6) + 123(-1)$

Q44-: $7^{123} \bmod 11 =$

Ans-: 2

Q45-: $\gcd(111, 90) =$

Ans-: $111(13) + 90(-16)$

Q46-: Inverse of 7 modulo 18 is

Ans-: 13

Q47-: The solution of linear congruence equation $5x \equiv 2 \pmod{9}$ is

Ans-: 4

Q48-: The solution of linear congruence equation $3x \equiv 7 \pmod{8}$ is

Ans-: 5

Q49-: Secret message produced by "MATH" using encryption function $f(p) = (p+7) \bmod 26$ is

Ans-: THAO

Q50-: While finding inverse of 7 modulo 10, Bezout's coefficient of 10 is

Ans-: -2

Q51-: $9^{145} \bmod 13 =$

Ans-: 9

Q52-: Coefficient of x^8 in the following generating function is

$$G(x) = 1/(1-x)^3$$

Ans-: 45

1

28

64

Q53:- What is the general form of the solutions of a linear homogeneous recurrence relation with constant coefficients if it's characteristic equation has roots as $\pm 3, \pm i$

Ans:- $c_1(3^n) + c_2(-3)^n + [c_3 \cos(n\pi/2) + c_4 \sin(n\pi/2)]$

Q54:- In the hasse diagram of the poset $(\{2,3,6,14,32,42,60\},/)$, the number of edges is

Ans:- 7

Q55:- In the hasse diagram of the poset $(\{2,3,4,9,12,18,36,63,72\},/)$, the upper bounds of $(12,18)$ are

Ans:- $(36,72)$

Q56:- A bag contains 12 red marbles, 10 white marbles, and 15 blue marbles. What is the minimum no. of marbles you have to choose randomly from the bag to ensure that we get 4 red marbles?

Ans:- 29

Q57:- On the set of real numbers, let (x,y) belongs R iff $x+y=0$ which of the following is true for the relation R ?

Ans:- Symmetric

Q58:- Which of the following is a prime number

Ans:- 1031

Q59:- $\gcd(1233,414)=$

Ans:- 9