United College of Engineering and Research, Allahabad

Department of Computer Science & Engineering

B.Tech CSE- III Semester
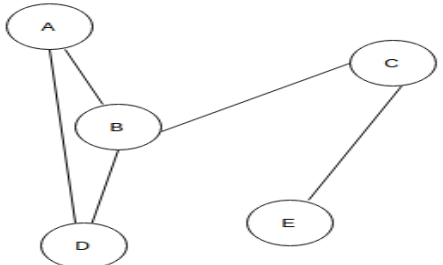
Set-5

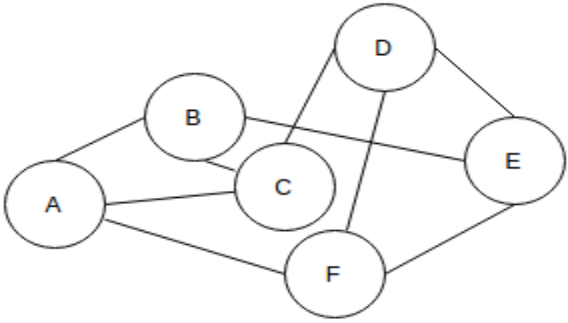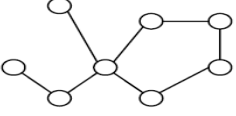**Course Name:** Discrete Structure and Theory of Logic   **AKTU Course Code:** KCS-303
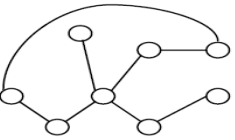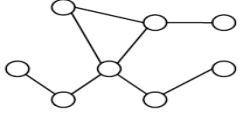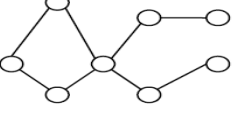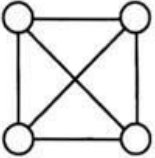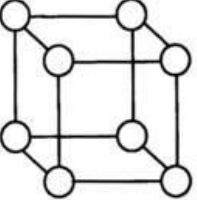
Time: 60 Minutes   **Max. Marks: 30**

- **All Questions are compulsory.**
- **All Questions carry one mark.**

Q. No.	Questions	CO
1	In the given graph identify the cut vertices. a) B and E b) C and D c) A and E d) C and B	CO5
2	What is the number of edges present in a complete graph having n vertices? a) (n*(n+1))/2 b) (n*(n-1))/2 c) n d) Information given is insufficient	CO5

3	The given Graph is regular. a) True b) False	CO5
4	A connected planar graph having 6 vertices, 7 edges contains _____ regions. a) 15 b) 3 c) 1 d) 11	CO5
5	If a simple graph G, contains n vertices and m edges, the number of edges in the Graph G'(Complement of G) is _____ a) (n*n-n-2*m)/2 b) (n*n+n+2*m)/2 c) (n*n-n-2*m)/2 d) (n*n-n+2*m)/2	CO5
6	What is the maximum number of edges in a bipartite graph having 10 vertices? a) 24 b) 21 c) 25 d) 16	CO5
7	For a given graph G having v vertices and e edges which is connected and has no cycles, which of the following statements is true? a) v=e b) v = e+1 c) v + 1 = e d) v = e-1	CO5
8	Which of the following ways can be used to represent a graph? a) Adjacency List and Adjacency Matrix b) Incidence Matrix c) Adjacency List, Adjacency Matrix as well as Incidence Matrix d) No way to represent	CO5
9	A cycle on n vertices is isomorphic to its complement. What is the value of n? a) 5 b) 32	CO5

	c) 17 d) 8	
10	How many perfect matchings are there in a complete graph of 10 vertices? a) 60 b) 945 c) 756 d) 127	**CO5**
11	In an undirected connected planar graph G, there are eight vertices and five faces. The number of edges in G is _____. (A) 10 (B) 11 (C) 12 (D) 6	
12	Which of the following statements is/are TRUE for undirected graphs? P: Number of odd degree vertices is even. Q: Sum of degrees of all vertices is even. (A) Neither P nor Q (B) Both P and Q (C) Q only (D) P only	
13	The line graph L(G) of a simple graph G is defined as follows: · There is exactly one vertex v(e) in L(G) for each edge e in G. · For any two edges e and e' in G, L(G) has an edge between v(e) and v(e'), if and only if e and e'are incident with the same vertex in G. Which of the following statements is/are TRUE? (P) The line graph of a cycle is a cycle. (Q) The line graph of a clique is a clique. (R) The line graph of a planar graph is planar. (S) The line graph of a tree is a tree. (A) P only (B) P and R only (C) R only (D) P, Q and S only	
14	Let G be a simple undirected planar graph on 10 vertices with 15 edges. If G is a connected graph, then the number of bounded faces in any embedding of G on the	

plane is equal to

(A) 6

(B) 5

(C) 4

(D) 3

15	Which of the following graphs is isomorphic to

(A)

(B)

(C)

(D)

(A) A

(B) B

(C) C

(D) D

16	Let G be a complete undirected graph on 6 vertices. If vertices of G are labeled, then the number of distinct cycles of length 4 in G is equal to

(A) 360

(B) 45

(C) 30

(D) 15

17	

K4

Q3

(A) Neither K4 nor Q3 are planar

(B) Q3 is planar while K4 is not

	(C) Both K4 and Q3 are planar	
	(D) K4 is planar while Q3 is not	
18	Let G = (V,E) be a graph. Define $\xi(G) = \Sigma_d$ id x d, where id is the number of vertices of degree d in G. If S and T are two different trees with $\xi(S) = \xi(T)$,then (A) $\|S\| = 2\|T\|$ (B) $\|S\| = \|T\|-1$ (C) $\|S\| = \|T\|$ (D) $\|S\| = \|T\|+1$	
19	The degree sequence of a simple graph is the sequence of the degrees of the nodes in the graph in decreasing order. Which of the following sequences can not be the degree sequence of any graph? (I) 7, 6, 5, 4, 4, 3, 2, 1 (II) 6, 6, 6, 6, 3, 3, 2, 2 (III) 7, 6, 6, 4, 4, 3, 2, 2 (IV) 8, 7, 7, 6, 4, 2, 1, 1 (A) IV only (B) III and IV (C) I and II (D) II and IV	
20	What is the chromatic number of an n-vertex simple connected graph which does not contain any odd length cycle? Assume n >= 2. (A) n-1 (B) 3 (C) 2 (D) n	
21	Which one of the following is TRUE for any simple connected undirected graph with more than 2 vertices? (A) No two vertices have the same degree. (B) At least two vertices have the same degree. (C) At least three vertices have the same degree.	

	(D) All vertices have the same degree.	
22	Which of the following statements is true for every planar graph on n vertices? (A) The graph has a vertex-cover of size at most 3n/4 (B) The graph is Eulerian (C) The graph is connected (D) The graph has an independent set of size at least n/3	
23	Let G be the non-planar graph with the minimum possible number of edges. Then G has (A) 10 edges and 6 vertices (B) 10 edges and 5 vertices (C) 9 edges and 6 vertices (D) 9 edges and 5 vertices	
24	Which of the following graphs has an Eulerian circuit? (A) The complement of a cycle on 25 vertices (B) A complete graph on 90 vertices (C) Any k-regular graph where k is an even number. (D) None of the above	
25	Let G=(V,E) be a directed graph where V is the set of vertices and E the set of edges. Then which one of the following graphs has the same strongly connected components as G? (A) $G_1 = (V, E_1)$ where $E_1 = \{(u,v) \mid (u,v) \notin E\}$ (B) $G_2 = (V, E_2)$ where $E_2 = \{(u,v) \mid (v,u) \in E\}$ (C) $G_3 = (V, E_3)$ where $E_3 = \{(u,v) \mid \text{there is a path of length} \leq 2 \text{ from } u \text{ to } v \text{ in } E\}$ (D) $G_4 = (V_4, E)$ where V_4 is the set of vertices in G which are not isolated (A) A (B) B (C) C (D) D	
26	Consider an undirected graph G where self-loops are not allowed. The vertex set of G is {(i, j): 1 <= i <= 12, 1 <= j <= 12}. There is an edge between	

(a, b) and (c, d) if |a − c| <= 1 and |b − d| <= 1. The number of edges in this graph is _____.

(A) 500

(B) 502

(C) 506

(D) 510

27	An ordered n-tuple (d1, d2, … , dn) with d1 >= d2 >= ⋯ >= dn is called graphic if there exists a simple undirected graph with n vertices having degrees d1, d2, … , dn respectively. Which of the following 6-tuples is NOT graphic?	
	(A) (1, 1, 1, 1, 1, 1)	
	(B) (2, 2, 2, 2, 2, 2)	
	(C) (3, 3, 3, 1, 0, 0)	
	(D) (3, 2, 1, 1, 1, 0)	
28	The maximum number of edges in a bipartite graph on 12 vertices is _____.	
	(A) 36	
	(B) 48	
	(C) 12	
	(D) 24	
29	A cycle on n vertices is isomorphic to its complement. The value of n is _____.	
	(A) 2	
	(B) 4	
	(C) 6	
	(D) 5	
30	Let G be a connected planar graph with 10 vertices. If the number of edges on each face is three, then the number of edges in G is _____.	

	(A) 24	
	(B) 20	
	(C) 32	
	(D) 64	

Answer

1-D	2-B	3-A	4-B	5-A	6-C	7- B	8-C	9-A	10-B
11-B	12-B	13-A	14-A	15-B	16-B	17-C	18-C	19-D	20-C
21-B	22-A	23-C	24-A	25-B	26-C	27-C	28-A	29-D	30-A