



CS & IT ENGINEERING

Graph Theory

DPP 03

Discussion Notes

[MCQ]

$n = 7$

1. Consider a graph with order 7. The degree sequence of the graph is 4, 3, 3, 3, 2, 2, 1. Assume x is the number of edges and y is the degree sequence of the complement graph of the given graph. Find x and y?

- (a) $x = 10$ and $y = 5, 3, 3, 3, 2, 2, 2$
- (b) $x = 12$ and $y = 5, 4, 4, 3, 3, 3, 2$
- (c) $x = 14$ and $y = 5, 5, 4, 4, 4, 4, 2$
- (d) $x = 16$ and $y = 6, 5, 5, 5, 5, 3, 3$

$x = \text{no. of edges}$

$y =$

$$\begin{array}{r}
 K_7 \quad 6 \\
 G \rightarrow 4 \quad 3 \quad 3 \quad 3 \quad 2 \quad 2 \quad 1 \\
 \hline
 \bar{G} \quad 2 \quad 3 \quad 3 \quad 3 \quad 4 \quad 4 \quad 5
 \end{array}$$

[NAT]

2. What is the maximum number of edges in an complemented graph with 7 vertices? 21

maximum no. of edges

$$G + \bar{G} \downarrow = K_7.$$

Diagram illustrating the formula $G + \bar{G} = K_7$. It shows two circles: one containing 7 vertices (labeled $e=7$) and another containing 21 edges (labeled $\frac{7 \times 6}{2} = 21$). An arrow points from the circles to the equation.

[MSQ]

3. Which of the following is the number of vertices that form the self complementary graph?

- (a) 13 (b) 12
(c) 15 (d) 16

(abd)

$$e = \frac{13 \cdot 12}{4}$$

$$e = \frac{12 \cdot 11}{4}$$

c) $e = \frac{15 \cdot 14}{4} \times$

d) $e = \frac{16 \cdot 15}{4}$

$$e = \frac{n(n-1)}{4}$$

$$\frac{n}{4} \text{ or } \frac{n-1}{4}$$

[NAT]

4. In a self-complementary graph G of size 18, then find the number of vertices in the graph G ?

$$e = 18 \quad n =$$

$$n = 9$$

Self complement: $\frac{e}{2} = \frac{n(n-1)}{4}$

$$\begin{aligned} \frac{e}{2} &= \frac{n(n-1)}{4} \\ &= \frac{9(9-1)}{4} \\ &= 9 \cdot 8 \end{aligned}$$

$$e = \frac{n(n-1)}{4}$$

$$18 = \frac{n(n-1)}{4}$$

$$18 \times 4 = n(n-1)$$

[MCQ]

5. Consider a graph with 4 vertices and 3 edges then which of the following statement is True?

(\neg) S_1 : It may or may not be self-complementary graph.

(F) S_2 : It must be self-complementary graph.

(a) S_1 is True but S_2 is False ✓

(b) S_1 is False but S_2 is True

(c) Neither S_1 nor S_2 is True

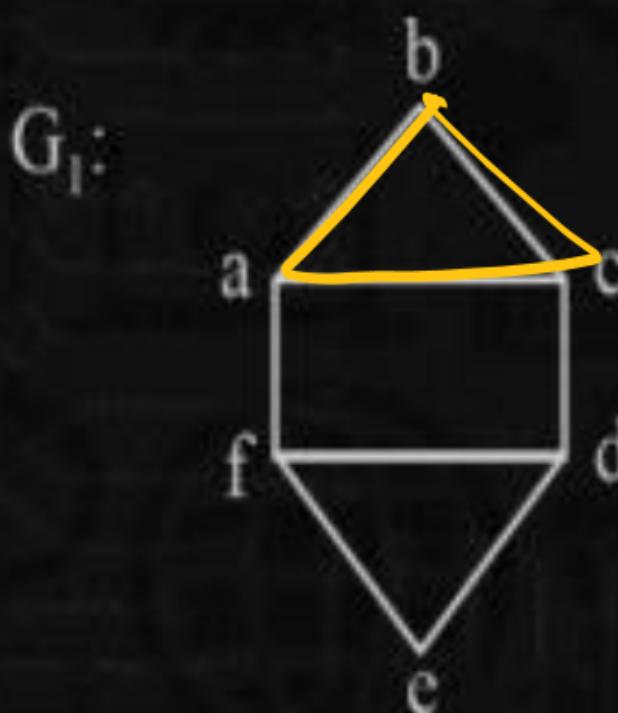
(d) None of these.



[MSQ]

6. Which of the following options is/are correct for isomorphic graphs

- (a) G_1 and G_2 are isomorphic graph. (F)
- (b) G_3 and G_4 are isomorphic graph. (T) (b, c)
- (c) G_1 and G_2 are not isomorphic graph. (T)
- (d) G_3 and G_4 are not isomorphic graph (F)



[MCQ]

7. Consider the following statements :

S_1 : If two graphs are self - complementary graph then they have equal number of vertices and edges. (\top)

S_2 : If two graphs G_1 and G_2 have same number of edges, vertices and same degree sequence then they are self-complement graphs. (F)

Which of the following option is true?

- (a) S_1 only ✓
- (b) S_2 only
- (c) Both S_1 and S_2
- (d) Neither S_1 nor S_2

