

CS & IT ENGINEERING

Graph Theory

Discrete Mathematics



DPP 06

Discussion Notes



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TOPICS TO BE COVERED

01 Question

02 Discussion

Q.1

Let G be a simple graph with 15 edges and \bar{G} be a complement graph of G has 21 edges, then the number of vertices in graph G is

—.

$$e(G) + e(\bar{G}) = n(n-1)/2.$$

[NAT]

$$15 + 21 = n(n-1)/2.$$

$$36 = n(n-1)/2.$$

$$72 = n(n-1)$$

$$n=9$$

P
W

Q.2

Which of the following is true for a graph with vertex connectivity is 3 and edge connectivity is 4?

$$\underline{K(G) = 3} \quad \underline{\lambda(G) = 4}$$

[MSQ]

A.

Removal of any 3 vertex can disconnect the graph.
(false)

B.

Removal of any 4 edges can disconnect the graph.
(false)

C.

Removal of some 3 vertices will increase the number of connected components.
(True)

D.

Removal of some 4 edges will increase the number of connected components.
(True)



Q.3

What is the maximum value of vertex connectivity and edge connectivity possible with a graph of order 10 and size 16? P
W

$$n = 10 \quad e = 16$$

[MCQ]

A.

$$1 \leq \text{VC}, \text{EC} \leq 3$$

B.

$$1 \leq \text{VC}, \text{EC} \leq 4$$

C.

$$0 \leq \text{VC}, \text{EC} \leq 3$$

D.

$$0 \leq \text{VC}, \text{EC} \leq 4$$

$$\underline{\kappa(G)} \leq \underline{\lambda(G)} \leq \underline{\delta(G)} \leq \frac{2e}{n} \leq \underline{\Delta(G)} \leq n-1.$$

$$\underline{\kappa(G)} \leq \underline{\lambda(G)} \leq \frac{2e}{n}.$$

$$\underline{\kappa(G)} \leq \underline{\lambda(G)} \leq \frac{2 \cdot 16}{10}$$

$$\leq 3.2$$

Q.4

Consider the given connected graph G

P
W



[MSQ]

Which of the following is not the cut set?

- A. {e₆, e₇, e₉} ✓
- B. {e₈, e₉, e₁₀, e₁₂} ✓ (a, b)
not cutset
- C. {e₈, e₉, e₁₀} *cutset*
- D. {e₁, e₂, e₃} *cutset*

Q.5

Consider the following statements:

S₁: The vertex connectivity of the graph is 1 if and only if graph has cut vertex. (True)

S₂: The edge connectivity of the graph is 1 if and only if graph has cut edge (True) (True)

Which of the following statements is true?

[MCQ]

- A. S₁ only
- B. S₂ only
- C. Both S₁ and S₂ ✓
- D. Neither S₁ nor S₂

Q.6

For the graph below, vertex connectivity is 2 and edge connectivity is 2.

[NAT]



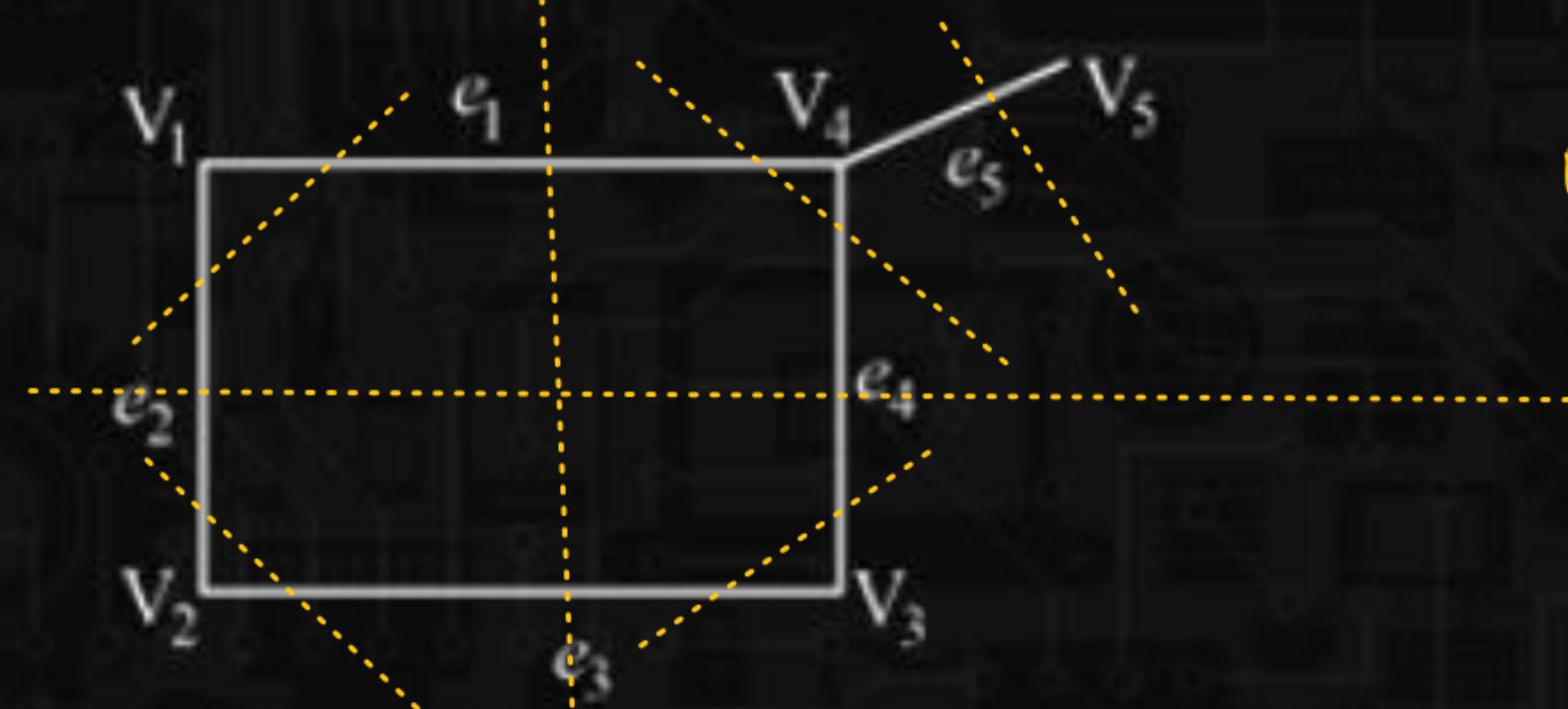
$$\chi(G) = 2 \quad k(G) = 2.$$

Q.7

Consider the simple undirected graph G.

P
W

[NAT]



Ans : 7

Find the number of cut set for the above graph G?

