



CS & IT ENGINEERING

Graph Theory

DPP 06

Discussion Notes

[NAT]

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 _____. ⑨

$$e(G) = 15$$

$$e(\bar{G}) = 21$$

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

$$15 + 21 = \frac{n(n-1)}{2}$$

$$n = 9.$$

$$36 = \frac{n(n-1)}{2}$$

$$\frac{n(n-1)}{2} = 36$$

[MSQ]

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

- (a) Removal of any 3 vertex can disconnect the graph. (F) $k(G) = 3$
- (b) Removal of any 4 edges can disconnect the graph. (F) $\lambda(G) = 4$
- (c) Removal of some 3 vertices will increase the number of connected components. (T)
- (d) Removal of some 4 edges will increase the number of connected components. (T)

[MCQ]

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

(a) $1 \leq VC, EC \leq 3$ ✓

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

(b) $1 \leq VC, EC \leq 4$ ✗

$$K(G) \leq \lambda(G) \leq \frac{2e}{n}$$

(c) $0 \leq VC, EC \leq 3$

$K(G) \leq 3$

$$\lambda(G) \leq \frac{2 \times 16}{10}$$

(d) $0 \leq VC, EC \leq 4$ ✗

$(1 \ 2 \ 3) \leq 3$

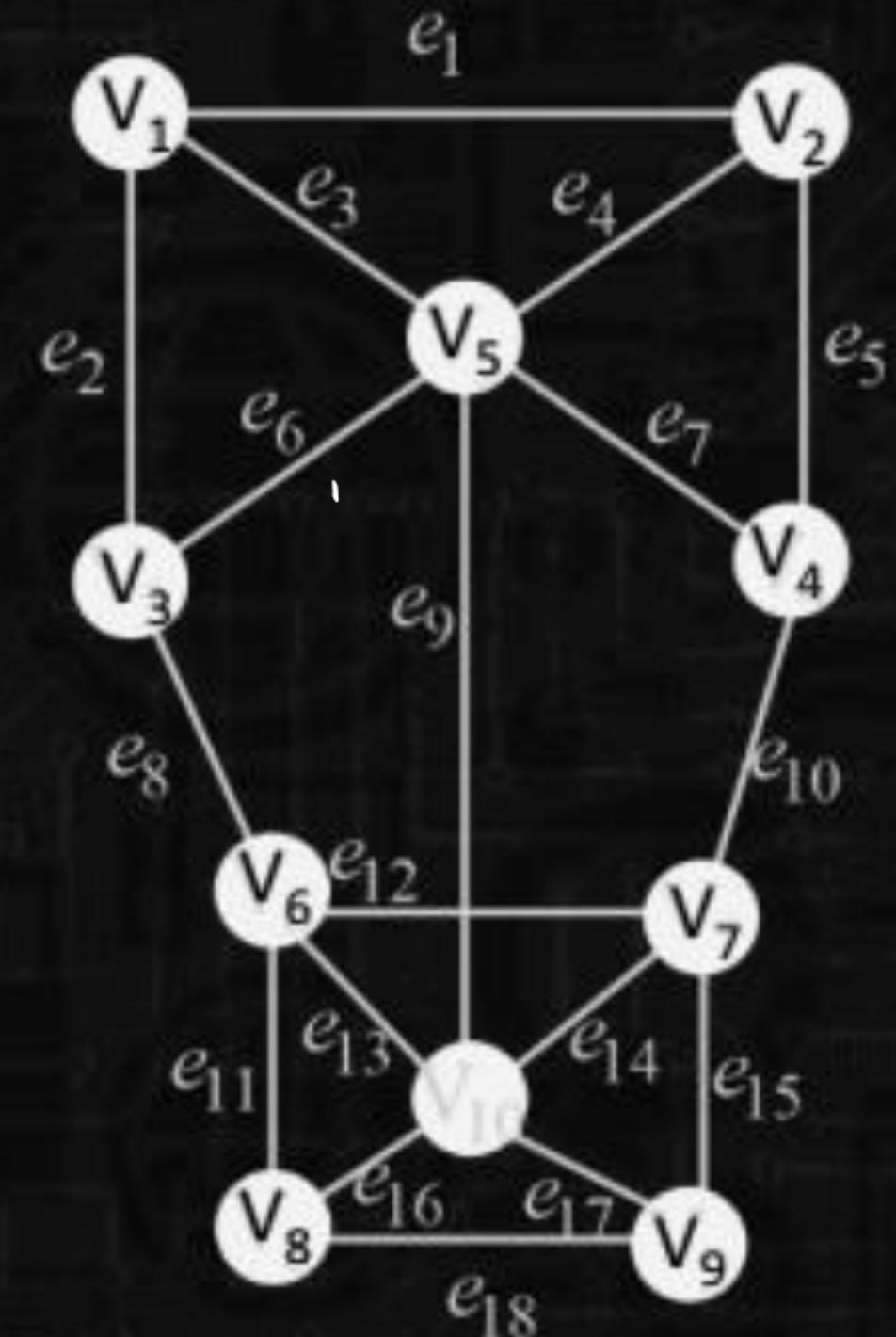
$$\lambda(G) \leq 3 \cdot 2$$

[MSQ]

4. Consider the given connected graph G
Which of the following is not the cut set?

- (a) $\{e_6, e_7, e_9\}$ ~~not cut set~~
- (b) $\{e_8, e_9, e_{10}, e_{12}\}$ ~~not cut set~~
- (c) $\{e_8, e_9, e_{10}\}$ \rightarrow cut set
- (d) $\{e_1, e_2, e_3\}$ \rightarrow cutset

{  } set is not cutset



[MCQ]

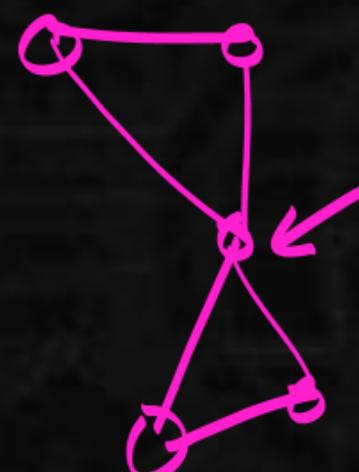
5. Consider the following statements:

S_1 : The vertex connectivity of the graph is 1 if and only if graph has cut vertex. (T)

S_2 : The edge connectivity of the graph is 1 if and only if graph has cut edge.

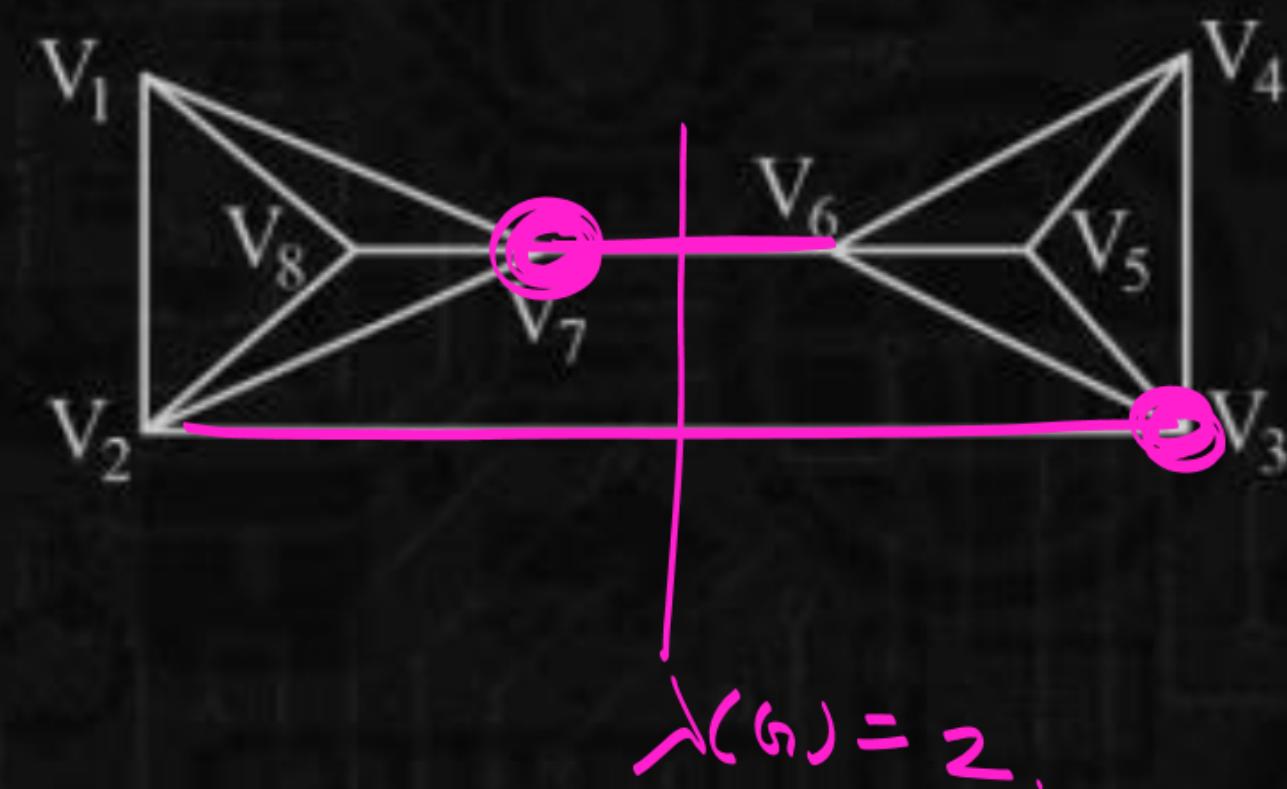
Which of the following statements is true?

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



[NAT]

6. For the graph below, vertex.

Connectivity is 2 and edge connectivity is 2.

[NAT]

7. Consider the simple undirected graph G.
Find the number of cut set for the above graph G?

Ans: 7

