

CS & IT ENGINEERING

Graph Theory

Discrete Mathematics



DPP 02 Discussion Notes



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TOPICS TO BE COVERED

01 Question

02 Discussion

Q.1

Consider a complete graph with size 2016. Suppose after deletion of 2 vertices from the above graph, the modified graph have x number of edges and y number of vertices. Find the value of $x - y$?

P
W

$$e = 2016.$$

$$\frac{n(n-1)}{2} = 2016.$$

$$n(n-1) = 4032 \textcircled{2}$$

$$n = 64$$

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

$$n = 189$$

$$y = 62.$$

[NAT]

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

$$n - y$$

$$189 - 62 = \underline{\underline{1829}}$$

$$\begin{array}{r} 31 \times 61 \\ (36+1)(60+1) \\ 1800 \\ 30 \\ 60 \\ \hline 1891 \end{array}$$

Q.2

Which of the following options is/are True?

P
W

[MSQ]



A.

Some k-regular graph can be complete graph. (\top)

B.

A graph with more than 2 vertices, it must have at least 2 vertices with same degree. (Thm 6) (\top)

C.

The degree sum of odd degree vertices must be even. (\top)

D.

The degree sum of odd degree vertices must be odd.

Q.3

Consider a wheel graph (wn) with $n \geq 4$. Which of the following is minimum number of edges added to the above wheel graph to make it complete graph? [MCQ]

A. $n(n-1)$

B. $\frac{(n^2 - 5n + 4)}{2}$ ✓

C. $\frac{n(n-1)}{4}$

D. None of these

$$e(wn) + \kappa = \frac{n(n-1)}{2}$$

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

$$\frac{n^2 - n - 4n + 4}{2}$$

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

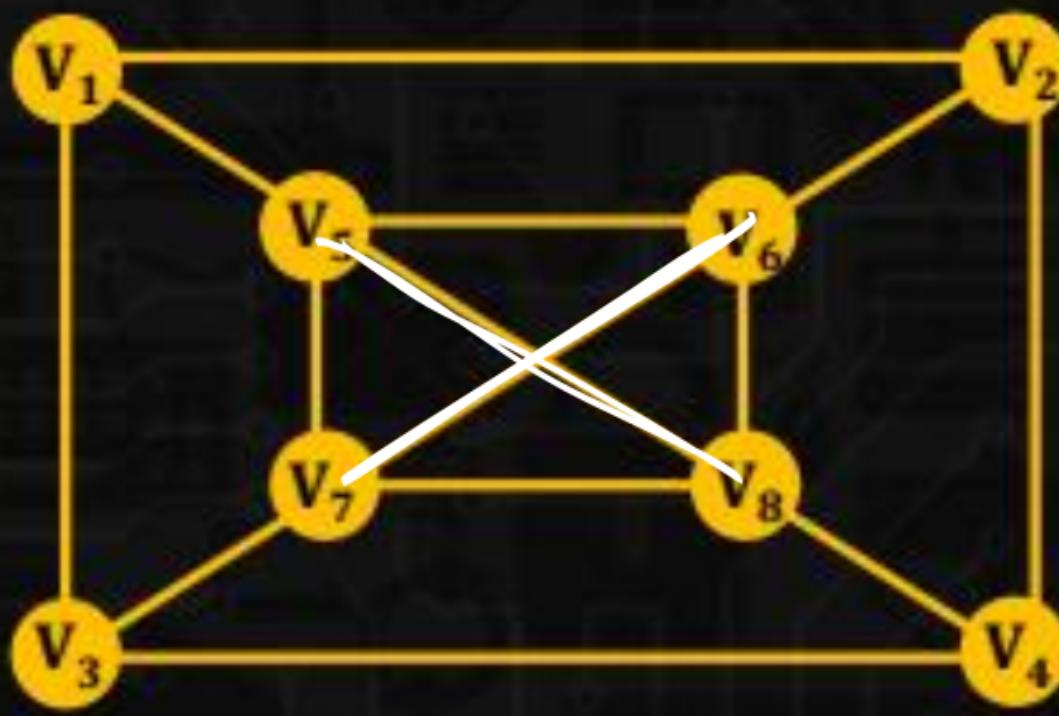
$$= \frac{n^2 - n - 4(n-1)}{2}$$

$$\frac{n^2 - 5n + 4}{2}$$

Q.4

Consider the given graph $G(V,E)$ with order is 8 $\{V_1, V_2, V_3, \dots, V_8\}$.
Find the minimum number of edges to be deleted from the graph,
such that the graph become bipartite graph Q? [NAT]

P
W



Q.5

Which of the following options is/are correct?

[MSQ]

A.

Every NULL graph is always bipartite graph. (F)

B.

Some cycle graph is complete graph. (T)

C.

A cyclic graph is different from cycle graph. (T)

D.

A graph G is bipartite graph if and only if it has even cycle. (F)

Q.6

Consider a regular graph with order 6 and size 12. Which of the following is the minimum degree(δ) and maximum degree (Δ)?

P
W

[MCQ]

- A. $\delta = 3, \Delta = 4$ ✗
- B. $\delta = 4, \Delta = 3$ ✗
- C. $\delta = 4, \Delta = 4$ ✓
- D. None of these

$$n = 6 \quad e = 12$$

$$\delta(G) \leq \frac{2e}{n} \leq \Delta(G)$$
$$\leq \frac{2 \times 12}{6}$$

$$\underline{\delta(G) \leq 4 \leq \Delta(G)}$$
$$3 \leq 4 \leq 4$$

