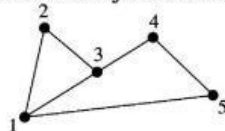


Network in Graph Theory

Rangkaian dalam Teori Graf

PAPER 1

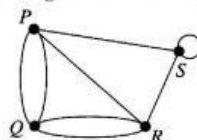
1. The diagram shows a simple graph.
Rajah di bawah menunjukkan satu graf mudah.



State the sum of degrees of the graph.
Nyatakan bilangan darjah graf itu.

- A 6 B 10
C 12 D 14

2. The diagram shows a graph with a loop and multiple edges.
Rajah di bawah menunjukkan satu graf yang mempunyai gelung dan berbilang tepi.



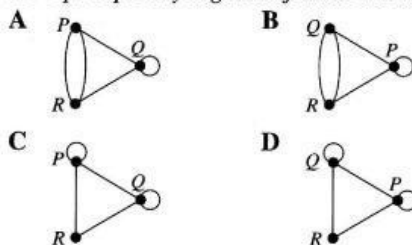
Which of the following are true?
Antara berikut, yang manakah benar?

- A $n(V) = 4, n(E) = 6$
B $n(V) = 4, n(E) = 8$
C $n(V) = 6, n(E) = 4$
D $n(V) = 8, n(E) = 4$

3. $E = \{(P, Q), (P, R), (P, R), (Q, Q), (Q, R)\}$

Which of the following graphs has the set of edges as shown above?

Antara graf berikut, yang manakah mempunyai set tepi seperti yang ditunjukkan di atas?



4. The table shows the sets of edges of four graphs where each graph has four vertices.
Jadual di bawah menunjukkan set tepi bagi empat graf dengan keadaan setiap graf mempunyai empat bucu.

Graph Graf	Set of edges Set tepi
P	$\{(1, 2), (1, 3), (2, 2), (2, 3), (2, 4)\}$
Q	$\{(1, 2), (1, 3), (2, 3), (2, 3), (4, 4)\}$
R	$\{(1, 3), (1, 3), (2, 3), (2, 4), (3, 4)\}$
S	$\{(1, 3), (1, 4), (2, 3), (2, 4), (3, 4)\}$

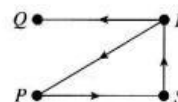
Which graph is a simple graph?

Graf manakah ialah satu graf mudah?

- A P B Q
C R D S

5. The diagram shows a directed graph with four vertices.

Rajah di bawah menunjukkan satu graf terarah dengan empat bucu.



State the set of edges of the graph.

Nyatakan set tepi bagi graf itu.

- A $E = \{(P, R), (P, S), (Q, R), (R, S)\}$
B $E = \{(P, S), (Q, R), (R, P), (S, R)\}$
C $E = \{(P, S), (R, P), (R, Q), (R, S)\}$
D $E = \{(P, S), (R, P), (R, Q), (S, R)\}$

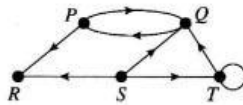
6. Which of the following has a sum of degrees such that a graph can be drawn?

Antara berikut, yang manakah mempunyai bilangan darjah dengan keadaan satu graf boleh dilukis?

- A 3, 3, 1, 1 B 3, 2, 2, 2
C 2, 3, 3, 1 D 2, 3, 1, 1

7. The diagram shows a directed graph with five vertices.

Rajah di bawah menunjukkan satu graf terarah dengan lima bucu.



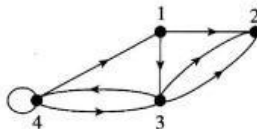
Which of the following is not true?

Antara berikut, yang manakah **tidak** benar?

- A $d_{in}(Q) = 3$ B $d_{in}(S) = 0$
C $d_{out}(R) = 2$ D $d_{out}(T) = 1$

8. The diagram shows a directed graph with four vertices.

Rajah di bawah menunjukkan satu graf terarah dengan empat bucu.



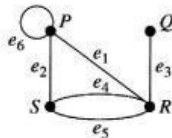
Determine $\sum d(V)$.

Tentukan $\sum d(V)$.

- A 16 B 15
C 14 D 13

9. The diagram shows a graph G .

Rajah di bawah menunjukkan satu graf G .



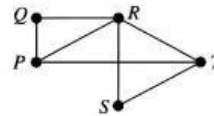
Which of the following is **not** a subgraph of graph G ?

Antara berikut, yang manakah **bukan** subgraf bagi graf G ?

- A B
C D

10. The diagram shows a graph.

Rajah di bawah menunjukkan satu graf.



Which of the following is **not** a tree based on the graph?

Antara berikut, yang manakah **bukan** pokok berdasarkan graf itu?

- A B
C D

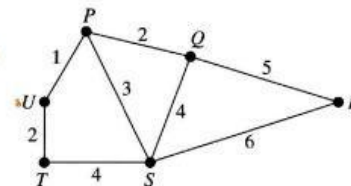
11. Which of the following is a tree?

Antara berikut, yang manakah satu pokok?

- A B
C D

12. The diagram shows an undirected weighted graph.

Rajah di bawah menunjukkan satu graf tak terarah dan berpemberat.



Liza draws a tree with a minimum total weight based on the graph. Calculate the minimum total weight.

Liza melukis satu pokok dengan jumlah pemberat minimum berdasarkan graf itu. Hitung jumlah pemberat minimum itu.

- A 12 B 13
C 14 D 15