# Penyelesaian Lengkap

**Kertas 1**

**1** Garisan yang menghubungkan dua bucu dikenali sebagai tepi.
*The line that connects two vertices is known as the edge.*

Jawapan/*Answer*: **D**

**2** • Darjah bucu ialah bilangan tepi yang menghubungkan satu bucu dengan bucu yang lain.
*The degree of a vertex is the number of edges that connect the vertex to other vertices.*
• Bilangan darjah bagi gelung dalam graf tak terarah ialah 2, iaitu pusingan mengikut arah jam dan pusingan mengikut lawan arah jam.
*The degree of a vertex with a loop in an undirected graph is 2, one in clockwise direction and the other in anticlockwise direction.*

Jawapan/*Answer*: **D**

**3** $\sum d(v) = 2(E)$
$= 2(6)$
$= 12$

Jawapan/*Answer*: **C**

**4** **A** – Bukan pokok kerana setiap pasangan bucu boleh dikaitkan dengan pelbagai cara
*Not a tree because each pair of vertices can be connected in various ways*
**B** – Bukan pokok kerana setiap pasangan bucu boleh dikaitkan dengan pelbagai cara
*Not a tree because each pair of vertices can be connected in various ways*
**C** – Bukan pokok kerana terdapat gelung
*Not a tree because there is a loop*
**D** – Pokok kerana setiap pasangan bucu hanya dikaitkan oleh satu tepi.
*A tree because each pair of vertices is connected by one edge only.*

Jawapan/*Answer*: **D**

**5** Jika $AC$ dialih keluar, hanya akan ada satu laluan dari $A$ ke $C$ iaitu $A \rightarrow B \rightarrow C$.
*If AC is removed, there will only be one path from A to C, which is $A \rightarrow B \rightarrow C$.*

Jawapan/*Answer*: **D**

**6** **A** – Bilangan tepi pokok adalah kurang satu daripada bilangan bucu.
*The number of edges of a tree is less one than the number of vertices.*

**B** – Jumlah darjah ialah dua kali ganda bilangan tepi.
*The sum of degree is twice the number of edges.*
**C** – Bilangan tepi pokok adalah kurang satu daripada bilangan bucu.
*The number of edges of a tree is less one than the number of vertices.*
**D** – Pokok ialah graf mudah tanpa gelung.
*A tree is a simple graph with no loop.*

Jawapan/*Answer*: **A**

**7** **B** – Bukan sebahagian daripada graf kerana tiada tepi yang mengaitkan bucu $A$ dan $B$ serta $B$ dan $C$.
*It is not part of the graph because there is no edge that connects vertices A and B and vertices B and C.*

Jawapan/*Answer*: **B**

**8** $\sum d(V) = 2(E)$
$= 2(7)$
$= 14$

Jawapan/*Answer*: **C**

**9** **D** – Bukan pokok kerana terdapat berbilang laluan dari satu bucu ke bucu lain
*Not a tree because there are multiple paths from one vertex to another*

Jawapan/*Answer*: **D**

**10** **A** – $(10 + 11 + 3)$ km $= 24$ km
**B** – $(10 + 5 + 5 + 3)$ km $= 23$ km
**C** – $(10 + 5 + 9) = 24$ km
**D** – $(18 + 34)$ km $= 52$ km

Jawapan/*Answer*: **B**
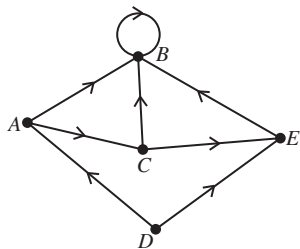
**11** $210 + 160 = 370$

Jawapan/*Answer*: **C**
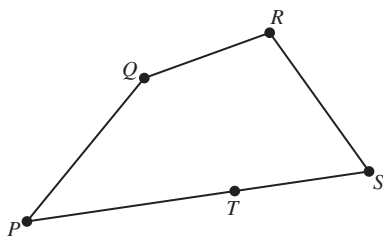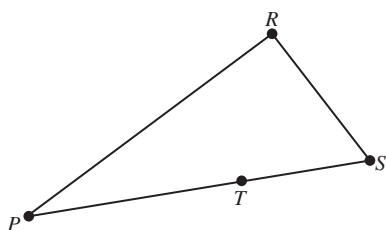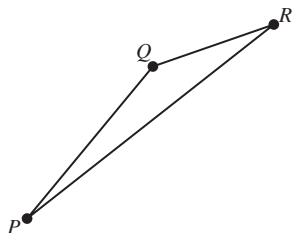
**12** Jawapan/*Answer*: **B**

**Kertas 2**

**Bahagian A**

**1** (a) Graf tak terarah dan tak berpemberat
*Undirected and unweighted graph*
(b) (i) $V = \{A, B, C\}$
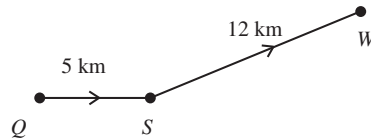(ii) $n(E) = 6$
(iii) $\sum d(V) = 2E = 2(6) = 12$

**2**



**3**







(Mana-mana jawapan yang sesuai)
(*Any suitable answers*)

**Bahagian B**

**4** (a) (i) $A - B - D - E$
$\qquad A - B - E$
$\qquad A - D - E$
(ii) Ya/*Yes*
$\qquad A - B - D - E$
(b) $A - B - D - F - E$
$\quad 8 + 10 + 15 + 8 = $ RM41

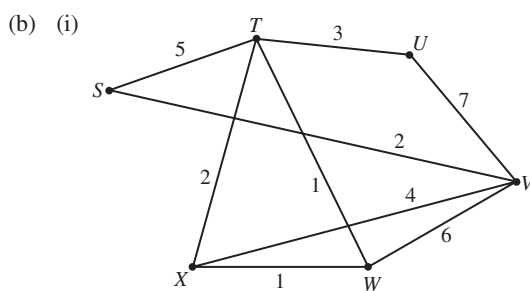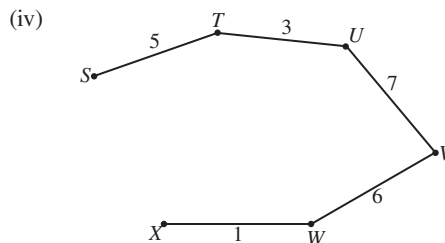**5** (a)



(b) $5 + 12 = 17$ km
(c) $Q - T - S - V - W$
$\quad 4 + 2 + 10 + 4.5 = 20.5$ km
(d) $Q - R - T - S - V - W$
$\quad 7 + 8 + 2 + 10 + 4.5 = 31.5$ km

**Bahagian C**

**6** (a) (i) $\{(F, G), (G, H), (G, J), (G, K), (H, I), (I, J),$
$\qquad (J, K), (K, F)\}$
(ii) $\sum d(V) = 2E = 2(8) = 16$

(b) (i)



(ii) Destinasi
*Destination*
(iii) $X$ dan/*and* $W$

(iv)



(v) $5 + 3 + 7 + 6 + 1 = 22$