

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI**

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI I : 2022/2023

DCQ50222 : PRINCIPLE OF STRUCTURE

TARIKH : 29 DISEMBER 2022

MASA : 8.30 AM – 10.30 AM (2 JAM)

Kertas ini mengandungi **SEMBILAN (9)** halaman bercetak.

Bahagian A: Struktur (2 soalan)

Bahagian B: Esei (4 soalan)

Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

SECTION A : 50 MARKS**BAHAGIAN A : 50 MARKAH****INSTRUCTION:**

This section consists of **TWO (2)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi DUA (2) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

CLO1
C2

- (a) Explain the internal and external forces in a building.

Jelaskan daya dalaman dan daya luaran dalam sesebuah bangunan.

[5 marks]

[5 markah]

CLO1
C2

- (b) Identify the force equilibrium and direction of the action forces in the **Diagram A1(b)** below.

*Kenalpasti keseimbangan daya dan arah dalam tindakan daya-daya dalam **Rajah A1(b)** di bawah.*

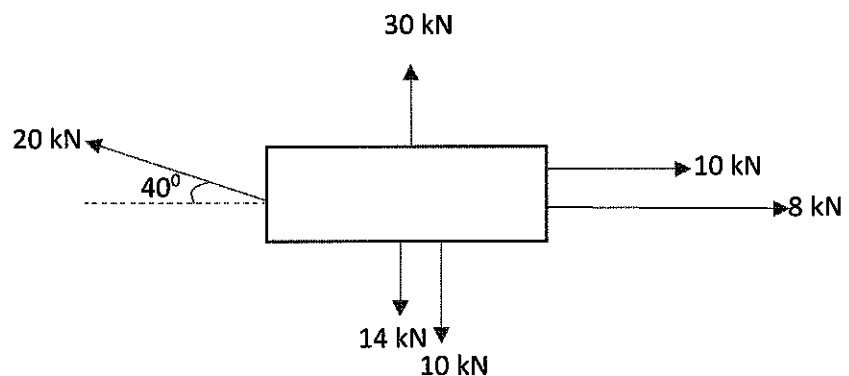


Diagram A1(b)/ Rajah A1(b)

[8 marks]

[8 markah]

CLO1
C2

- (c) The following **Diagram A1(c)** shows multiple forces that act at point O. Identify the resultant force, F_R and its direction, Θ .

Rajah A1(c) dibawah menunjukkan pelbagai daya yang bertindak dari titik asalan O. Kenalpasti jumlah daya yang terhasil F_R dan arah daya, Θ .

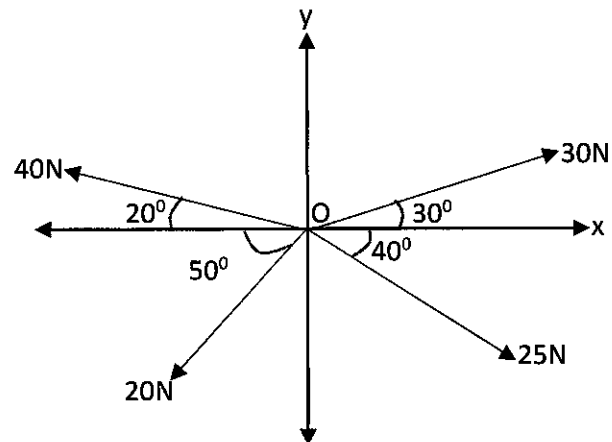


Diagram A1(c)/ Rajah A1(c)

[12 marks]

[12 markah]

QUESTION 2**SOALAN 2**CLO1
C2

- (a) Identify the number of reactions for **TWO (2)** types of beam support.
Kenalpasti bilangan tindak balas bagi DUA (2) jenis sokongan rasuk.

[5 marks]

[5 markah]

CLO1
C2

- (b) **Diagram A2(b)** shows a beam loaded with some forces. Classify the types of loads based on the diagram.

Gambarajah A2(b) menunjukkan beberapa beban dikenakan ke atas rasuk. Kelaskan jenis-jenis beban berdasarkan gambarajah tersebut.

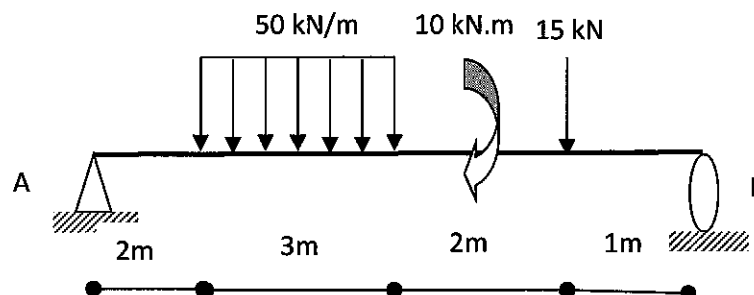


Diagram A2(b) /Rajah A2(b)

[8 marks]

[8 markah]

CLO1
C2

- (c) By using appropriate diagram, explain **FOUR (4)** types of beams such as simply supported beam, cantilever beam, overhanging beam and continuous beam.

Dengan menggunakan rajah yang sesuai, jelaskan EMPAT (4) jenis rasuk seperti rasuk tupang mudah, rasuk julur, rasuk tergantung dan rasuk selanjat.

[12 marks]

[12 markah]

SECTION B : 100 MARKS**BAHAGIAN B : 100 MARKAH****INSTRUCTION:**

This section consists of **FOUR (4)** essay questions. Answer **TWO (2)** questions only.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan esei . Jawab DUA (2) soalan sahaja.

QUESTION 1**SOALAN 1**

CLO2
C3

- (a) **Diagram B1(a)** below shows three loads acting on a beam. With the aid of sketch free body diagram, calculate the reaction value at point A and B by using Principle of Moment method.

Rajah B1(a) dibawah menunjukkan tiga daya beban yang bertindak ke atas sebuah rasuk. Dengan bantuan gambarajah jasad bebas, kirakan nilai tindakbalas pada titik A dan B dengan menggunakan kaedah Prinsip Momen.

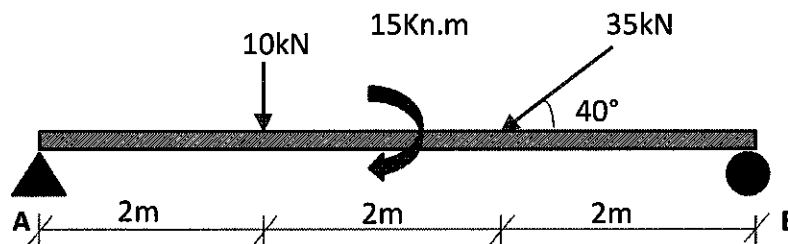


Diagram B1(a) / Rajah B1(a)

[10 marks]

[10 markah]

CLO2
C3

- (b) A cantilever beam is subjected to point load and uniformly distributed loads as shown in the **Diagram B1(b)** below. Calculate the reaction at the support beam to complete the sketch of shear force and bending moment diagram.

*Satu rasuk julur dikenakan beban tumpu dan beban teragih seragam seperti dalam **Rajah B1(b)** di bawah. Kirakan tindakbalas pada penyokong rasuk untuk melengkapkan gambarajah beban ricih dan momen lentur.*

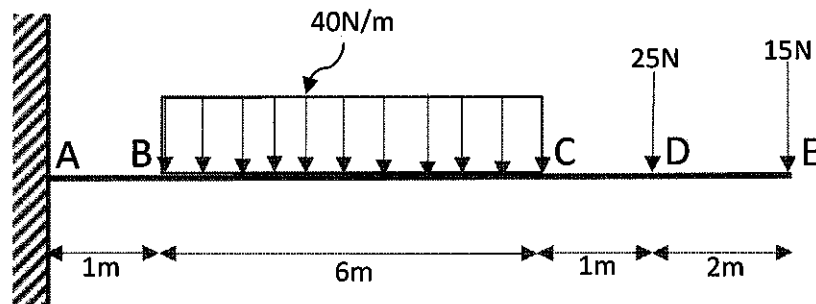


Diagram B1(b)/ Rajah B1(b)

[15 marks]

[15 markah]

QUESTION 2

SOALAN 2

CLO2
C3

- (a) **Diagram B2(a)**, shows a simply supported beam which carries point load and uniformly distributed load. With the aid of sketch free body diagram, calculate the reaction at the beam support.

Rajah B2(a), menunjukkan satu rasuk disokong mudah yang menanggung beban tumpu dan beban teragih seragam. Dengan bantuan gambarajah jasad bebas, kirakan tindakbalas pada penyokong rasuk tersebut.

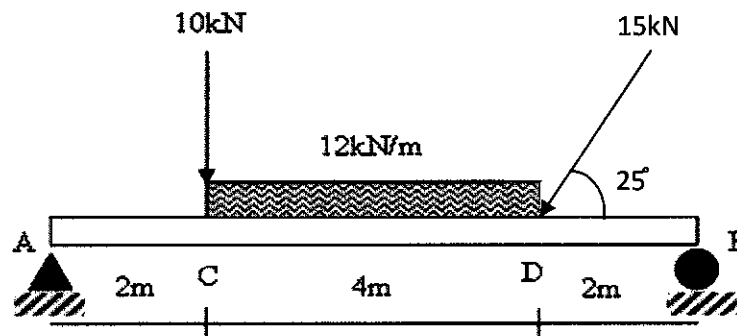


Diagram B2(a) / Rajah B2(a)

[10 marks]

[10 markah]

- (b) With the aid of the shear force and bending moment diagram, calculate the value of shear force and bending moment based on **Diagram B2(a)** on **Question B2(a)** above.

*Dengan bantuan gambarajah beban ricih dan momen lentur, kirakan nilai daya ricih dan momen lentur berdasarkan **Rajah B2(a)** dalam Soalan B2(a) di atas.*

[15 marks]

[15 markah]

CLO2
C3

- (c) With the aid of the shear force and bending moment diagram, calculate the value of shear force and bending moment based on **Diagram B2(a)** on **Question B2(a)** above.

*Dengan bantuan gambarajah beban ricih dan momen lentur, kirakan nilai daya ricih dan momen lentur berdasarkan **Rajah B2(a)** dalam Soalan B2(a) di atas.*

[15 marks]

[15 markah]

QUESTION 3**SOALAN 3**CLO2
C3

- (a) Explain by using a sketch the terms of tensile stress and compressive stress
Terangkan dengan lakaran istilah tegasan tegangan dan tegasan mampatan.

[10 marks]

[10 markah]

CLO2
C3

- (b) A steel bar with a size of 25mm x 10mm and a length of 2m is imposed to a tension load of 25 kN and elongated by 0.05mm. Calculate the value of the stress, strain and the modulus of elasticity.

Sebatang bar size 25mm x 10mm dan 2m panjang dikenakan beban 25 kN dan mengalami pemanjangan sebanyak 0.05mm. Kiraka tegasan, terikan dan modulus keanjalan.

[15 marks]

[15 markah]

QUESTION 4**SOALAN 4**CLO2
C3

- (a) A rectangular bar with dimensions of 200 mm width and 50 mm depth is loaded with a compression of 50N. Calculate the stress and strain in the bar. Given $E = 250 \times 10^9 \text{ N/mm}^2$.

Satu bar berkeratan segiempat tepat mempunyai dimensi 200 mm lebar dan 50 mm dalam dibebankan dengan mampatan sebanyak 50N. Kirakan tegasan dan terikan di dalam bar. Diberi $E = 250 \times 10^9 \text{ N/mm}^2$.

[10 marks]

[10 markah]

CLO2
C3

- (b) 40 mm diameter steel rod with a length of L m is imposed to a compression load of 45 kN and contracted by 0.07 mm. Calculate the compressive stress, compressive strain, and the length of the steel rod if the value of steel rod of Young's Modulus, E is 205 kN/mm^2 .

Rod keluli berdiameter 40 mm dan L m panjang dikenakan beban mampatan 45 kN dan mengalami pemendekkan sebanyak 0.07 mm. Kirakan tegasan mampatan, terikan mampatan dan panjang rod keluli, jika nilai Modulus Keanjalan Young's untuk rod keluli, E ialah 205 kN/mm^2 .

[15 marks]

[15 markah]

SOALAN TAMAT