



KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

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

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI II : 2025/2026

DCW20322 : WOOD MECHANIC STRUCTURE 1

TARIKH : 30 APRIL 2026

MASA : 2.30 PETANG - 4.30 PETANG (2 JAM)

Kertas ini mengandungi **LAPAN (8)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

INSTRUCTION:

This section consists of **FOUR (4)** questions. Answers **ALL** questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan. Jawab SEMUA soalan

QUESTION 1**SOALAN 1**

- CLO1 (a) Describe the axial force with the aid of a diagram.

Terangkan daya paksi dengan bantuan gambar rajah.

[5 marks]

[5 markah]

- CLO1 (b) A column is subjected to a 200 kN tensile force. The cross-section of the column, which includes a hollow section in the middle, is shown in Figure 1(b). Calculate the tensile stress in the bar.

Sebatang tiang dikenakan daya tegangan 200 kN. Keratan rentas tiang yang mempunyai bahagian tengah yang berongga ditunjukkan pada Rajah 1(b). Kira tegasan tegangan dalam bar tersebut.

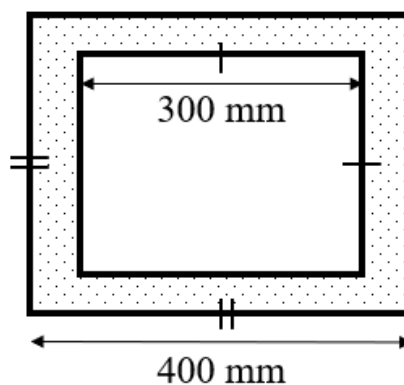


Figure 1(b) / Rajah 1(b)

[10 marks]

[10 markah]

CLO1

- (c) A copper bar, as shown in Figure 1(c), is subjected to a tensile load of 30 kN. The bar consists of two parts; part AB with length 20 cm and cross-sectional area 9 cm² and part BC with length 7.5 cm and cross-sectional area 4 cm². Calculate the elongation in each segment of the bar, if given that the $E_{\text{copper}} = 1,100 \text{ kN/cm}^2$.

Sebuah palang tembaga seperti yang ditunjukkan dalam Rajah 1(c) dikenakan daya tegangan sebanyak 30 kN. Palang tersebut terdiri daripada dua bahagian; bahagian AB dengan panjang 20 cm dan luas keratan rentas 9 cm² dan bahagian BC dengan Panjang 7.5 cm dan luas keratan rentas 4 cm². Kira pertambahan Panjang bagi setiap bahagian pada palang itu, jika diberi $E_{\text{tembaga}} = 1,100 \text{ kN/cm}^2$.

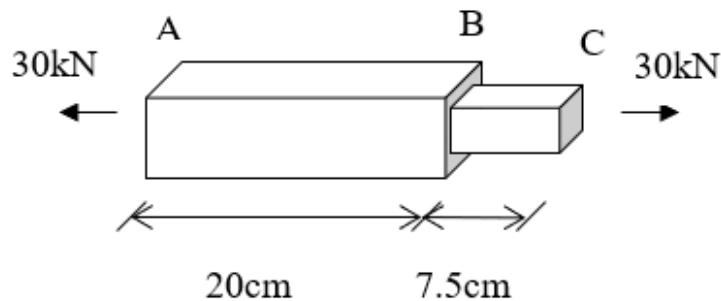


Figure 1(c) / Rajah 1(c)

[10 marks]

[10 markah]

QUESTION 2

SOALAN 2

- CLO1 (a) A material is said to be elastic if it obeys the Hooke's Law. Explain the Hooke's Law.

Satu bahan dikatakan elastik jika mematuhi Hukum Hooke. Terangkan Hukum Hooke.

[5 marks]

[5 markah]

- CLO1 (b) In Figure 2(b), a wooden block with a rectangular cross-section is subjected to a horizontal shear force of 120 kN. The Modulus of Rigidity (G) of the wood is given as 1.2 kN/mm^2 . Calculate:

Dalam Rajah 2(b) blok kayu dengan keratan rentas segi empat tepat, dikenakan daya ricih mendatar sebanyak 120 kN. Modulus ketegaran (G) kayu tersebut ialah 1.2 kN/mm^2 . Kira:

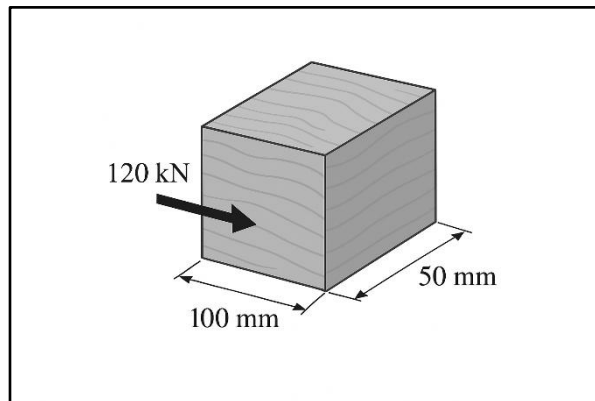


Figure 2(b) / Rajah 2(b)

- i) the shear stress in the wooden block.
tegasan ricih dalam blok kayu tersebut.

[6 marks]

[6 markah]

- ii) the shear strain in the block.
terikan ricih dalam blok kayu tersebut.

[4 marks]

[4 markah]

CLO1

- (c) A puncher of 19 mm diameter as shown in Figure 2(c) is used to punch a hole through a steel plate of thickness 6 mm. A force of 116 kN is required. Calculate:

Penebuk berdiameter 19 mm seperti yang ditunjukkan pada Rajah 2(c) digunakan untuk menebuk lubang dalam plat keluli yang berketebalan 6 mm. Daya 166 kN diperlukan.

Kira:

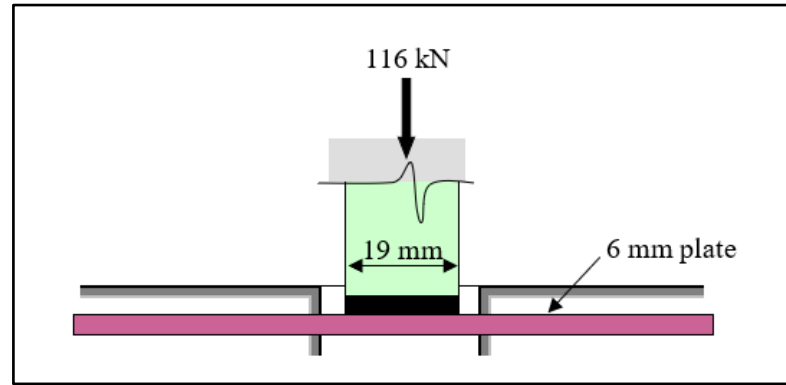


Figure 2(c) / Rajah 2(c)

- i) the average shear stress in the plate.
tegasan ricih purata dalam plat tersebut.

[6 marks]

[6 markah]

- ii) the average compressive stress in the punch, given the cross-section area of the punch is 283.53 mm^2 .

Purata tegasan mampatan dalam penebut tersebut, diberikan luas keratan rentas pada penebuk ialah 283.53 mm^2

[4 marks]

[4 markah]

QUESTION 3**SOALAN 3**

- CLO2 (a) Illustrate a simply supported beam and the directions of the support reaction of the beam when it is subjected to a load.

Lukis rasuk disokong mudah dan arah-arrah tindak balas penyokong rasuk tersebut apabila ia dikenakan beban.

[5 marks]

[5 markah]

- CLO2 (b) Figure 3(b) shows a 5 m span simply supported beam was subjected to a uniformly distributed load of 400 N/m. Calculate the reaction force at support A and B.

Rajah 3(b) menunjukkan rasuk disokong mudah yang mempunyai panjang 5 m dikenakan 400 N/m beban teragih seragam. Kira daya tindak balas bagi penyokong A dan B.

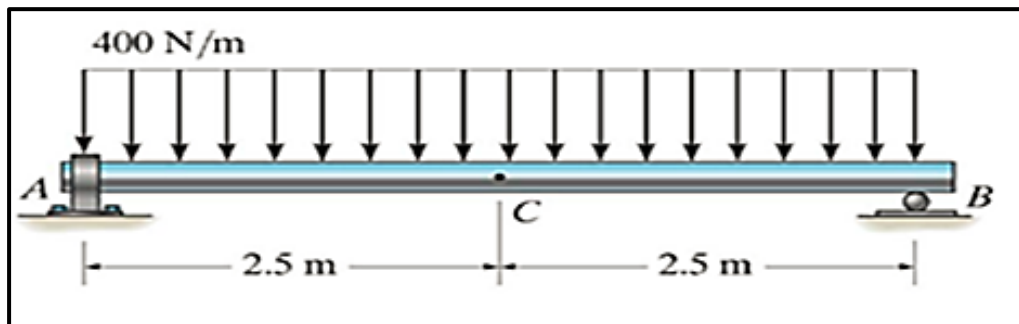


Figure 3(b) / Rajah 3(b)

[10 marks]

[10 markah]

- CLO2 (c) Figure 3(c) shows a cantilever beam subjected to a point load and a uniformly distributed load. Calculate the reaction at the support A.

Rajah 3(c) menunjukkan rasuk julur dikenakan beban tumpu dan beban teragih seragam. Kira daya tindakbalas bagi penyokong A.

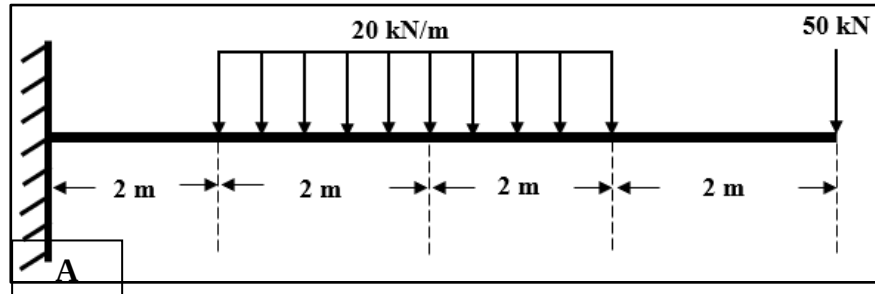


Figure 3(c) / Rajah 3(c)

[10 marks]

[10 markah]

QUESTION 4

SOALAN 4

- CLO2 (a) Sketch the free body diagram of an overhanging beam subjected to a moment in the middle of its span.

Lakar gambar rajah jasad bebas bagi rasuk gantung yang dikenakan momen pada bahagian tengah rasuk tersebut.

[5 marks]

[5 markah]

- CLO2 (b) Figure 4(b) shows overhanging beam subjected to a point load of 12 kN and 8 kN. Sketch the Shear Force Diagram (SFD) and Bending Moment Diagram (BMD) of the beam. Given the reaction A (A_Y) = 7 kN and reaction C (C_Y) = 13 kN.

Rajah 4(b) menunjukkan rasuk hujung tergantung dikenakan beban tumpu 12 kN dan 8 kN. Lakarkan Gambarajah Daya Ricih (GDR) dan Gambarajah Momen Lentur (GML) bagi rasuk tersebut. Diberikan tindak balas pada A (A_Y) = 7 kN dan tindak balas pada C (C_Y) = 13 kN.

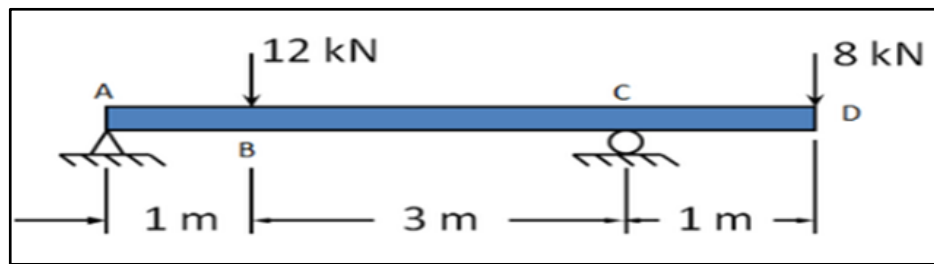


Figure 4(b) / Rajah 4(b)

[10 marks]

[10 markah]

- CLO2 (c) An overhang beam 4 m in length was subjected to loads as shown in Figure 4(c). If the vertical reaction at support A (A_Y) is 5 kN and the reaction at support D (D_Y) is 15 kN, sketch the Shear Force Diagram (SFD) and Bending Moment Diagram (BMD) of the beam.

Sebuah rasuk julur dengan panjang 4 m dikenakan beban seperti dalam Rajah 4(c). Sekiranya tindak balas menegak pada penyokong A (A_Y) ialah 5 kN dan tindak balas pada penyokong D (D_Y) ialah 15 kN, lakar Gambarajah Daya Ricih (GDR) dan Gambarajah Momen Lentur (GML) bagi rasuk tersebut.

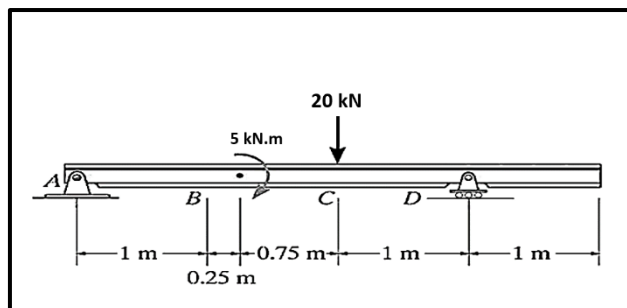


Figure 4(c) / Rajah 4(c)

[10 marks]

[10 markah]

FORMULA DCW20322**(WOOD MECHANIC STRUCTURE 1)**

NO.	FORMULA NAME	FORMULA 1	FORMULA 2
1.	DIRECT STRESS	$\sigma = \frac{P}{A}$	
2.	DIRECT STRAIN	$\varepsilon = \frac{\delta L}{L}$	
3.	MODULUS YOUNG	$E = \frac{\sigma}{\varepsilon}$	$E = \frac{PL}{A\delta L}$
4.	LENGTH CHANGE	$\delta L = \frac{PL}{AE}$	
5.	TOTAL OF LENGTH CHANGE	$\Sigma \delta L = \delta L_1 + \delta L_2$	
6.	SLOPE - LOAD VS ELONGATION GRAPH	$m = \frac{y_2 - y_1}{x_2 - x_1}$	
7.	MODULUS YOUNG - LOAD VS ELONGATION GRAPH	$E = mx \frac{L}{A}$	
8.	MODULUS YOUNG - STRESS VS STRAIN GRAPH	$E = \frac{\sigma}{\varepsilon}$	
9.	SHEAR STRESS	$\tau = \frac{V}{A}$	
10.	SHEAR STRAIN	$\gamma = \frac{\tau}{G}$	
11.	MODULUS OF RIGIDITY	$G = \frac{\tau}{\gamma}$	
12.	EQUILIBRIUM EQUATION	$\begin{aligned}\Sigma M \curvearrowright^{+ve} &= 0 \\ \Sigma F_y \uparrow^{+ve} &= 0 \\ \Sigma F_x \rightarrow^{+ve} &= 0\end{aligned}$	