SULIT

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 : 2024/2025

DCW20322: WOOD MECHANIC STRUCTURE 1

TARIKH : 14 MEI 2025
MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas soalan ini mengandungi **SEMBILAN (9)** halaman bercetak.
Soalan 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 axial force.

Terangkan daya paksi.

[5 marks]

[*5 markah*]

CLO1 (b) A wood sample of 350 mm length that has a square cross section with dimension of 25 mm width, carries an axial tension of 40 kN. Determine:

Sampel kayu sepanjang 350 mm yang mempunyai keratan rentas segi empat sama dengan dimensi 25 mm lebar, dikenakan 40 kN tegangan paksi. Tentukan:

i) the tension stress in the wood sample.

tegasan tegangan pada sampel kayu tersebut.

[5 marks]

[5 *markah*]

ii) the elongation of the wood sample when load is applied, given the modulus of elasticity (E) is 250 kN/mm^2.

pemanjangan sampel kayu apabila beban dikenakan, diberikan modulus keanjalan (E) ialah 250 kN/mm^2.

[5 marks]

[*5 markah*]

CLO1

(c) A 15 m length with 0.50 m^2 area cross section beam is used in a bridge construction. The allowable stress in the beam must not exceed 600 N/m^2. Calculate:

Sebatang rasuk yang mempunyai panjang 15 m dan keluasan keratan rentas 0.50 m^2, digunakan untuk membina sebuah jambatan. Tegasan rasuk adalah tidak melebihi 600 N/m^2 Kirakan:

i) the maximum force the beam can sustain.
daya maksimum yang boleh ditampung oleh rasuk itu.

[4 marks]
[*4 markah*]

ii) the maximum strain in the beam, if the modulus of elasticity (E) is 205 x 10^9 N/m^2.
terikan maksimum rasuk tersebut, jika modulus keanjalan (E) ialah 205 x 10^9 N/m^2.

[6 marks]
[*6 markah*]

QUESTION 2

SOALAN 2

CLO1 (a) A normal stress and strain relationship are represented in the form of a stress versus strain graph. Determine the proportional limit, elastic limit and rupture strength in the stress versus strain graph sketching.

Hubungan tegasan dan terikan normal dipersembahkan dalam bentuk graf tegasan melawan terikan. Tentukan had kekadaran, had elastik dan tegasan pecah di dalam lakaran graf tegasan melawan terikan.

[5 marks]

[*5 markah*]

CLO1 (b) In Figure 2(b) two steel plates are connected using rivet diametrical 1.5 cm. If tension force subjected was 30 kN, calculate:

Dalam Rajah 2(b) dua plat keluli disambungkan menggunakan rivet berdiameter 1.5 cm. Jika daya tegangan yang dikenakan ialah 30 kN, kirakan:

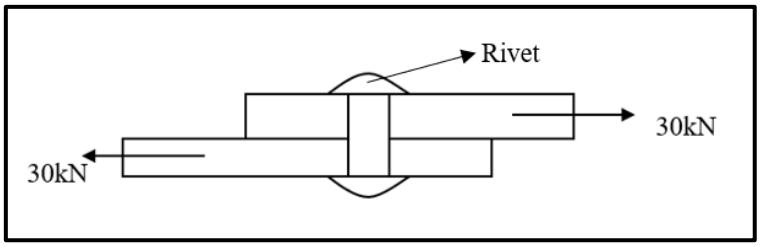

Figure 2(b)

Rajah 2(b)

i) the shear stress in rivet.

tegasan ricih dalam rivet.

[6 marks]

[*6 markah*]

ii) the shear stress in rivets, if another steel plate is added to the connection causing the rivets subjected to double shear stress.
tegasan ricih dalam rivet, sekiranya satu lagi plat keluli ditambahkan pada sambungan tersebut yang menyebabkan rivet mengalami tegasan ricih berganda.

[4 marks]
[*4 markah*]

CLO1

(c) A bar as shown in Figure 2(c) is pulled with a force of 50 kN, calculate:
Sebatang bar seperti yang ditunjukan pada Rajah 2(c) ditarik dengan daya 50 kN, kirakan:

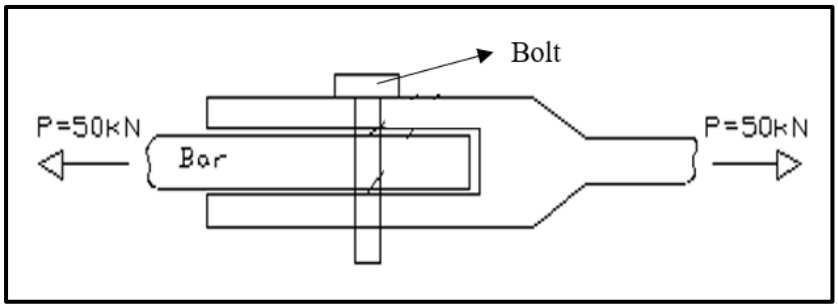

Figure 2(c)
Rajah 2(c)

i) the shear stress in the bolt if the diameter of the bolt is 19 mm.
tegasan ricih bol sekiranya diameter bol ialah 19 mm.

[4 marks]
[*4 markah*]

ii) the percentage increase in shear stress if the diameter of the bolt is reduced to 16 mm.
peratus pertambahan tegasan ricih bol sekiranya diameter bol dikurangkan kepada 16 mm.

[6 marks]
[*6 markah*]

QUESTION 3

SOALAN 3

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

Lukiskan rasuk julur dan arah-arah tindak balas penyokong rasuk tersebut apabila ia dikenakan beban.

[5 marks]

[*5 markah*]

CLO2 (b) Figure 3(b) shows a 10 m long simply supported beam that is subjected to a point load and an inclined load. Calculate the reaction force at support A and B.

Rajah 3(b) menunjukan rasuk disokong mudah yang mempunyai panjang 10 m dikenakan beban tumpu dan beban condong. Kirakan daya tindak balas bagi penyokong A dan B.

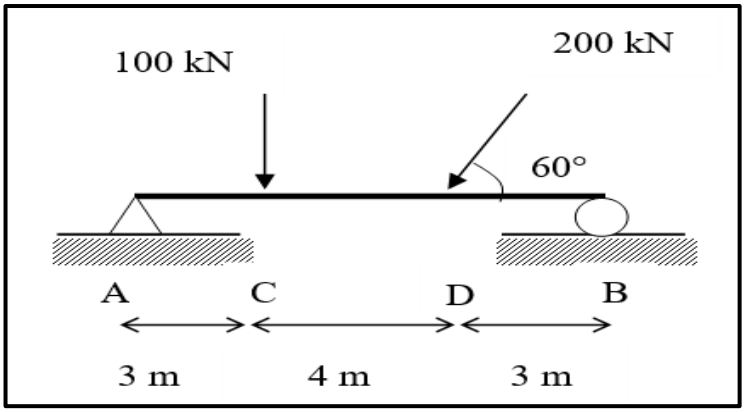

Figure 3(b)

Rajah 3(b)

[10 marks]

[*10 markah*]

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

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

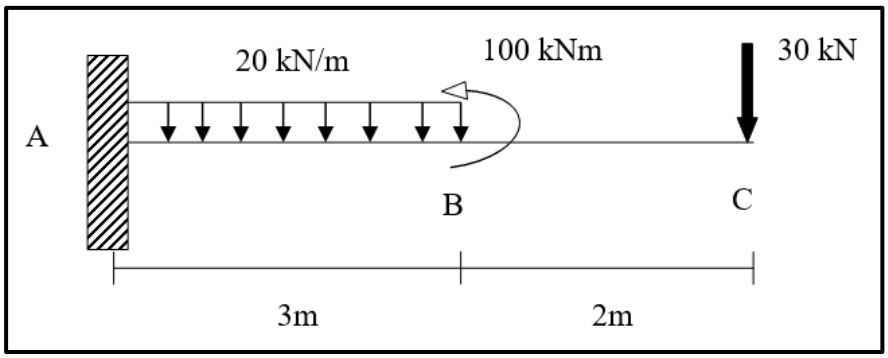

Figure 3(c)

Rajah 3(c)

[10 marks]

[*10 markah*]

QUESTION 4

SOALAN 4

CLO2 (a) Illustrate the roller and pinned supporters and the directions of the support reactions for each supporter.

Lukiskan penyokong rola dan penyokong pin serta arah-arah tindak balas bagi setiap penyokong.

[5 marks]

[*5 markah*]

CLO2 (b) An overhang beam 7.5 m in length is subjected to loads as shown in Figure 4(b). Given the reaction B_Y = 46 kN, sketch the Shear Force Diagram of the beam.

Sebuah rasuk hujung tergantung dengan panjang 7.5 m dikenakan beban seperti dalam Rajah 4(b). Diberikan tindak balas B_Y = 46 kN, lakarkan Gambarajah Daya Ricih rasuk tersebut.

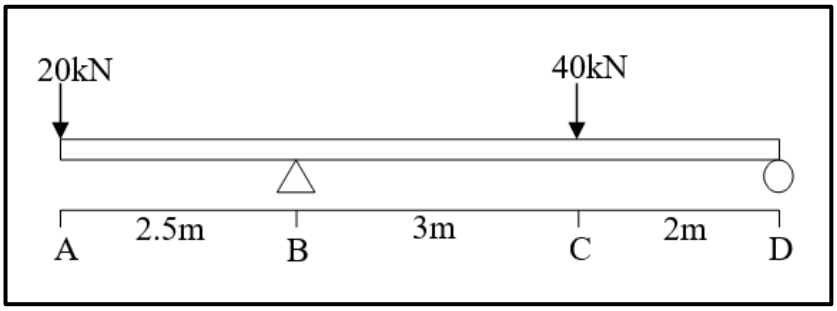

Figure 4(b)

Rajah 4(b)

[10 marks]

[*10 markah*]

CLO2

(c) A simply supported beam 8 m in length was subjected to loads as shown in Figure 4(c). If the vertical reaction at support A (A_Y) and E (E_Y) are 9 kN and 6 kN respectively, illustrate the Shear Force Diagram (SFD) and Bending Moment Diagram (BMD) of the beam.

Satu rasuk disokong mudah dengan panjang 8 m dikenakan beban seperti dalam Rajah 4(c). Sekiranya tindak balas menegak pada penyokong A (A_Y) dan E (E_Y) ialah masing-masing 9 kN dan 6 kN, lukiskan gambar rajah daya ricih dan gambar rajah momen lentur rasuk tersebut.

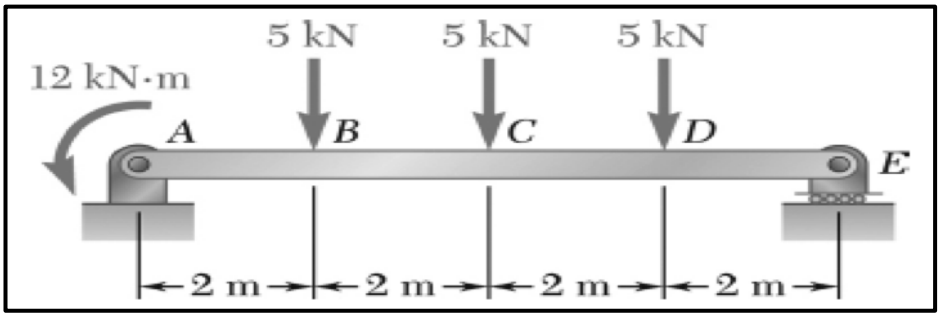

Figure 4(c)
Rajah 4(c)

[10 marks]
[*10 markah*]

END OF QUESTION
SOALAN TAMAT

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.	SLOPE - LOAD VS ELONGATION GRAPH	$m = \frac{y_2 - y_1}{x_2 - x_1}$	
5.	MODULUS YOUNG - LOAD VS ELONGATION GRAPH	$E = mx\frac{L}{A}$	
6.	MODULUS YOUNG - STRESS VS STRAIN GRAPH	$E = \frac{\sigma}{\varepsilon}$	
7.	SHEAR STRESS	$\tau = \frac{V}{A}$	
8.	SHEAR STRAIN	$\gamma = \frac{\tau}{G}$	
9.	MODULUS OF RIGIDITY	$G = \frac{\tau}{\gamma}$	
10.	EQUILIBRIUM EQUATION	$\sum M \circlearrowright^{+ve} = 0$ $\sum F_y \uparrow^{+ve} = 0$ $\sum F_x \rightarrow^{+ve} = 0$	