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 : 2022/2023

DCW20062: WOOD MECHANIC STRUCTURE 1

TARIKH : 07 JUN 2023
MASA : 2.30 PTG – 4.30 PTG (2 JAM)

Kertas ini mengandungi **SEBELAS (11)** halaman bercetak.

Bahagian A: Struktur (2 soalan)
Bahagian B: Struktur (4 soalan)

Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

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 struktur. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO1 (a) There are certain types of forces, that when involved in doing work on objects will change the total mechanical energy of the object and there are other types of forces that can never change the total mechanical energy of an object. The two categories of forces are referred to as internal forces and external forces. Identify **TWO (2)** types of external forces.

*Terdapat jenis daya tertentu, apabila terlibat dalam melakukan kerja pada objek akan mengubah jumlah tenaga mekanikal objek dan terdapat jenis daya lain yang tidak boleh mengubah jumlah tenaga mekanikal objek. Dua kategori daya dirujuk kepada daya dalaman dan daya luaran. Kenalpasti **DUA (2)** jenis daya luaran.*

[5 marks]

[*5 markah*]

CLO1 (b) A wooden rod has two different parts of cross section subjected with compression load of 25 N as shown in Diagram A1(b). Calculate the stress for each part.

Satu rod kayu mempunyai 2 bahagian keratan rentas dikenakan beban mampatan 25 N seperti di dalam Rajah A1(b). Kirakan tegasan pada setiap bahagian.

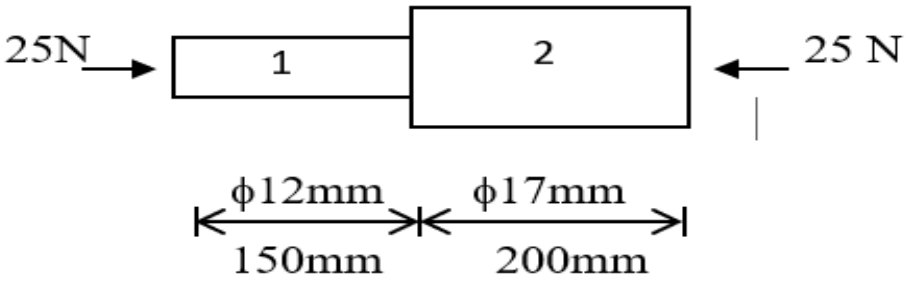

Diagram A1(b)

Rajah A1(b)

[10 marks]

[10 markah]

CLO1 (c) A block as shown in the Diagram A1(c) below is subjected with a compression load of 90 kN have been shortened by 0.03 mm. Calculate:

i. Compressive stress

ii. Strain

Satu blok seperti Rajah A1(c) di bawah dikenakan beban mampatan 90 kN mengalami pemendekan 0.03 mm. Kira:

i. Tegasan mampatan

ii. Terikan

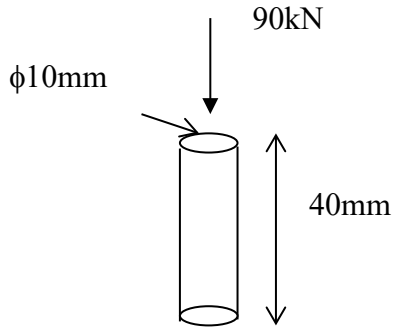

Diagram A1(c)

Rajah A1(c)

[10 marks]

[*10 markah*]

QUESTION 2

SOALAN 2

CLO2 (a) Sketch a wood joint connected with a screw that is subjected to double shear stress.

Lakarkan sambungan kayu yang dihubungkan oleh skru yang mengalami tegasan ricih ganda.

[5 marks]

[*5 markah*]

CLO2 (b) A simply supported beam is given as shown in Figure A2(b). Referring to the figure, calculate the reaction force at the support A and B of the beam.

Rasuk disokong mudah diberikan seperti pada Rajah A2(b). Merujuk kepada rajah tersebut, kirakan daya tindak balas bagi penyokong A dan B.

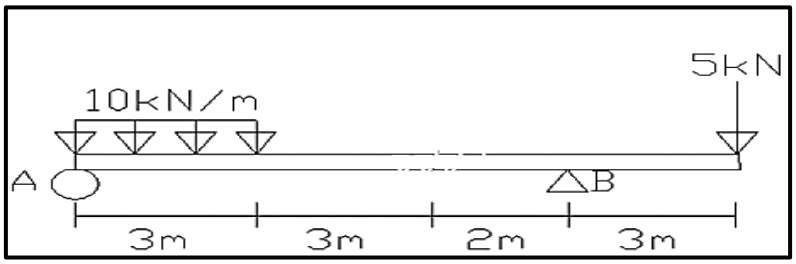

Figure A2(b)

Rajah A2(b)

[10 marks]

[*10 markah*]

CLO2 (c) A 7.5 m long simply supported beam was subjected to a load as shown in Figure A2(c). If the vertical reaction at support A and C are 60 kN and 30 kN respectively, illustrate the Shear Force Diagram (SFD) and Bending Moment Diagram (BMD) of the beam.

Sebuah rasuk sokong mudah dengan panjang 8 m menanggung beban seperti dalam Rajah A2(c). Sekiranya tindak balas menegak pada penyokong A dan C masing-masing ialah 60 kN dan 30 kN, lukiskan gambar rajah daya ricih dan gambar rajah momen lentur rasuk tersebut.

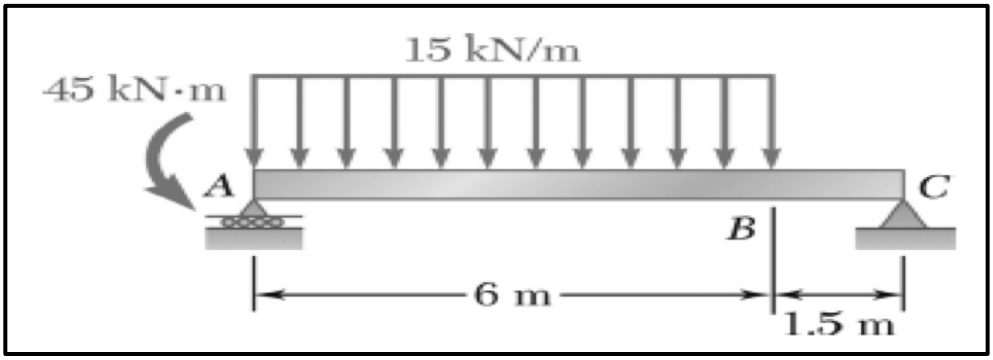

Figure A2(c)

Rajah A2(c)

[10 marks]

[*10 markah*]

SECTION B: 50 MARKS

BAHAGIAN B :50 MARKAH

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1

SOALAN 1

CLO2 (a) A 4m long steel bar as shown in Diagram B1(a) being imposed with tension force of 5 N. Calculate elongation bar if $E = 2.0 \times 10^6$ N/cm^2.

Satu rod keluli 4 m panjang yang ditunjukkan dalan Rajah B1(a) dikenakan daya tegangan 5 N. Kira pemanjangan rod jika $E = 2.0 \times 10^6$ N/cm^2.

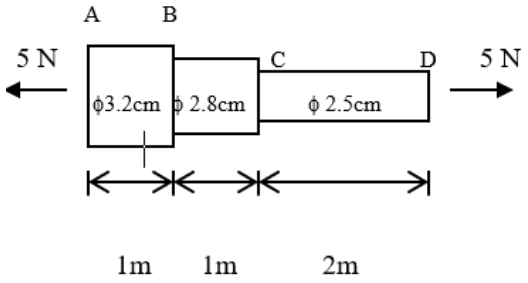

Diagram B1(a)

Rajah B1(a)

[5 marks]

[*5 markah*]

CLO2 (b) A material with round cross section of 20 mm in diameter is subjected to a tension force of 100 kN. Calculate tension stress sustained by the material.
Satu bahan dengan luas bulatan berdiameter 2 mm dikenakan daya tegangan 100 kN. Kira tegasan tegangan yang ditanggung oleh bahan.

[10 marks]
[*10 markah*]

CLO2 (c) If a pair of rivet with diameter of 8 mm failed in single shear when subjected to a load of 5 kN. Determine the shear stress occurs in the rivet.
Jika sepasang rivet dengan diameter 8 mm gagal di dalam ricih tunggal apabila dikenakan beban 5 kN. Tentukan tegasan ricih di dalam rivet.

[10 marks]
[*10 markah*]

QUESTION 2
SOALAN 2

CLO2 (a) A beam is normally horizontal and the loads acting on the beams are generally vertical. There are various ways in which beams are loaded. Interpret **THREE (3)** types of load.
*Rasuk biasanya mendatar dan beban yang bertindak pada rasuk biasanya menegak. Terdapat pelbagai cara di mana rasuk dibebankan. Tafsirkan **TIGA (3)** jenis beban.*

[5 marks]
[*5 markah*]

CLO2 (b) A 5 m long cantilever beam was subjected to loads as shown in Diagram B2(b) below. By using the static equilibrium equation, calculate the reaction at support A.

Satu rasuk julur 5 m panjang dikenakan beban seperti Rajah B2(b) di bawah. Menggunakan persamaan keseimbangan statik, kira tindakbalas pada penyokong A.

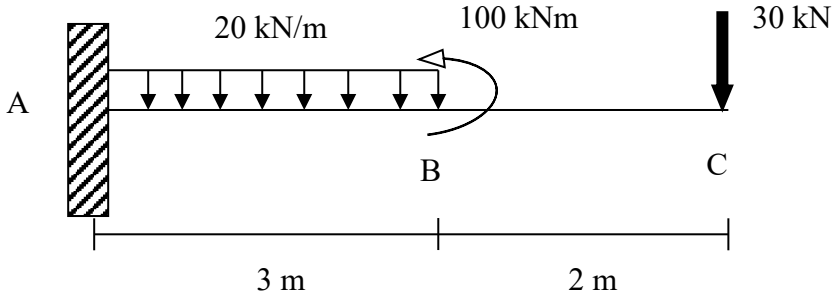

Diagram B2(b)

Rajah B2(b)

[10 marks]

[*10 markah*]

CLO2 (c) A hollow rod with 600 mm length, outside diameter and inside diameter 30 mm and 20 mm. It is subjected with 50kN load and have elongation, 0.2 mm. Determine stress and strain for the rod.

Satu rod berongga dengan panjang 600 mm, diameter luar dan diameter dalam 30 mm dan 20 mm. Ia dikenakan beban 50kN dan mempunyai pemanjangan, 0.2 mm. Tentukan tegasan dan terikan untuk rod.

[10 marks]

[*10 markah*]

QUESTION 3

SOALAN 3

CLO2 (a) Illustrate the shear force diagram (SFD) and the bending moment diagram (BDM) of a simply supported beam as shown in Figure B3(a), with label the maximum bending moment. *Lakarkan gambar rajah daya ricih dan gambar rajah momen lentur bagi rasuk sokong mudah seperti yang ditunjukkan pada Rajah B3(a) dengan label momen lentur maksimum.*

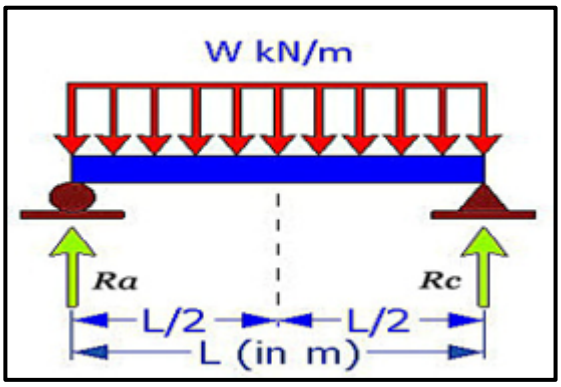

Figure B3(a)

Rajah B3(a)

[5 marks]

[*5 markah*]

CLO2 (b) An overhang 6 m length beam was subjected to a point load of 30 kN and 50 kN as shown in Figure B3(b). Given the reaction R_B = 56 kN and R_D = 24 kN, calculate the Shear Force and Bending Moment for point A, B, C and D by using Section Method.

Sebuah rasuk hujung tergantung dengan panjang 5 m menanggung pembebanan seperti dalam Rajah B3(b). Diberikan tindak balas RB = 56 kN dan RD = 24 kN, kirakan daya ricih dan momen lentur bagi titik A, B, C dan D menggunakan Kaedah Keratan.

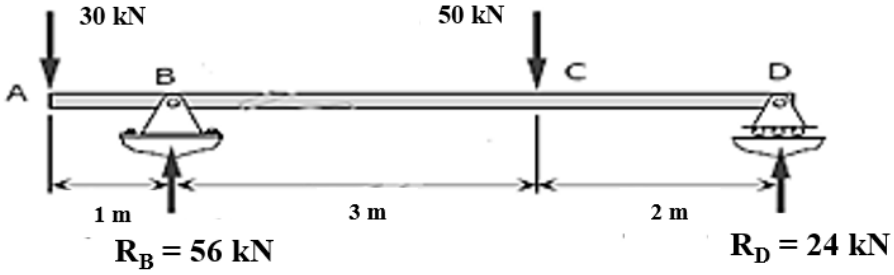

Figure B3(b)

Rajah B3(b)

[10 marks]

[*10 markah*]

CLO2 (c) Based on the butt joint shown in Figure B3(c), determine the diameter of the bolt, if the average shear stress in the bolts is 125.50 N/mm^2. Answer must be in integer.

Berdasarkan penyambungan temu seperti yang ditunjukan pada Rajah B3(c), tentukan diameter bol, sekiranya tegasan ricih pada bol-bol ialah 125.50 N/mm^2. Jawapan mestilah dalam bentuk nombor bulat.

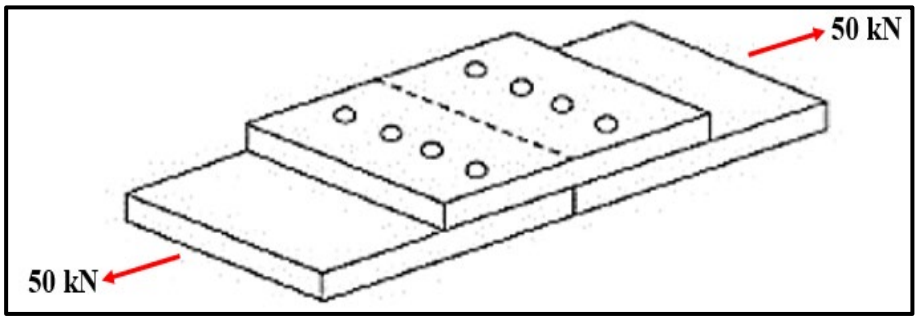

Figure B3(c)

Rajah B3(c)

[10 marks]

[*10 markah*]

QUESTION 4

SOALAN 4

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

Lukiskan rasuk disokong mudah dan arah-arah tindak balas penyokong rasuk tersebut apabila ia dikenakan beban tumpu.

[5 marks]

[*5 markah*]

CLO2 (b) Figure B4(b) shows a 14 m long simply supported beam that is subjected to two point loads. Calculate the reaction force at support A and D.

Rajah B4(b) menunjukan rasuk disokong mudah yang mempunyai panjang 7 m dikenakan dua beban tumpu. Kirakan daya tindak balas bagi penyokong A dan D.

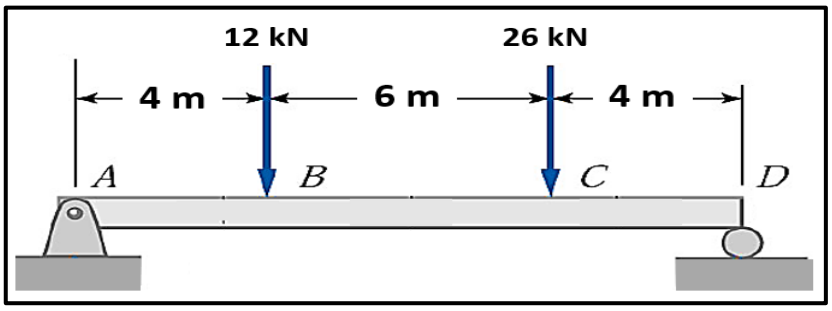

Figure B4(b)

Rajah B4(b)

[10 marks]

[*10 markah*]

CLO2 (c) A simply supported 7 m length beam was subjected to a point load of 14 kN and 28 kN as shown in Figure B4(c). Sketch the shear force diagram (SFD) and the bending moment diagram (BMD) of the beam. Given the reaction A_Y = 18 kN and reaction D_Y = 24 kN.

Satu rasuk hujung tergantung dengan panjang 7 m dikenakan beban tumpu 14 kN dan 28 kN seperti dalam Rajah B4(c). Lakarkan gambarajah daya ricih dan gambarajah momen lentur bagi rasuk tersebut. Diberikan tindak balas A_Y = 18 kN dan tindak balas D_Y = 24 kN.

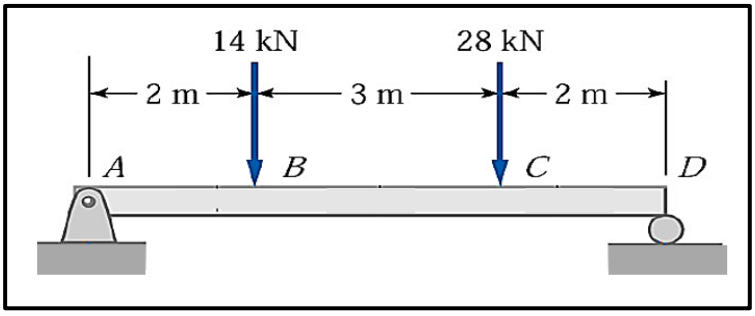

Figure B4(c)

Rajah B4(c)

[10 marks]

[*10 markah*]

SOALAN TAMAT