

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI**

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI DISEMBER 2015

DCB5182: INTRODUCTION TO STRUCTURES

TARIKH : 02 APRIL 2016

MASA : 8.30 AM - 10.30 AM (2 JAM)

Kertas ini mengandungi **SEPULUH (10)** 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)

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
C1

(a) Describe the types of structures below;

Huraikan jenis struktur dibawah;(i) Arches
Gerbang(ii) Truss
Kerangka

[5 marks]

[5 markah]

CLO1
C3

(b) Identify the reactions on each support below;

Kenal pasti tindakbalas yang ada pada tupang berikut.(i) Hinge or pinned support.
Tupang pin atau engsel

[3 marks]

[3 markah]

(ii) Roller support.
Tupang rola

[2 marks]

[2 markah]

(iii) Fixed end support
Tupang terikat tegar

[3 marks]

[3 markah]

- CLO1 C3 (c) The compound beam in **Figure 1** is a fixed at A, B and C. Calculate the reaction at A, B and C. Assume the connection at B is a pin and C is a roller.

Rasuk di dalam **Rajah 1** terikat tegar di hujung A. Kirakan tindakbalas di A, B dan C. Anggapkan sambungan di B adalah pin dan tupang di C adalah rola

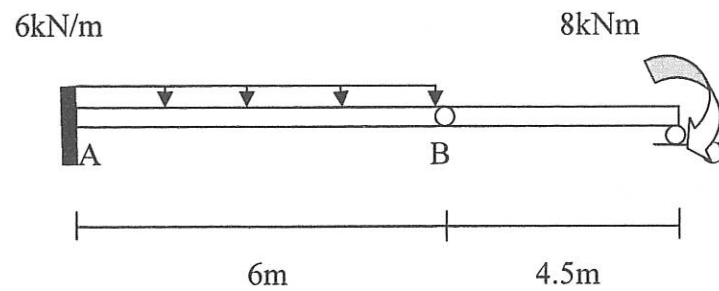


Figure 1/ Rajah 1

[12 marks]
[12 markah]

QUESTION 2
SOALAN 2

- CLO1 C1 (a) List TWO (2) equations used in equilibrium equation.
Senaraikan DUA (2) persamaan yang digunakan di dalam persamaan keseimbangan.

[5 marks]
[5 markah]

- CLO1 C2 (b) Three plates are connected with two rivets such as shown in **Figure 2**. If shear stress in the rivet does not exceed more than $80\text{MN} / \text{m}^2$, calculate the diameter of the rivet.

Tiga plat disambung dengan 2 rivet seperti dalam **Rajah 2**. Jika tegasan ricih di dalam rivet tidak melebihi $80\text{MN} / \text{m}^2$, kirakan diameter rivet.

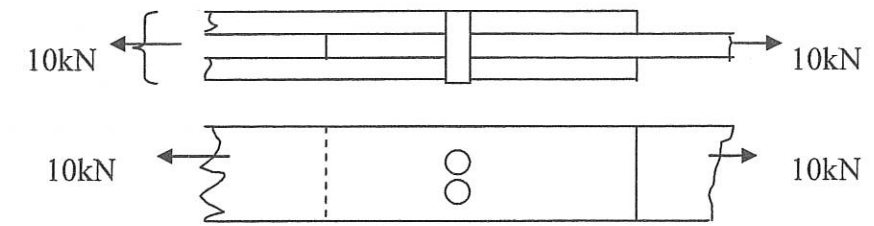


Figure 2/ Rajah 2

[8 marks]
[8 markah]

- CLO1 C3 (c) Draw the shear force diagram and bending moment diagram for the beam in **Figure 3**.

Lukiskan gambarajah daya ricih dan momen lentur untuk rasuk dalam Rajah 3.

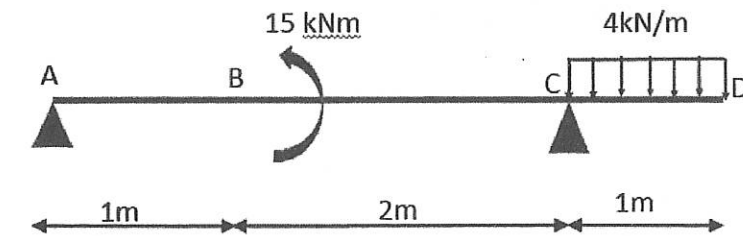


Figure 3 / Rajah 3

[12 marks]
[12 markah]

SECTION B : 50 MARKS

BAHAGIAN B : 50 MARKAH

INSTRUCTION:

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

ARAHAN:

Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab mana-mana **DUA (2)** soalan.

QUESTION 1

SOALAN 1

CLO1
C1

- (a) List **FIVE (5)** advantages of concrete.
Senaraikan LIMA (5) kebaikan konkrit.

[5 marks]

[5 markah]

CLO1
C2

- (b) Calculate the force in each member of the truss shown in **Figure 4** and indicate whether the members are in tension or compression.
Kirakan nilai daya bagi setiap anggota kekuda seperti dalam Rajah 4 dan tentukan samada anggota tersebut didalam tegangan atau mampatan.

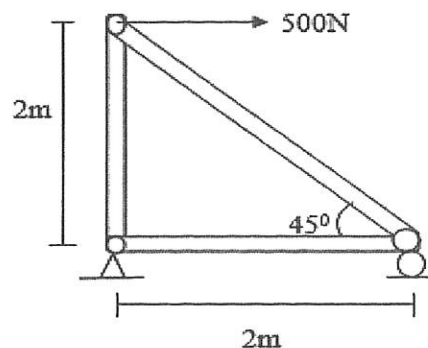


Figure 4 / Rajah 4

[8 marks]

[8 markah]

CLO1
C3

- (c) A beam 10m long is supported at its left end and at a point 8m from left end. The beam carries a load as shown in **Figure 5**. Draw the shear force and bending moment diagram.
Sebatang rasuk yang panjangnya 10m di tupang pada hujung kiri dan pada 8m dari kiri. Rasuk tersebut menanggung bebas seperti dalam Rajah 5. Lukiskan gambarajah daya ricih dan momen lentur untuk rasuk tersebut..

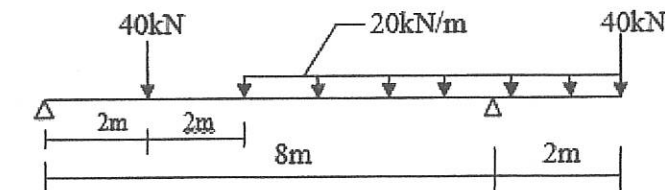


Figure 5 / Rajah 5

[12 marks]

[12 markah]

QUESTION 2

SOALAN 2

CLO2
C1

- (a) Draw **TWO (2)** types of reactions and directions for the pin and fix end support.
Lukiskan DUA (2) jenis tindak balas dan arah mereka untuk penyokong pin dan penyokong bina dalam.

[5 marks]

[5 markah]

CLO2
C2

- (b) Two bars of wood connected with a bolt of 13mm in diameter in **Figure 6**. Calculate shear stress in wood and shear stress in bolt.
Dua bar kayu disambung menggunakan bolt berdiameter 13 mm seperti Rajah 6. Kirakan tegasan ricih dalam kayu dan tegasan ricih dalam bolt.

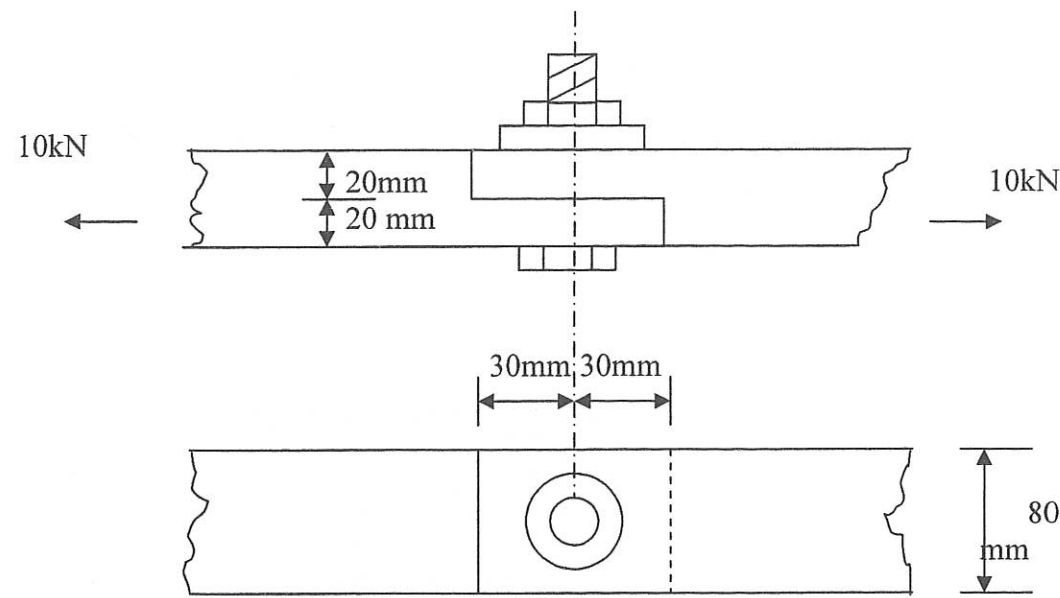


Figure 6/ Rajah 6

[8 marks]

[8 markah]

CLO2
C3

- (c) Draw the shear force diagram and bending moment diagram for the cantilever beam in Figure 7.
Lukiskan gambarajah daya ricih dan momen lentur bagi rasuk julur seperti pada Rajah 7.

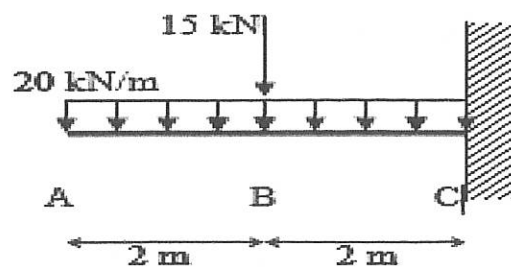


Figure 7 / Rajah 7

[12 marks]

[12 markah]

QUESTION 3

SOALAN 3

CLO2
C1

- (a) Draw the shear and moment diagram for the beam in Figure 8.
Lukiskan gambarajah ricih dan momen untuk rasuk pada Rajah 8.

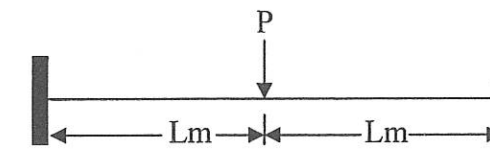


Figure 8 / Rajah 8

[5 marks]

[5 markah]

CLO2
C2

- (b) Consider the simply supported beam in Figure 9 carrying a uniform distributed load $w=25\text{kN/m}$ across the complete span. Determine the reaction at the support, shear force at the support and the maximum bending moment.

Sebatang rasuk tertumpang mudah seperti dalam Rajah 9 menanggung beban teragih seragam $w=25\text{kN/m}$ sepanjang rasuk. Tentukan nilai-nilai tindakbalas pada rasuk, daya ricih pada rasuk dan momen maksima.

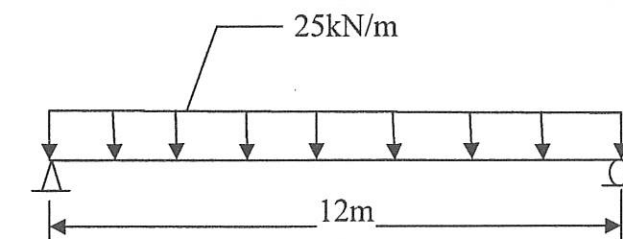


Figure 9 / Rajah 9

[8 marks]

[8 markah]

CLO2
C3

- (c) Draw the shear force and bending moment diagram for the beam in **Figure 10**. Consider the beam to be simply supported. Determine the maximum shear and moment, and their location.

Lukiskan gambarajah daya ricih dan momen lentur untuk rasuk dalam Rajah 10. Rasuk tersebut tertupang mudah. Tentukan juga nilai ricih dan momen maksima serta kedudukannya sekali

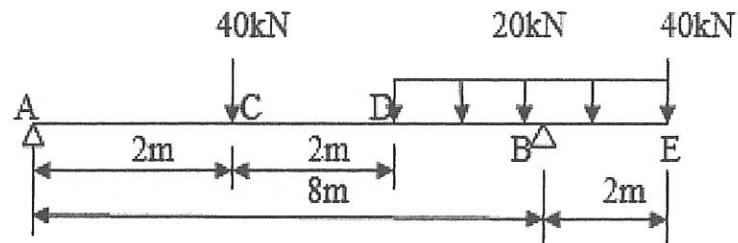


Figure 10 / Rajah 10

[12 marks]

[12 markah]

QUESTION 4

SOALAN 4

CLO2
C1

- (a) Draw the elongation and shortening of wood bar when a tension load and compression load is subjected.

Lukis graf pemanjangan dan pemendekan yang berlaku pada bar kayu bila dikenakan beban tegangan dan mampatan.

[5 marks]

[5 markah]

CLO1
C3

- (b) A rod is 2.5 m long and 1290 mm² wide cross-section with 1.5 mm elongation is subjected to tensile force 142 kN. Calculate,

Satu rod 2.5 m panjang dan keratan rentas 1290 mm² dengan pemanjangan 1.5mm dikenakan daya tegangan 142 kN. Kirakan,

- i) stress,
tegasan,

- ii) strain,
terikan,

- iii) Young's Modulus and
Modulus Young dan

- iv) the safety factor if the ultimate stress 432 Mpa of the rod.
faktor keselamatan jika tegasan maksima 432 Mpa rod tersebut.

[12 marks]

[12 markah]

CLO2
C2

- (c) A wood rod, 3m long carries a load of 20kN. If the elongation does not exceed 0.2mm, calculate :

Sebatang kayu, mempunyai panjang 3m membawa beban 20kN. Jika pemanjangan tidak melebihi 0.2mm, kirakan:

- i) Rod minimum cross sectional area
Luas keratan rentas minima kayu

- ii) Stress
Tegangan

- iii) Strain
Tegasan

$$E = 206 \text{ kN/m}^2$$

[8marks]

[8 markah]

SOALAN TAMAT