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

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2019

DCB5182: INTORDUCTION TO STRUCTURES

TARIKH   : 30 OKTOBER 2019
MASA   : 8.30 PAGI - 10.30 PAGI (2 JAM)

Kertas ini mengandungi **TIGA BELAS (13)** halaman bercetak.
Bahagian A: Struktur (2 soalan)
Bahagian B: Struktur (4 soalan)
Dokumen sokongan yang disertakan : Formula

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 question. Answer **ALL** questions.

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

QUESTION 1
SOALAN 1

CLO1
C1

(a) List **FIVE (5)** disadvantages of timber.

*Senaraikan **LIMA (5)** kelemahan kayu.*

[5 marks]
[*5 markah*]

CLO1
C3

(b) Illustrate **ONE (1)** example of Framework Structural System.

*Ilustrasikan **SATU (1)** contoh bagi Sistem Kerangka Struktur.*

[8 marks]
[8 *markah*]

CLO1
C3

(c) i.   Interpret **ONE (1)** example of support in structure.

*Tafsirkan **SATU (1)** contoh penyokong dalam struktur.*

[4 marks]
[4 *markah*]

ii. Sketch the reactions at joint and support base on **Figure A1c (i)** and **Figure A1c (ii)**.

*Lakarkan tindakbalas pada sambungan dan penyokong berdasarkan **Rajah A1c (i)** dan **Rajah A1c (ii)**.*
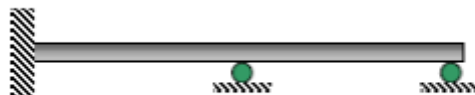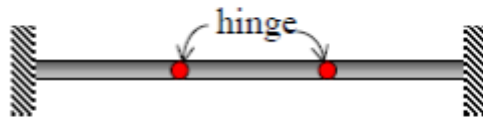
Figure A1c (i)/ *Rajah A1c (i)*

Figure A1c (ii)/ *Rajah A1c (ii)*

[8 marks]
[*8 markah*]

QUESTION 2
SOALAN 2

CLO1
C1

(a) Define **Concept of Equilibrium Forces** with the aid of diagram.

*Definasikan **Konsep Keseimbangan Daya** dengan bantuan gambarajah.*

[5 marks]
[*5 markah*]

CLO1
C3

(b) Interpret **TWO (2)** types of deformation occur in structure member based on **Figure A2b (i)** and **Figure A2b (ii)**.

*Tafsirkan **DUA (2)** jenis perubahan yang berlaku dalam anggota struktur berdasarkan **Rajah A2b (i)** dan **Rajah A2b (ii)**.*
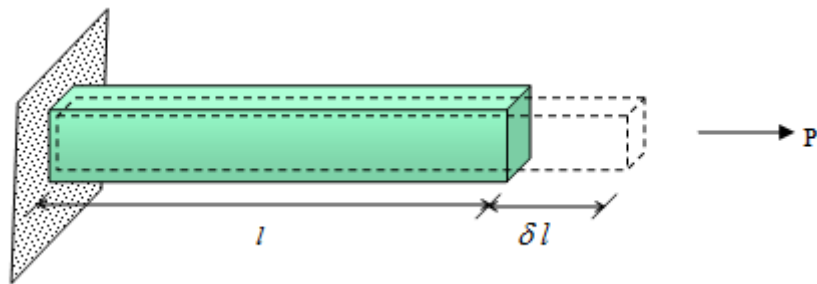
Figure A2b (i)/ *Rajah A2b (i)*
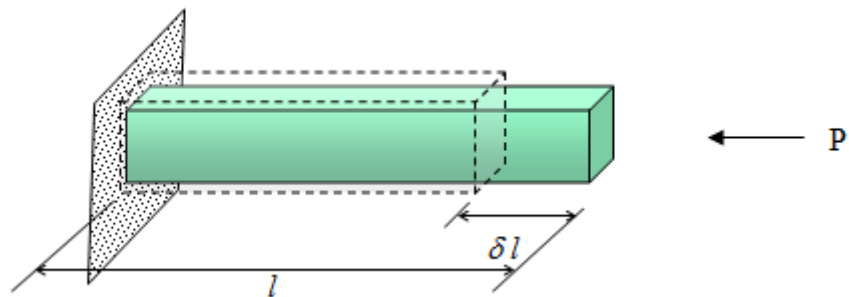
Figure A2b (ii)/ *Rajah A2b (ii)*

[8 marks]
[8 *markah*]

CLO1
C3

(c) i. Calculate the reactions at the supports based on **Figure A2c (i)**.

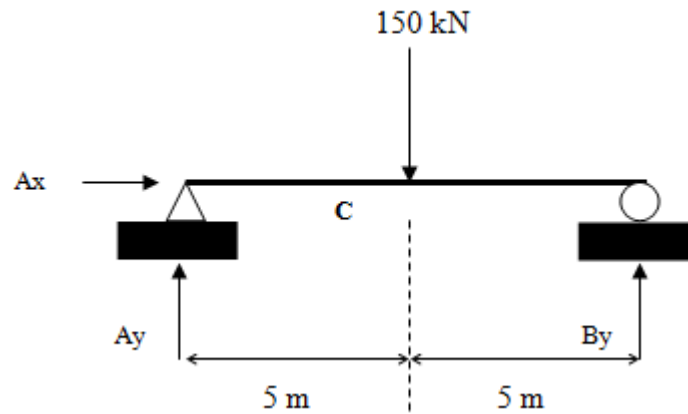Kirakan tindakbalas pada penyokong dibawah berdasarkan **Rajah A2c (i)**.

Figure A2c (i) / Rajah A2c (i)

[4 marks]
[4 *markah*]

ii. Sketch Shear Force Diagram (SFD) and Bending Moment Diagram (BMD) of beam in **Figure A2c (ii)** below.

*Lakarkan Gambarajah Daya Ricih (GDR) dan Gambarajah Momen Lentur (GML) bagi rasuk dalam **Rajah A2c (ii)** dibawah.*
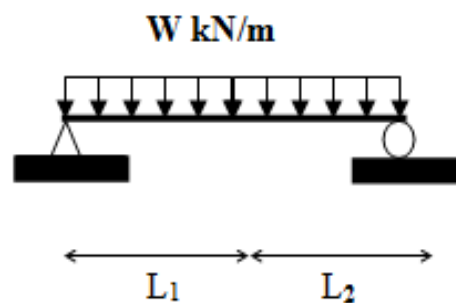

Figure A2c (ii) / Rajah A2c (ii)

[8 marks]
[8 *markah*]

SECTION B   : 50 MARKS
BAHAGIAN B : 50 MARKAH

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

ARAHAN:
*Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab **DUA (2)** soalan sahaja.*

QUESTION 1
SOALAN 1

CLO2
C1

(a) State the uses of concrete as a material in structural construction.

Nyatakan penggunaan konkrit sebagai satu bahan dalam pembinaan struktur.

[5 marks]
[*5 markah*]

CLO2
C2

(b) Describe **Cantilever Beam** and **Simply Supported Beam**.

*Huraikan **Rasuk Julur** dan **Rasuk Disokong Mudah**.*

[8 marks]
[*8 markah*]

CLO2
C3

(c) The overhang beam in **Figure B1c** is applied with a uniform distributed load and two point loads. Sketch **Bending Moment Diagram (BMD)** and calculate the value of **Maximum Bending Moment (M_{max})**.

*Rasuk juntai dalam **Rajah B1c** dikenakan satu beban teragih seragam dan dua beban tumpu. Lakarkan **Gambarajah Momen Lentur (GML)** dan kirakan nilai **Momen Lentur Maksimum (M_{Mak})**.*
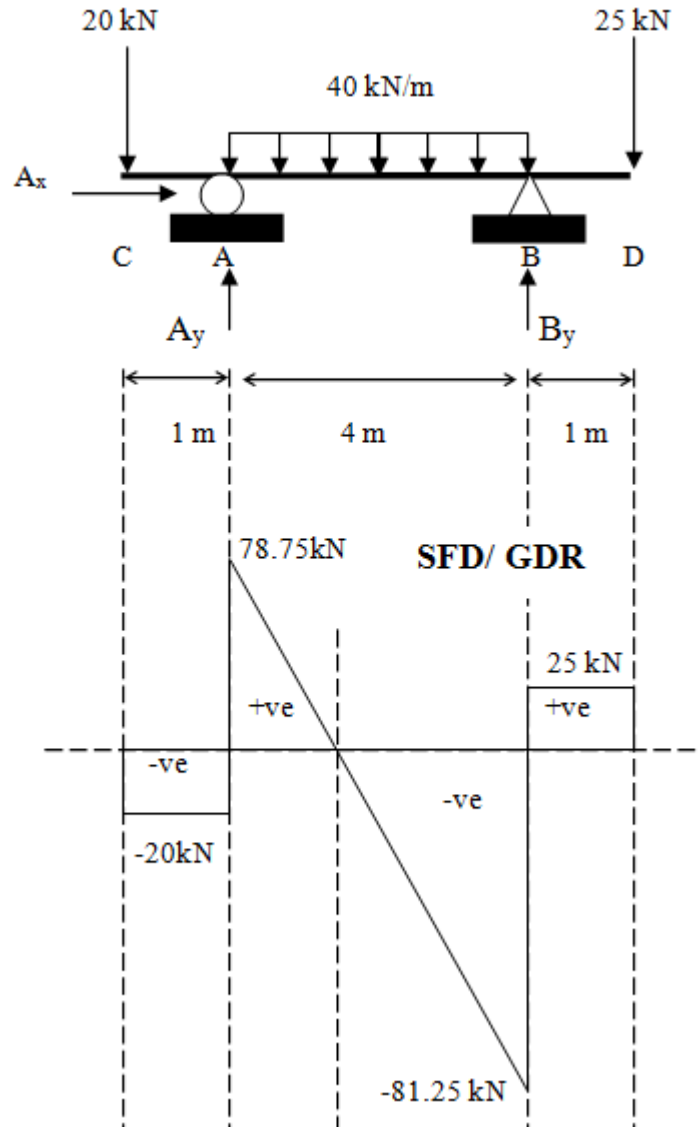
20 kN   25 kN

40 kN/m

A_x

C   A   B   D

A_y B_y

1 m   4 m   1 m

78.75kN   **SFD/ GDR**

25 kN

+ve

+ve

-ve

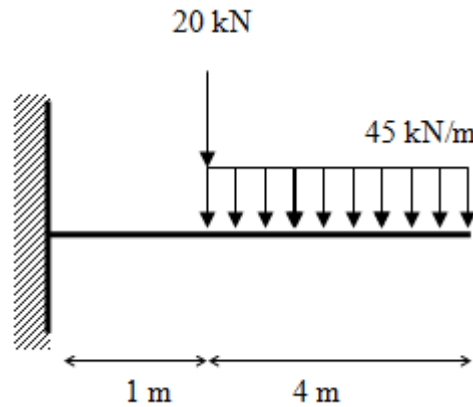-20kN   -ve

-81.25 kN

Figure B1c / *Rajah B1c*

[12 marks]
[12 *markah*]

QUESTION 2
SOALAN 2

CLO2
C1

(a) Draw Free Body Diagram (FBD) based on **Figure B2(a)**.

*Lukiskan Gambarajah Jasad Bebas (GJB) berdasarkan **Rajah** B2(a).*

Figure B2(a) / *Rajah* B2(a)

[5 marks]
[*5 markah*]

CLO2
C2

(b) Differentiate between Uniformly Distributed Load and Moment.

Bezakan diantara Beban Teragih Seragam dan Momen

[8 marks]
[*8 markah*]

CLO2
C3

(c) Below are data sample from Tensile Test:

Berikut adalah data sampel daripada Ujian Tegangan:

Table B2(c) / *Jadual B2(c)*

| Load/ *Beban* (kN)	3	6	9	12	15	18	21
Elongation/ *Pemanjangan* (mm)	0.2	0.4	0.6	0.8	1.0	1.3	1.7

Actual Diameter/ *Diameter sebenar* = 12.5 mm

Gauge Length/ *Panjang Tolok*   = 200mm

Final Diameter/ *Diameter Akhir*   = 8.0 mm

Final Length/ *Panjang Akhir*   = 260mm

By drawing the graph 'Load versus Elongation', Calculate **Young's Modulus**, **Percentage of Elongation** and **Percentage of Reduction in Area**.

*Dengan melukis graf 'Beban melawan Pemanjangan',kirakan **Modulus Young**, **Peratus Pemanjangan** dan **Peratus Pengurangan Luas**.*

[12 marks]

[*12 markah*]

QUESTION 3
SOALAN 3

CLO2
C1

(a) Identify the 'x' distance value based on **Figure B3(a)** below:

*Tentukan nilai jarak 'x' berdasarkan dalam **Rajah B3(a)** di bawah:*
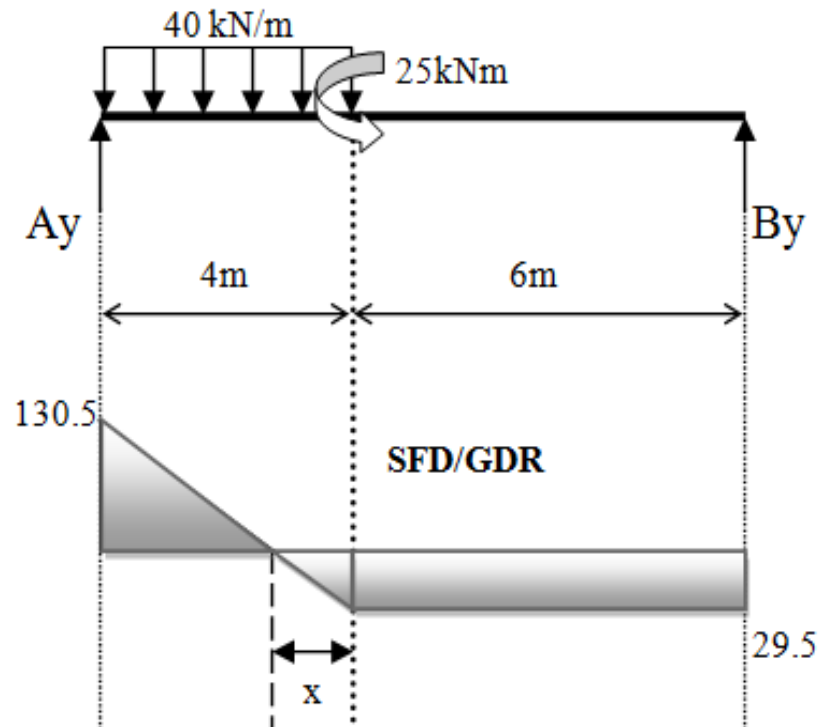
Figure B3(a) / *Rajah B3(a)*

[5 marks]
[*5 markah*]

CLO2
C2

(b) Differentiate between **Overhanging Beam** and **Continuous Beam**.

*Bezakan diantara **Rasuk Juntai** dan **Rasuk Selanjar**.*

[8 marks]
[*8 markah*]

CLO2
C3

(c) Based on **Figure B3(c)** below, draw **Shear Force Diagram (SFD)** and **Bending Moment Diagram (BMD)**.

*Berdasarkan **Rajah B3(c)** dibawah, Lukiskan **Gambarajah Daya Ricih (GDR)** dan **Gambarajah Momen Lentur (GML)**.*
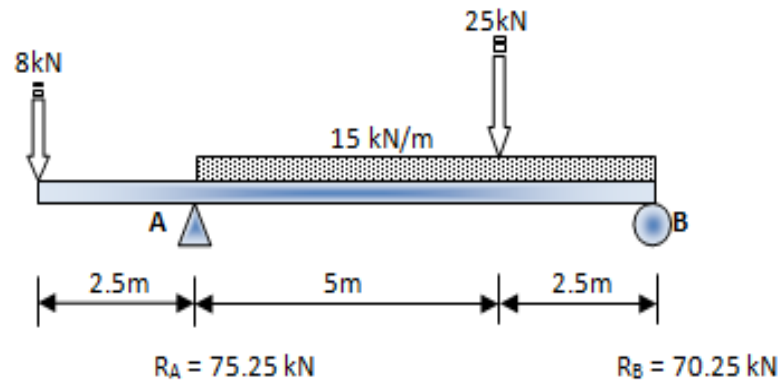

Figure B3(c) / *Rajah B3(c)*

[12 marks]
[*12 markah*]

QUESTION 4
SOALAN 4

CLO2
C1

(a) Describe Elasticity with **ONE (1)** related example.

*Huraikan Keanjalan dengan **SATU (1)** contoh berkaitan.*

[5 marks]
[*5 markah*]

CLO2
C2

(b) **Figure B4(b)** showed a steel bar tied strongly to an aluminum bar with their individual length of 900mm and 500mm. The steel bar cross sectional area is 250mm^2 and the aluminum bar is 200mm^2. Calculate the total reduction experienced by the bar when subjected to a compression load of 40kN.

Rajah B4(b) menunjukkan bar keluli terikat kuat kepada bar aluminum dengan panjang masing-masing adalah 900mm dan 500mm. Luas keratan rentas bagi keluli dan aluminum adalah 250mm^2 dan 200mm^2. Kirakan jumlah pengurangan yang dialami apabila bar dikenakan beban mampatan sebanyak 40kN.

Given/ Diberi:

[E_{steel}/ E_{keluli} = 207 GPa dan E_{al}/ $E_{aluminium}$ = 70GPa]
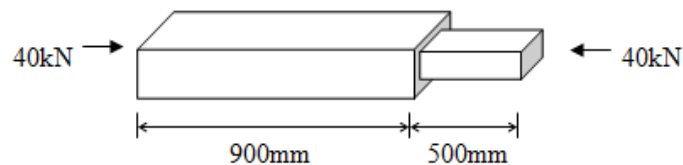
Figure B4(b) / *Rajah B4(b)*

[8 marks]
[*8 markah*]

CLO2
C3

(c)   The following results are attained from a Tensile Test:
Berikut adalah keputusan yang diperolehi daripada Ujian Tegangan:

Sample Diameter/ Diameter Sampel   = 12mm

Gauge Length/ Panjang Tolok   = 55mm

Ultimate Load/ Beban Muktamad   = 30kN

Ultimate Length/ Panjang Muktamad   = 58.88mm

Neck Diameter/ Diameter Leher   = 8.4mm

Calculate **Ultimate Stress**, **Percentage of Elongation** and **Percentage of Reduction of area**.

*Kirakan **Tegasan Muktamad**, **Peratus Pemanjangan** dan **Peratus Pengurangan Luas**.*

[12 marks]
[*12 markah*]

SOALAN TAMAT

FORMULAS

$r = 3n$

$F = m \times g$

$P = \dfrac{F}{A}$

$M = F \times d$

$A = \dfrac{\pi d^2}{4}$

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$\sigma = \dfrac{F}{A}$

$\varepsilon = \dfrac{e}{L}$

$E = \dfrac{\sigma}{\varepsilon}$

$E = \dfrac{FL}{Ae}$