

SULIT



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

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2015

CC601 : STRUCTURAL ANALYSIS 2

TARIKH : 19 OKTOBER 2015

TEMPOH : 11.15AM – 1.15PM (2 JAM)

Kertas ini mengandungi **TIGA BELAS (13)** halaman bercetak.

Bahagian A: Soalan Pendek (10 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 : 40 MARKS
BAHAGIAN A : 40 MARKAH

INSTRUCTION:

This section consists of **TEN (10)** short questions. Answer **ALL**.

ARAHAN:

*Bahagian ini mengandungi **SEPULUH (10)** soalan pendek. Jawab **SEMUA** soalan.*

QUESTION 1**SOALAN 1**

CLO 1
C1

Indicate whether the truss in **Figure A1 (a) and (b)** is statically determinate or statically indeterminate.

*Nyatakan sama ada kerangka dalam **Rajah A1 (a) dan (b)** adalah boleh tentu statik atau tidak boleh tentu statik.*

[4 marks]

[4 markah]

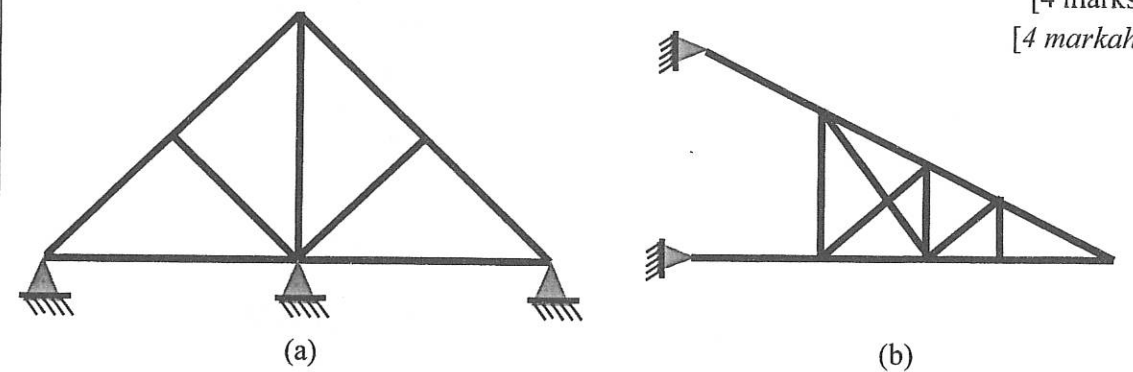


Figure A1/ Rajah A1

QUESTION 2
SOALAN 2

CLO2
C2

Recognize the type of internal forces of EF, BC, CD dan AB in **Figure A2** below.

Kenalpasti jenis daya dalaman pada anggota EF, BC, CD dan AB pada **Rajah A2** di bawah..

[4 marks]

[4 markah]

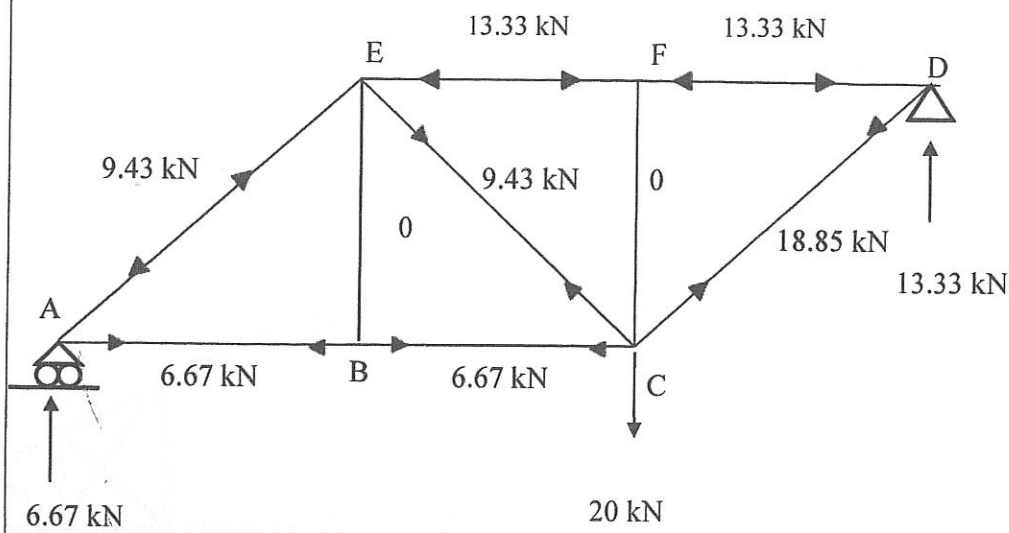


Figure A2/ Rajah A2

QUESTION 3
SOALAN 3

CLO1
C1

State **TWO (2)** factors that can influence the truss displacement.

Nyatakan **DUA (2)** faktor yang mempengaruhi anjakan kekuda.

(4 marks)

(4 markah)

QUESTION 4
SOALAN 4

CLO2
C2

Calculate the horizontal displacement of joint D in **Figure A4**. AE is constant.

Kirakan ajakan ufuk sendi D kerangka dalam **Rajah A4**. AE adalah malar.

[4 marks]

[4 markah]

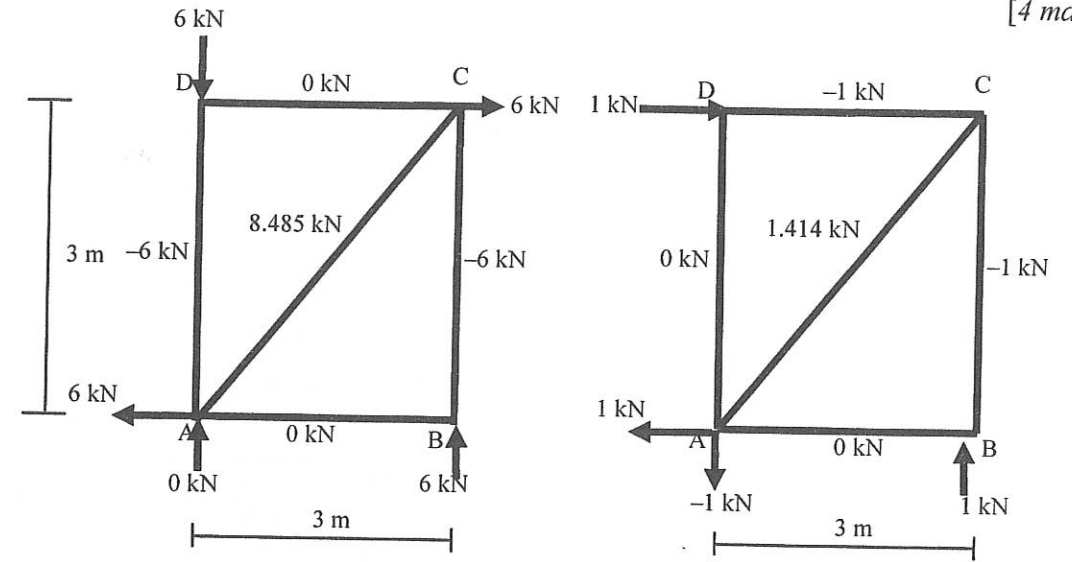


Figure A4/ Rajah A4

QUESTION 5
SOALAN 5

CLO1
C2

By referring to **Figure A5**, compute the degree of indeterminacy of the truss.

Merujuk kepada **Rajah A5**, hitung nilai darjah tidak boleh tentu statik bagi kerangka tersebut

(4 marks)

[4 markah]

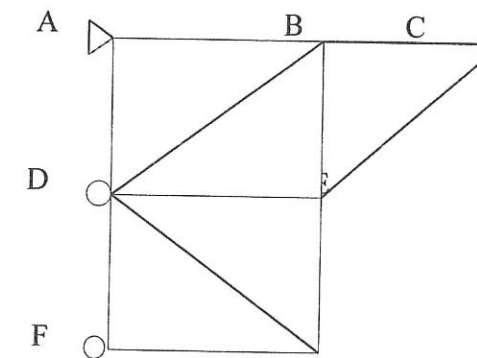


Figure A5/ Rajah 5

QUESTION 6
SOALAN 6

CLO1
C3

Table A6 shows the solution to determinate the force in each member of indeterminate structure.

- Compute the magnitude of redundancy, R.
- Calculate the actual force, F.

Jadual A6 menunjukkan penyelesaian untuk menentukan daya dalaman setiap anggota struktur tidak boleh tentu statik.

- Hitung magnitud lelebih, R.
- Kirakan daya sebenar, F.

Table A6 / Jadual A6

Member	u	P (kN)	L (m)	uPL	u ² L	F=P+uR
AB	-0.45	0.00	2.00	0.00	0.41	
AC	1.00	100.62	4.47	449.77	4.47	
AD	-0.89	0.00	4.00	0.00	3.17	
DB	1.00	0.00	4.47	0.00	4.47	
DC	-0.45	-45.00	2.00	40.50	0.41	
CB	-0.89	0.00	4.00	0.00	3.17	
			Σ			

[4 marks]
[4 markah]

CLO1
C1

QUESTION 7
SOALAN 7

Define the influence line for a beam.

Takrifkan garis imbas bagi rasuk.

[4 marks]
[4 markah]

QUESTION 8
SOALAN 8

CLO1
C2

By referring to Figure A8, calculate the bending moment at point C.

Merujuk pada Rajah A8 di bawah, kirakan momen lentur pada titik C.

[4 marks]
[4 markah]

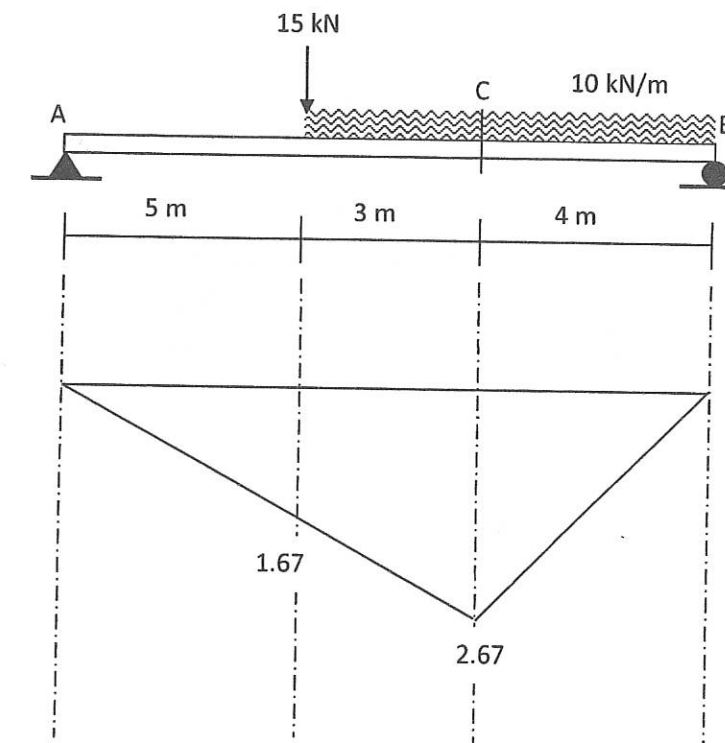


Figure A8 / Rajah A8

QUESTION 9
SOALAN 9

CLO2
C2

Determine the resultant P and its position for the beam shown in **Figure A9**.

Tentukan daya paduan, P dan seterusnya tentukan kedudukan daya paduan P bagi rasuk yang ditunjukkan dalam **Rajah A9**.

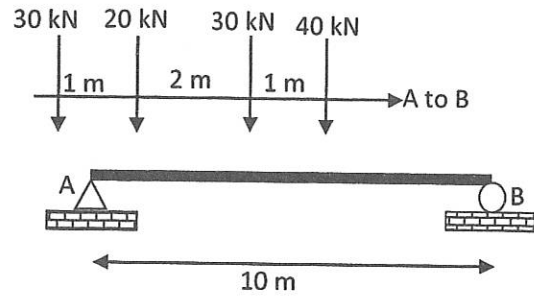


Figure A9 / Rajah A9

(4 marks)

(4 markah)

QUESTION 10
SOALAN 10

CLO1
C3

By referring to **Figure A10**, illustrate the influence line diagram for the reaction force at support A and BF member.

Merujuk pada **Rajah A10**, ilustrasikan diagram garis imbas untuk daya tindakbalas pada sokong A dan anggota BF.

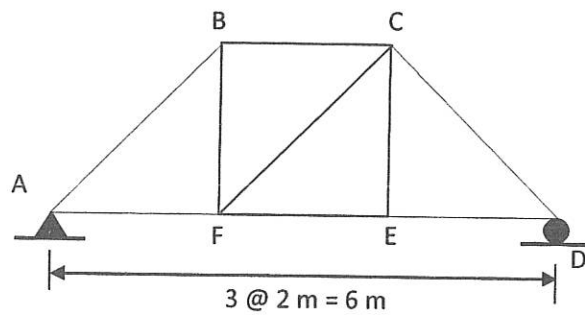


Figure A10 / Rajah A10

[4 marks]

[4 markah]

SECTION B : 60 MARKS
BAHAGIAN B : 60 MARKAH

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **THREE (3)** questions only.

ARAHAN:

Bahagian ini mengandungi **EMPAT (4)** soalan struktur. Jawab **TIGA (3)** soalan sahaja.

QUESTION 1
SOALAN 1

A simply supported beam is loaded as shown in **Figure B1**

Satu rasuk disokong mudah dikenakan beban seperti dalam **Rajah B1**.

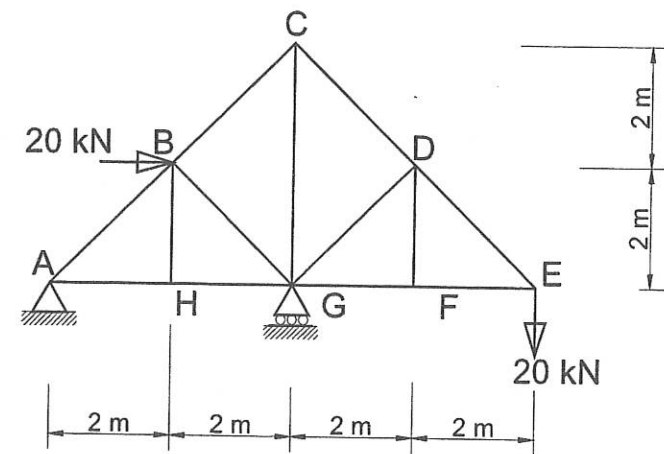


Figure B1 / Rajah B1

CLO1
C3

a) Calculate the value of reaction at the support.

Kirakan nilai tindakbalas pada penyokong.

[5 marks]

[5 markah]

CLO1
C3

- b) Compute the values and type of internal force of member BC, BG and HG using section method.

Hitung daya dalaman anggota BC, BG dan HG dengan menggunakan Kaedah Keratan

[15 marks]

[15 markah]

QUESTION 2

SOALAN 2

Framework of **Figure B2** is loaded as shown below. Modulus Young, E value for all members is 200 kN/mm^2 and cross section area, A for all members is 250 mm^2 . Given reaction forces due to external loads; $A_x = -30 \text{ kN}$, $A_y = -40 \text{ kN}$, $E_y = 60 \text{ kN}$ and reaction forces due to horizontal virtual unit; $A_x = -1$, $A_y = -0.667$, $E_y = 0.667$.

Kerangka seperti Rajah B2 dikenakan beban seperti yang ditunjukkan di bawah. Diberi nilai modulus young, E untuk semua anggota ialah 200 kN/mm^2 dan luas keratan rentas, A untuk semua anggota ialah 250 mm^2 . Diberi daya-daya tindakbalas disebabkan beban luar; $A_x = -30 \text{ kN}$, $A_y = -40 \text{ kN}$, $E_y = 60 \text{ kN}$ dan daya-daya tindakbalas disebabkan beban unit ufuk; $A_x = -1$, $A_y = -0.667$, $E_y = 0.667$.

CLO 1
C3

- a) Calculate the internal force in each member of the truss due to external loads.

Kirakan daya dalaman bagi semua anggota kekuda disebabkan beban luar.

[7 marks]

[7 markah]

CLO 1
C3

- b) Calculate the internal force in each member of the truss due to horizontal virtual unit load at joint C.

Kirakan daya dalaman bagi semua anggota kekuda disebabkan beban unit ufuk pada sendi C.

[7 marks]

[7 markah]

CLO 2
C5

- c) Based on the answers in 2(a) and 2(b), generate the horizontal displacement of joint C.

Berdasarkan jawapan-jawapan soalan 2(a) dan 2(b), hasilkan anjakan ufuk pada sendi C.

[6 marks]

[6 markah]

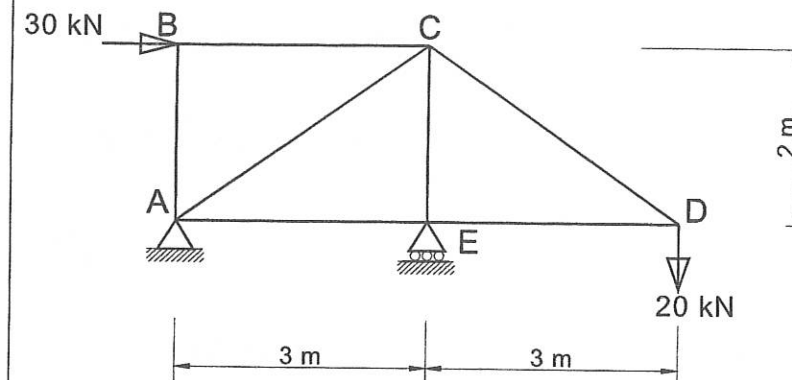


Figure B2 / Rajah B2

QUESTION 3

SOALAN 3:

A simply supported truss is subjected to a horizontal and vertical load as shown in **Figure B3**. Given reaction at joint A, $V_A=2 \text{ kN}$ and reaction at joint D, $V_D=18 \text{ kN}$, $H_D = -12 \text{ kN}$. The cross sectional area, A and modulus elasticity, E are constant for each member of truss.

Kekuda sokong mudah dikenakan beban tumpu ufuk dan pugak seperti yang ditunjukkan dalam Rajah B3. Diberi daya tindak balas pada sendi A, $V_A=2 \text{ kN}$ dan daya tindak balas pada sendi D, $V_D=18 \text{ kN}$ dan $H_D = -12 \text{ kN}$. Luas keratan rentas, A dan modulus keanjalan, E adalah malar untuk setiap anggota kekuda.

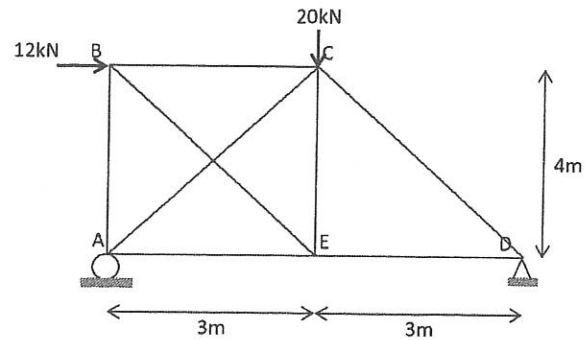


Figure B3 / Rajah B3

- CLO 1
C3
- a) Select BE member as the redundant member. Compute the internal forces in all truss members.
Pilih anggota BE sebagai kelebihan. Hitungkan daya dalaman bagi setiap anggota kekuda.

[7 marks]
[7 markah]

- CLO 1
C3
- b) Calculate the forces in all members due to the virtual unit load.
Kirakan daya dalaman bagi semua anggota kekuda disebabkan oleh beban unit.

[6 marks]
[6 markah]

- CLO 1
C3
- c) Determine the magnitude of redundant, R.
Tentukan magnitud nilai kelebihan, R.

[3 marks]
[3 markah]

- CLO 2
C5
- d) Produce the actual force in all members of the truss by using magnitude of redundant, R.
Hasilkan daya dalaman bagi semua anggota kekuda dengan menggunakan magnitud kelebihan, R.

[4 marks]
[4 markah]

QUESTION 4

SOALAN 4

A simply supported beam with 40m span is subjected to moving concentrated loads as shown in Figure B4.

CLO 1
C3

Sebuah rasuk tumpang mudah dengan panjang rentang 40m dikenakan beban bergerak seperti yang ditunjukkan dalam Rajah B4.

- a) Calculate the resultant force of the series of loads.
Kirakan daya paduan bagi satu siri beban tumpu.

[1 mark]

[1 markah]

CLO 1
C3

- b) Determine the location of the resultant force.
Tentukan kedudukan daya paduan.

[3 marks]

[3 markah]

CLO 1
C4

- c) Analyze the absolute maximum moment due the series of moving concentrated load.

Analisa momen maksima mutlak disebabkan satu siri beban tumpu.

[16 marks]
[16 markah]

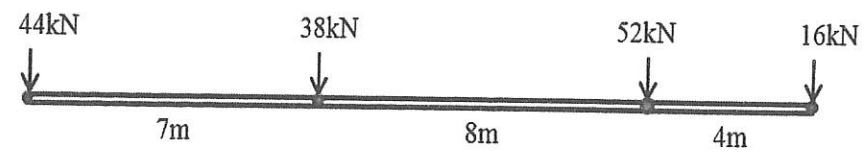


Figure B4 / Rajah B4

SOALAN TAMAT