SULIT

POLITEKNIK MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2017

DCW 3012: WOOD MECHANICS STRUCTURE 1

TARIKH : 21 OKTOBER 2017
MASA : 11.15PAGI – 1.15PETANG (2 JAM)

Kertas ini mengandungi **SEMBILAN (9)** halaman bercetak.
Bahagian A: Soalan Struktur (2 Soalan)
Bahagian B: Soalan 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 berstruktur. Jawab semua soalan.*

QUESTION 1

SOALAN 1

CLO2
C3

(a) Figure Q1a shows an 8m long overhang beam subjected to a 10kN/m uniformly distributed load and 5kN point load. Calculate the reaction force for the support.

Rajah Q1a menunjukkan sebuah rasuk hujung tergantung 8m panjang yang dikenakan beban teragih seragam 10kN/m dan beban tumpu 5kN. Kirakan daya tindakbalas pada penyokong.

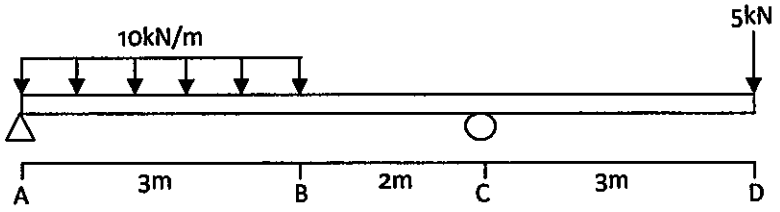

Figure Q1a/ Rajah Q1a

[10 marks]
[10 *markah*]

CLO2
C4

(b) A simply supported beam is loaded with 18kN/m uniformly distributed load and 30kN point load as shown in Figure Q1b. Given the reaction $R_A = 34.5kN$ and $R_D = 31.5kN$, calculate

Satu rasuk disokong mudah dikenakan beban teragih seragam sebanyak 18kN/m dan beban tumpu 30kN seperti yang ditunjukkan pada Rajah S1b. Diberikan $R_A = 34.5kN$ and $R_C = 31.5kN$, kirakan

i. shear force and bending moment acting at point A, B, C, and D.
daya ricih dan momen lentur pada titik A, B, C, dan D.

ii. draw the shear force and bending moment diagram of the beam.
lukiskan gambarajah daya ricih dan momen lentur bagi rasuk

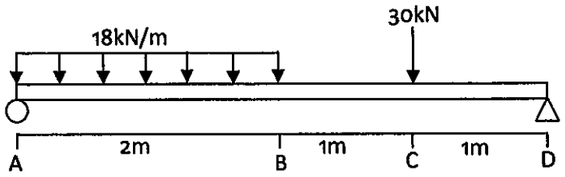

Figure Q1b/Rajah Q1b

[15 marks]
[*15 markah*]

QUESTION 2

SOALAN 2

CLO2
C3

(a) Draw the shear force and bending moment diagrams for the beam in Figure Q2a.
Lukis gambarajah daya ricih dan gambarajah momen lentur bagi rasuk dalam Rajah Q2a.

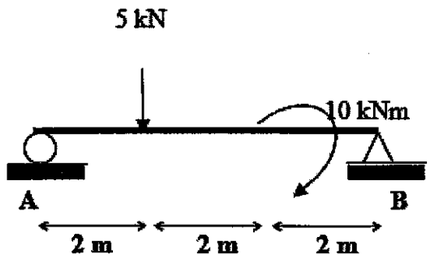

Figure Q2a / Rajah Q2a

[10 marks]
[*10 markah*]

CLO2
C4

(b) Draw the shear force and bending moment diagrams for the beam in Figure Q2b.
Lukis gambarajah daya ricih dan gambarajah momen lentur bagi rasuk pada Rajah Q2b.

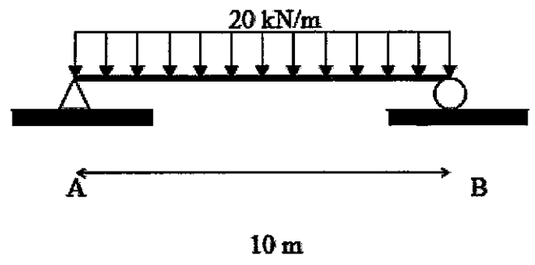

Figure Q2b / Rajah Q2b

[15 marks]
[*15 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 struktur. Jawab **DUA (2)** soalan sahaja.*

QUESTION 1
SOALAN 1

CLO1 C2 (a) Using a sketch, explain the types of forces below:
Dengan bantuan lakaran, terangkan jenis daya berikut:

i. compression forces
daya mampatan

ii. tension forces
daya Tegangan

[8 marks]
[8 *markah*]

CLO1 C3 (b) A tensile test was performed on a rod with a diameter of 12.5mm and a length of 200mm. After the completion of the experiment, it is found that the rod diameter is 8mm and the length becomes 260mm. Below are the data obtained from the test.

Satu ujikaji tegangan dilakukan ke atas sebatang rod yang mempunyai garis pusat 12.5mm dan panjang 200mm. Setelah selesai ujikaji dijalankan didapati garis pusat rod adalah 8mm dan panjangnya menjadi 260mm. Berikut adalah data ujikaji.

Load, kN	5	10	15	20	25	30
Extension, mm (x 10^{-3})	40	78	117	157	197	237

Plot Load vs Extension graph, determine:
Plotkan graf Beban melawan Pemanjangan dan tentukan:

i. the modulus of elasticity
modulus keanjalan

ii. the percentage of reduction in area
peratusan pengurangan luas

[17 marks]
[17 *markah*]

QUESTION 2
SOALAN 2

CLO1 C2 (a) A block as shown in the Figure Q2a is subjected with a compression load of 90 kN has been shortened by 0.03 mm. Calculate :

Satu blok seperti Rajah Q2a dikenakan beban mampatan 90 kN mengalami pemendekan 0.03 mm. Kira:

i. compressive stress
tegasan mampatan

ii. strain
terikan

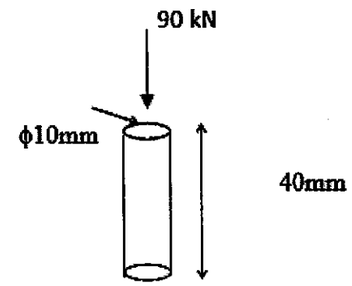

Figure Q2a / Rajah Q2a

[10 marks]
[*10 markah*]

CLO1 C3 (b) A rod of 2.5m with cross section 1290 mm^2 has elongation of 1.5 mm when it is subjected with force of 142 kN. Calculate:-

Satu rod 2.5 m panjang berkeratan rentas 1290 mm^2 mengalami pemanjangan 1.5 m apabila dikenakan beban 142 kN. Kirakan:

i. tensile stress in rod
tegasan tegangan di dalam rod

ii. strain
terikan

iii. modulus of elastic
modulus keanjalan

[15 marks]
[*15 markah*]

QUESTION 3
SOALAN 3

CLO1
C2

(a) Explain shear stress together with the formula and unit. Then list down **FIVE (5)** factors which influence shear strength.

*Terangkan tegasan ricih beserta formula dan unit. Kemudian senaraikan **LIMA (5)** faktor yang mempengaruhi kekuatan ricih.*

[10 marks]
[10 *markah*]

CLO1
C3

(b) i. The lap joint show in Figure Q3b(i) is connected by four 20 mm diameter rivets. Calculate the shear stress in the rivets; assuming that the load P = 120 kN is carried equally by the four rivets.

Satu sambungan tindih seperti dalam Rajah Q3b(i) disambungkan menggunakan empat rivet berdiameter 20 mm. kirakan tegasan ricih pada rivet; anggapkan bahawa beban P = 120kN diagih sama rata untuk empat rivet tersebut.

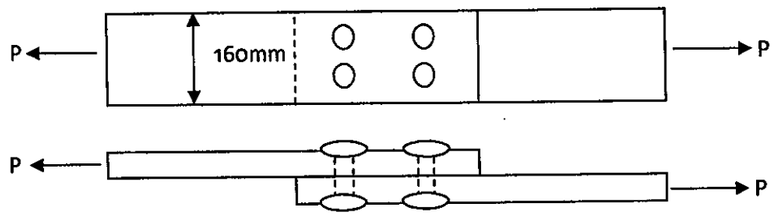

Figure Q3b(i)/ Rajah Q3b(i)

[8 marks]
[8 *markah*]

ii. Three plates are connected with two rivets as shown in Figure Q3b(ii). If the shear stress in the rivet does not exceed 80MN/m^2, determine the diameter of the rivet.

Tiga plat disambung dengan dua rivet seperti dalam Rajah Q3b(ii). Jika tegasan ricih dalam rivet tidak melebihi 80MN/m^2, tentukan garis pusat rivet.

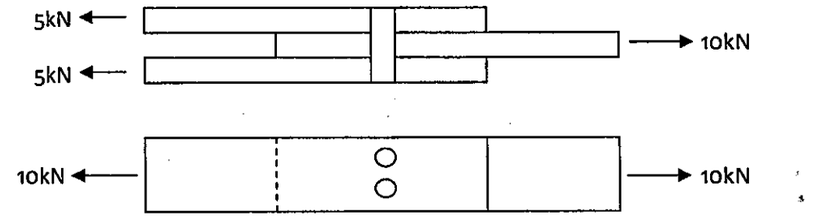

Figure Q3b(ii)/ Rajah Q3b(ii)

[7marks]
[7 *markah*]

QUESTION 4

SOALAN 4

CLO1 C2

(a) Identify **THREE (3)** types of reaction force for each support with diagram.

*Kenalpasti **(TIGA)** 3 jenis daya tindakbalas untuk setiap penyokong beserta gambar.*

[10 marks]

[*10 markah*]

CLO1 C3

(b) Figure Q4b shows a simply supported beam. Calculate the reaction force at the support .

Rajah Q4b menunjukkan rasuk tupang mudah. Kirakan daya tindakbalas pada penyokong.

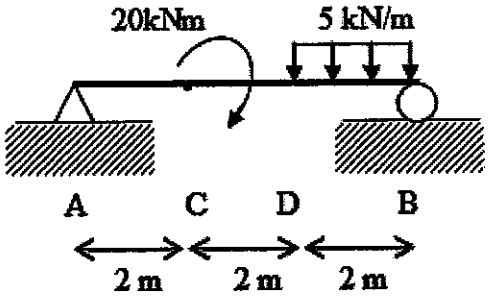

Figure Q4b / Rajah Q4b

[15 marks]

[*15 markah*]

SOALAN TAMAT