

SULIT



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

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2017

DCW2102 : ENGINEERED WOOD PRODUCT

TARIKH : 01 NOVEMBER 2017

MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas ini mengandungi **SEMBILAN (9)** 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**

- (a) Describe the Engineered Wood Product?

CLO1
C1

Terangkan maksud 'Engineered Wood Product'?

[5 Marks]

[5 Markah]

- (b)

CLO1
C3

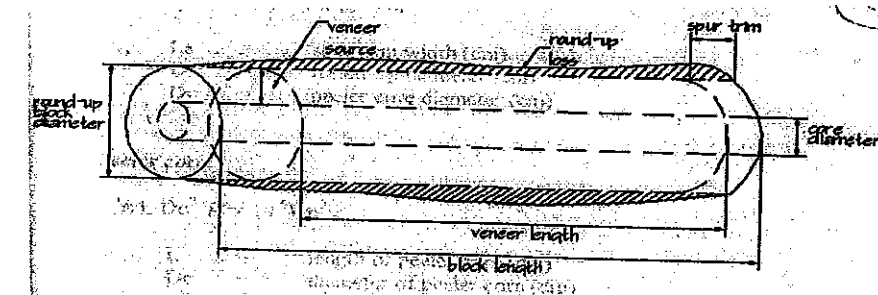


Figure Q1(b) / Gambarajah Q1(b)

Referring to Figure Q1(b), calculate the total of veneer recovery in the veneer manufacturing using the information given:

Berdasarkan gambarajah Q1(b), kirakan jumlah keseluruhan venir yang terhasil dalam pemrosesan venir berdasarkan maklumat yang diberikan:

Round-up diameter : 50 cm

Diameter keliling : 50 cm

Core Diameter	:	5.80 cm
Diameter teras	:	5.80 cm
Veneer length	:	120 cm
Panjang venir	:	120 cm

[15 Marks]

[15 Markah]

CLO1
C2

- (c) Identify the types of Structural Composite Lumber.
Kenal pasti jenis-jenis 'Structural Composite Lumber'.

[5 Marks]

[5 Markah]

QUESTION 2**SOALAN 2**CLO1
C3

- (a) Relate the reduction of natural variability of Laminated Veneer Lumber (LVL) compared to solid timber as stated in Figure Q2a.

Hubungkan pengurangan kepelbagaian semulajadi Papan Venir Berlaminaasi (LVL) berbanding kayu balak seperti yang dinyatakan pada Rajah Q2a.

Reduction of natural variability

Solid wood
Variability is at its
greatest level.



Laminated Veneer
Lumber
Variability is reduced
in one plane.

Figure Q2a/ Rajah Q2a

[10 marks]

[10 markah]

CLO1
C2

- (b) Briefly describe the sunken joints and delamination which normally occur in glulam manufacturing.

Terangkan secara ringkas 'sunken joints' dan 'delamination' yang sering berlaku dalam pembuatan glulam.

[5 marks]

[5 markah]

CLO1
C4

- (c) Calculate the average percentage of thickness swelling of a Parallel Strand Lumber after being soaked in distilled water for 24 hours, given that:

Kira purata peratusan pembengkakan ketebalan 'Parallel Strand Lumber' selepas direndam dalam air suling selama 24 jam, diberikan:

SAMPEL	INITIAL TS (mm)	PRESENT TS (mm)	PERCENTAGE OF THICKNESS SWELLING (%)
1	35.6	x	6.74
2	33.2	37.6	y
3	30.9	34.2	10.68
AVERAGE			z

(Show calculation work. Answer in 2 decimal place)

(Tunjukkan jalan kerja. Jawapan dalam 2 titik perpuluhan)

[10 marks]

[10 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. Sila jawab **DUA (2)** soalan sahaja.

QUESTION 1

SOALAN 1

- (a) The Modulus of Elasticity (MOE) of wood materials is often determined with a static bending test. For the test, a beam is center-point loaded while the load and deflection are measured. Show the formula to calculate MOE with the definition of each item, and calculate MOE for the question below;

MOE bahan berasaskan kayu sering ditentukan melalui ujian lenturan pegun. Semasa ujian, beban diletakkan ditengah-tengah palang dan pengiraan lenturan akan dibuat. Tunjukkan formula untuk mengira MOE beserta penerangan bagi setiap item, seterusnya kirakan MOE bagi soalan di bawah;

A strip of plywood with 12.5mm thick and 76 mm wide is loaded at midspan between supports that are 305mm apart. When the loaded reaches 89 N, the deflection is measured as 0.0015m.

Sekeping papan lapis dengan ketebalan 12.5mm dan lebar 76mm dibebankan diantara penahan 305mm. Apabila beban mencecah 89 N, lenturan yang diukur ialah 0.0015m.

[15 Marks]

[15 Markah]

CLO2
C4

- (b) Referring to Table Q1(b)i and Table Q1(b)ii, calculate the Compression Strength (MPa) for Plywood Type A and Type B.

Berdasarkan Jadual Q1(b)i dan B2, kirakan kekuatan tekanan (MPa) untuk Papanlapis A dan Papanlapis B.

Table Q1(b)i: Plywood Type A

Sample No.	Length (mm)	Width (mm)	Thickness (mm)	Max. Force Calc. at Entire (kN)	Compression Strength	
					Calc. at Entire (MPa)	at Entire (MPa)
1	59.96	20.38	10.17	1.85		
2	59.96	20.44	10.54	2.08		
3	59.77	20.06	10.83	1.69		
4	60.03	20.53	10.65	1.94		
5	60.05	20.56	10.57	1.68		

Table Q1(b)ii: Plywood Type B

Sample No.	Length (mm)	Width (mm)	Thickness (mm)	Max. Force Calc. at Entire (kN)	Compression Strength	
					Calc. at Entire (MPa)	at Entire (MPa)
1	59.91	19.88	12.34	2.73		
2	59.71	19.85	12.51	3.52		
3	59.95	19.95	12.01	3.43		
4	60.01	19.90	12.08	3.38		
5	59.87	19.90	12.24	3.17		

[10 Marks]

[10 Markah]

QUESTION 2

SOALAN 2

- (a) Sketch the diagram of glue spreading process referring to Figure Q2(a).
Lakarkan gambar rajah proses penyebaran gam merujuk Rajah Q2(a)

CLO 2
C3

Figure Q2(a) : Glue Spreading Process /
Rajah Q2(a) : Proses Penyebaran Gam

[10 marks]

[10 markah]

- (b) List FIVE (5) factors which affect cold press adherence in plywood manufacturing.
Tafsirkan LIMA (5) faktor yang mempengaruhi kepada kelekatan peneka sejuk dalam pembuatan papan lapis.

CLO 2
C3

[5 marks]

[5 markah]

CLO 2
C4

- (c) Based on a laboratory scale (g/cm^3), calculate the volume of plywood and the total quantity of Urea formaldehyde required to produce a 5-ply plywood, given that:
Berdasarkan skala makmal (g/cm^3), kirakan jumlah kuantiti Urea formaldehid yang diperlukan untuk menghasilkan papan lapis 5-lapisan, diberikan:

Target density of Urea formaldehyde for 3-ply plywood	: 110 kg/m ³
Mass of board	: 21.78g

(Show the calculation work. Answer should be in 2 decimal places.)

(Tunjukkan jalan pengiraan. Jawapan dalam 2 titik perpuluhan)

[10 marks]

[10 markah]

QUESTION 3

SOALAN 3

CLO2
C3

- (a) Sketch Parallel Strand Lumber (PSL) manufacturing process.
Lakarkan proses pembuatan PSL.

[10 Marks]

[10 Markah]

CLO2
C3

- (b) Interpret the performance requirement for Structural Composite Lumber (SCL).
Tafsirkan keperluan kekuatan 'Structural Composite Lumber' (SCL).

[10 marks]

[10 markah]

CLO2
C4

- (c) Identify FIVE (5) drawbacks in air drying for lumber.
Kenalpasti LIMA (5) kelemahan kaedah pengeringan udara untuk kayu.

[5 marks]

[5 markah]

QUESTION 4

SOALAN 4

- (a) Draw a flow chart of glulam fabrication process starting from log grading process.

CLO2
C3

Lakarkan carta alir proses penghasilan glulam bermula daripada proses penggredan balak.

[10 marks]

[10 markah]

- (b) Glulam beams have a high potential in structural element commonly used as construction panel. There are several types of Glulam combination which has varied properties each other. Interpret the horizontal members and vertical members of Glulam combination.

CLO2
C3

Glulam beam mempunyai potensi yang tinggi dalam elemen penstrukturan[#] biasanya digunakan untuk panel pembinaan. Terdapat beberapa jenis kombinasi Glulam yang mana mempunyai perbezaan ciri-ciri antara satu sama lain. Huraikan kombinasi glulam untuk 'horizontal members' dan 'vertical members'.

[10 marks]

[10 markah]

- (c) Explain TWO (2) common defects occur in Engineered Wood Product.

CLO2
C4

Senaraikan TWO (2) kecacatan yang berlaku pada Produk Kejuruteraan Kayu.

[5 marks]

[5 markah]

SOALAN TAMAT