

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI**

JABATAN KEJURUTERAAN MEKANIKAL

PENILAIAN ALTERNATIF

SESI DISEMBER 2020

DJJ30093/DJJ3053 : ENGINEERING MECHANICS

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KAEDAH PENILAIAN : PEPERIKSAAN ONLINE

JENIS PENILAIAN : SOALAN ESEI BERSTRUKTUR (2 SOALAN)

TARIKH PENILAIAN : 13 JULAI 2021

TEMPOH PENILAIAN : 1 JAM

LARANGAN TERHADAP PLAGIARISM (AKTA 174)

**PELAJAR TIDAK BOLEH MEMPLAGIAT APA-APA IDEA, PENULISAN, DATA
ATAU CIPTAAN ORANG LAIN. PLAGIAT ADALAH SALAH SATU
PENYELEWENGAN AKADEMIK. SEKIRANYA PELAJAR DIBUKTIKAN
MELAKUKAN PLAGIARISM, PENILAIAN BAGI KURSUS BERKENAAN AKAN
DIMANSUHKAN DAN DIBERI GRED F DENGAN NILAI MATA 0.**

**(RUJUK BUKU ARAHAN-ARAHAN PEPERIKSAAN DAN KAEDAH PENILAIAN (Diploma) EDISI 6, JUN 2019,
KLAUSA 17.3)**

INSTRUCTION:

This section consists of **TWO (2)** structured essay questions. Answer **ALL** questions.

ARAHAN :

Bahagian ini mengandungi DUA (2) soalan esei berstruktur. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

DJJ30093 CLO1
DJJ3053 CLO1
C3

- (a) If the tension in cord OR is 70 N. Calculate masses of m_A and m_B which can be supported as shown in figure. 1(a)

Jika tegangan dalam dawai OR ialah 70 N. Kira jisim m_A dan m_B seperti rajah 1(a)

[12 marks]

[12 markah]

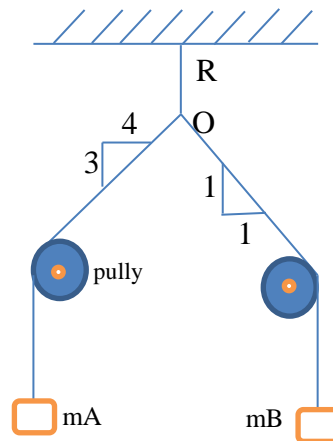


Figure 1(a)
Rajah 1(a)

- (b) Determine the force in each member of the truss as shown in Figure 3(b). Determine whether the members are in tension or compression

Tentukan daya di dalam setiap kekuda seperti rajah 3(a). Kenalpasti sama ada daya itu mampatan atau regangan.

[13 marks]

[13 markah]

DJJ30093 CLO2
DJJ3053 CLO1
C4

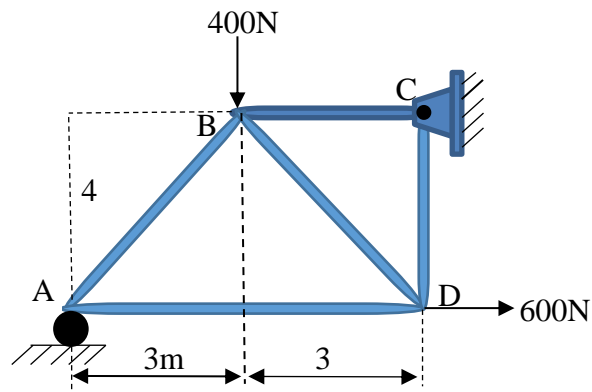


Figure 1(b)
Rajah 1(b)

QUESTION 2

SOALAN 2

- (a) A lorry starts from rest and then accelerates uniformly for 70 seconds and reaches a velocity of 80 m/s at the end of acceleration. Its velocity is maintained for a while and then it stops within 65 seconds with constant deceleration. The total distance travelled by the lorry is 12.2 km.

Sebuah lori dari keadaan pegun memecut seragam 70 saat dan mencapai halaju 80 m/s pada akhir pecutan tersebut. Halaju dikekalkan untuk seketika dan ia berhenti dalam masa 65 saat dengan nyahpecutan seragam. Jumlah jarak yang dilalui oleh lori tersebut ialah 12.2 km.

- i. Sketch a velocity-time graph.
Lakarkan graph halaju melawan masa

[4 marks]

[4 markah]

- ii. Calculate the acceleration of the lorry.
Kirakan pecutan kereta tersebut

[2 marks]

[2 markah]

- iii. Calculate the time taken for the journey.

Kirakan jumlah masa yang diambil untuk perjalanan tersebut

[4 marks]

[4 markah]

DJJ30093 CLO1
DJJ3053 CLO1
C3

- (b) A car with a weight of 400 kg is driven downhill which is 5° incline and at a speed of 60 km/h as shown in figure 2(b). When the brakes are applied, it will cause a constant total braking force of 4000 N until the car stops. Based on this information:

Sebuah kereta dengan berat 400 kg dipandu menuruni satu cerun bersudut 5° pada kelajuan 60 km/j seperti dalam rajah 2(b). Apabila brek dikenakan ia menghasilkan daya membrek sebanyak 4000N sehingga kereta berhenti. Berdasarkan maklumat ini:

- i. Draw a free body diagram of the car.

Lukiskan rajah badan bebas bagi kereta tersebut.

[3 marks]

[3 markah]

- ii. Calculate the kinetic energy of the car.

Kirakan tenaga kinetik bagi kereta tersebut.

[6 marks]

[6 markah]

- iii. Calculate work done by the car.

Kirakan kerja yang dilakukan oleh kereta tersebut.

[3 marks]

[3 markah]

- iv. Calculate the distance travelled by the car.

Kirakan jarak yang dilalui oleh kereta tersebut.

[3 marks]

[3 markah]

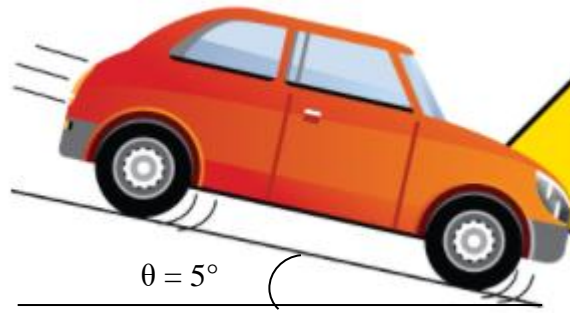


Figure 2(b)
Rajah 2(b)

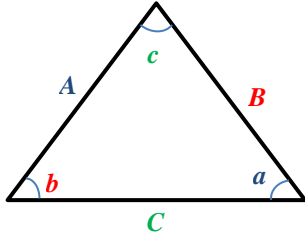
SOALAN TAMAT

LIST OF FORMULA

DJJ3053 – ENGINEERING MECHANICS

STATICS

1. TRIANGLE RULE



Sine law:

$$\frac{A}{\sin a} = \frac{B}{\sin b} = \frac{C}{\sin c}$$

Cosine law:

$$C = \sqrt{A^2 + B^2 - 2AB \cos c}$$

2. ADDITION OF SYSTEM OF COPLANAR FORCE

$$(\rightarrow) \Sigma F_x = F_{1x} + F_{2x} - F_{3x}$$

$$(+\uparrow) \Sigma F_y = F_{1y} - F_{2y} + F_{3y}$$

$$F_R = \sqrt{(\Sigma F_x)^2 + (\Sigma F_y)^2}$$

$$\theta = \tan^{-1} \left| \frac{\Sigma F_y}{\Sigma F_x} \right|$$

3. CARTESIAN VECTOR

$$\mathbf{F} = F_x \mathbf{i} + F_y \mathbf{j} + F_z \mathbf{k}$$

$$\mathbf{u}_A = \frac{\mathbf{F}}{F} = \frac{F_x}{F} \mathbf{i} + \frac{F_y}{F} \mathbf{j} + \frac{F_z}{F} \mathbf{k}$$

$$\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = 1$$

$$\mathbf{F}_R = \Sigma \mathbf{F} = \Sigma F_x \mathbf{i} + \Sigma F_y \mathbf{j} + \Sigma F_z \mathbf{k}$$

$$\mathbf{r} = (x_B - x_A) \mathbf{i} + (y_B - y_A) \mathbf{j} + (z_B - z_A) \mathbf{k}$$

$$\mathbf{F} = F \mathbf{u} = F \frac{\mathbf{r}}{r}$$

4. EQUILIBRIUM OF PARTICLE

$$\Sigma \mathbf{F} = 0$$

$$F = ks$$

DYNAMICS

1. RECTILINEAR MOTION OF PARTICLES

$$v = ds/dt$$

$$a = dv/dt$$

2. UNIFORM RECTILINEAR MOTION

- a constant

$$v = u + at$$

$$v^2 = u^2 + 2as$$

$$s = ut + \frac{1}{2}at^2$$

$$s = \frac{1}{2}(v + u)t$$

$$v = r\omega$$

$$a = r\alpha$$

3. WORK OF FORCE

$$U_{1 \rightarrow 2} = (F \cos \alpha) \Delta x$$

4. KINETIC ENERGY OF PARTICLE

$$KE = \frac{1}{2}mv^2$$

$$U_{1 \rightarrow 2} = T_2 - T_1$$

5. POTENTIAL ENERGY

$$PE = mgh$$