

3

SULIT



BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN MATEMATIK, SAINS DAN KOMPUTER

PEPERIKSAAN AKHIR
SESI DISEMBER 2015

DBS1012 : ENGINEERING SCIENCE

TARIKH : 02 APRIL 2016
MASA : 2.30 PM – 4.30 PM (2 JAM)

Kertas ini mengandungi EMPAT BELAS (14) halaman bercetak.

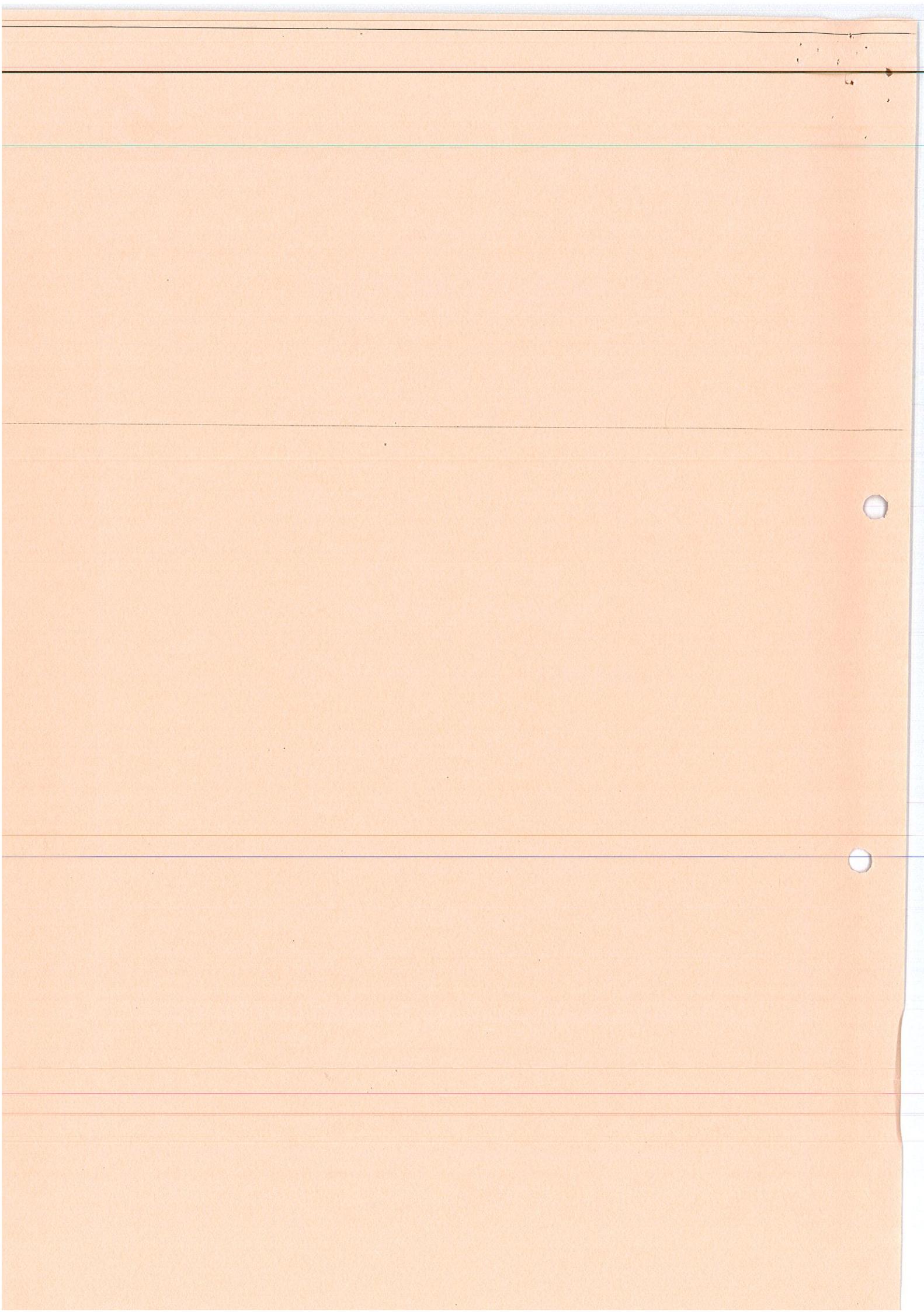
Bahagian A: Struktur (6 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALANINI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT



SECTION A : 100 MARKS**BAHAGIAN A : 100 MARKAH****INSTRUCTION:**

This section consists of **SIX (6)** structured questions. Answer **FOUR (4)** questions only.

ARAHAN :

Bahagian ini mengandungi ENAM (6) soalan subjektif. Jawab EMPAT (4) soalan sahaja.

QUESTION 1**SOALAN 1**

- | | |
|------------|---|
| CLO1
C1 | <p>(a) Define scalar and vector quantity with examples.
 <i>Takrifkan kuantiti skalar dan vector beserta contoh setiap satu.</i></p> <p style="text-align: right;">[4 marks]
 [4 markah]</p> |
| CLO1
C2 | <p>(b) Describe the differences between base quantity and derived quantity with TWO (2) examples.
 <i>Jelaskan perbezaan antara kuantiti asas dan terbitan beserta DUA (2) contoh setiap satu.</i></p> <p style="text-align: right;">[6 marks]
 [6 markah]</p> |
| CLO3
C3 | <p>(c) Convert the following units:
 <i>Tukarkan unit berikut:</i></p> <p>i. 100905 cm^2 to m^2.
 100905 cm^2 kepada m^2.</p> <p style="text-align: right;">[3 marks]
 [3 markah]</p> |

ii. 9969 kg/m^3 to g/cm^3 .

9969 kg/m^3 kepada g/cm^3 .

[4 marks]

[4 markah]

CLO3
C3

(d) i. List the types of errors in measurement.

Senaraikan jenis ralat dalam pengukuran.

[2 marks]

[2 markah]

ii. Describe THREE (3) differences between the errors.

Terangkan TIGA (3) perbezaan antara ralat tersebut.

[6 marks]

[6 markah]

QUESTION 2**SOALAN 2**

CLO1

C1

- (a) Define the following terms and state their SI unit.

Takrifkan setiap yang berikut dan nyatakan unit SI baginya.

- i. Displacement

Sesaran

[2 markah]

[2 marks]

- ii. Velocity

Halaju

[2 marks]

[2 markah]

CLO 1

C2

- (b) An airplane travelling at 150m/s is accelerated uniformly at 25m/s
- ²
- .

Sebuah kapal terbang bergerak pada 150m/s memecut secara seragam pada 25m/s².

- i. What is the airplane's speed after 15s?

Berapa kelajuan kapal terbang selepas 15s?

[2 marks]

[2 markah]

- ii. What distance has it travelled at that point of time?

Berapa jarak dilalui pada masa tersebut?

[4 marks]

[4 markah]

- CLO 3 (c) A lorry moves from a stationary state, undergoes uniform acceleration for 200m in 5 seconds. After 5 seconds, the lorry moves at a constant velocity for half a minute. The lorry then stops in 10 seconds. Based on the given situation:
Sebuah lori bergerak dari keadaan pegun, memecut secara seragam sejauh 200m dalam masa 5 saat. Selepas 5 saat, lori tersebut bergerak dengan halaju seragam untuk masa setengah minit. Kemudian lori berhenti dalam masa 10 saat.
- i. Sketch the velocity-time graph
Lakarkan graf halaju-masa [3 marks]
- ii. Calculate the acceleration of the lorry for the first 5 seconds
Pecutan lori pada masa 5 saat pertama [5 marks]
- iii. Calculate the deceleration of the lorry
Nyahpecutan lori [2 marks]
- iv. Calculate the total displacement of the lorry
Jumlah sesaran lori [5 marks]

QUESTION 3**SOALAN 3**CLO1
C1

- (a) i. Define force.

Takrifkan daya.

[1 mark]

[1 markah]

- ii. State
- THREE (3)**
- examples of activities that involve force in everyday life.

*Nyatakan **TIGA (3)** contoh aktiviti yang melibatkan daya dalam kehidupan seharian.*

[3 marks]

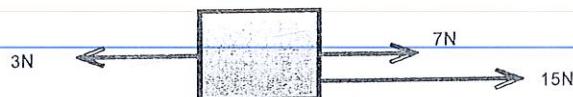
[3 markah]

CLO1
C2

- (b) Find the magnitude of the resultant force and determine its direction for each of situation below:

Dapatkan magnitude daya paduan dan tentukan arah bagi setiap situasi di bawah:

- i.



[3 marks]

[3 markah]

ii.



[3 marks]

[3markah]

CLO3
C3

- (c) Calculate the centre of gravity, \bar{x} from point A for the beam in Figure 3 (c) so that the beam remains in equilibrium by using:

Kirakan pusat graviti, \bar{x} dari titik A bagi rasuk dalam Rajah 3 (c) supaya rasuk tersebut masih dalam keadaan seimbang menggunakan:

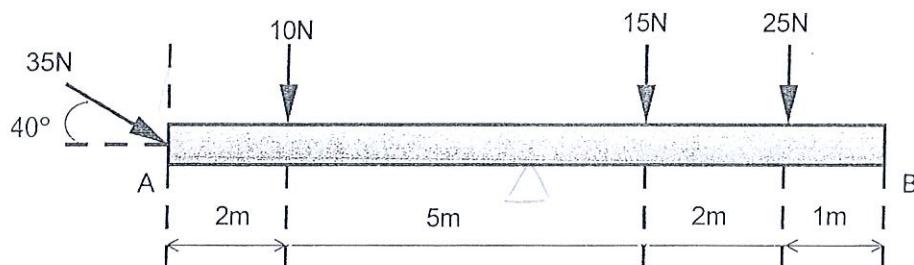


Figure 3 (c) / Rajah 3 (c)

- i. Moment of force method

Kaedah momen daya

- ii. Resultant Moment of Force Method

Kaedah momen paduan daya

[15 marks]

[15 markah]

QUESTION 4**SOALAN 4**

CLO1

C1

- (a) Define each of the following terms and state its SI unit:

Berikan takrifan setiap yang berikut dan nyatakan unit SI baginya:

- i. Energy

Tenaga

[2 marks]

[2markah]

- ii. Power

Kuasa

[2 marks]

[2markah]

CLO1

C2

- (b) Cik Aliya with a mass of 50 kg is climbing up to the top of 20 m stairs within 1 minute. Calculate the work done and power produced by Cik Aliya to climb up the stairs.

Cik Aliya dengan jisim 50 kg naik ke atas tangga yang berketinggian 20 m dalam masa 1 minit. Kirakan kerja dan kuasa yang dihasilkan oleh Cik Aliya untuk naik ke atas.

[6 marks]

[6 markah]

- CLO3 C3 (c) A coconut with a mass of 1 kg falls from a tree which is 15 m high from the ground. Calculate :

Sebiji kelapa dengan jisim 1 kg gugur dari pokok yang berketinggian 15 m dari tanah. Kirakan :

- i. Potential energy while the coconut is still on the tree.

Tenaga keupayaan sewaktu kelapa tersebut masih berada di atas pokok.

[3 marks]

[3 markah]

- ii. Potential energy and kinetic energy when the coconut falls 10 m from the tree.

Tenaga keupayaan dan tenaga kinetik apabila kelapa tersebut gugur bebas sejauh 10 m.

[5marks]

[5markah]

- iii. Velocity of the coconut just before it touches the ground.

Halaju kelapa tersebut sebelum mencelah tanah.

[3 marks]

[3 markah]

- CLO3 C3 (d) A motor is used to pump water from a river with a depth of 5 m at a rate of 30N per minute. Calculate the power of the pump.

Sebuah motor digunakan untuk mengepam air dari sungai pada kedalaman 5 m pada kadar 30 N seminit. Kirakan kuasa pam tersebut.

[4 marks]

[4 markah]

QUESTION 5**SOALAN 5**CLO 1
C1

- (a) Define each of the following terms and state its SI unit:

Takrifkan setiap yang berikut dan nyatakan unit SI baginya:

- i. Density

Ketumpatan

[2marks]

[2markah]

- ii. Relative Density

Ketumpatan Bandingan

[2marks]

[2markah]

CLO 1
C2

- (b) Calculate the density and relative density of a block with the following measurements:

Kirakan ketumpatan dan ketumpatan bandingan bagi sebuah blok dengan pengukuran seperti berikut:

Mass / Jisim : 7.5 kg	Width / Lebar : 0.15 m
Length / Panjang : 0.20 m	Height / Tinggi : 0.10 m

[6marks]

[6markah]

CLO 3
C3

- (c) An ice cube which measures 350 cm x 350 cm x 350 cm is floating on the water surface.

Seketul kiub ais dengan pengukuran 350 cm x 350 cm x 350 cm terapung di atas permukaan air.

- i. Calculate the mass of the ice cube if the given density of the ice cube is 0.917 g/cm³.

Kirakan jisim bagi kiub ais jika diberi ketumpatan bagi kiub ais adalah 0.917 g/cm³.

[8marks]

[8markah]

- ii. Calculate the mass of water displaced by the ice cube.

Kirakan jisim air yang disesarkan oleh kiub ais.

[4marks]

[4markah]

- iii. Calculate the buoyant force exerted.

Kirakan daya apungan yang terhasil.

[3marks]

[3markah]

SULIT

QUESTION 6**SOALAN 6**CLO 1
C1

- (a) Define each of the following terms and state its SI unit:

Berikan takrifan setiap yang berikut dan nyatakan unit SI baginya:

- i. Heat

Haba

[2 marks]

[2markah]

- ii. Temperature

Suhu

[2 marks]

[2markah]

CLO 1
C2

- (b) Explain TWO (2) ways of heat transfer with examples.

Terangkan DUA (2) kaedah pemindahan haba beserta contoh.

[6marks]

[6markah]

CLO 3
C3

- (c) A butcher puts 13 kg of beef into a freezer. The initial temperature of the beef is
- 27°C
- . After an hour, the temperature drops to
- $x^{\circ}\text{C}$
- . The amount of heat lost is -705.7 J. Given the specific heat capacity of the beef is
- $2.81 \text{ J/kg}^{\circ}\text{C}$
- . Find the value of
- $x^{\circ}\text{C}$
- .

Seorang pemotong daging meletakkan 13 kg daging ke dalam peti sejuk. Suhu awal daging tersebut ialah 27°C . Selepas sejam, suhu daging tersebut menurun kepada $x^{\circ}\text{C}$. Kuantiti haba yang hilang ialah sebanyak -705.7 J. Diberi muatan haba tentu daging tersebut ialah $2.81 \text{ J/kg}^{\circ}\text{C}$. Kira nilai $x^{\circ}\text{C}$.

[5marks]

[5markah]

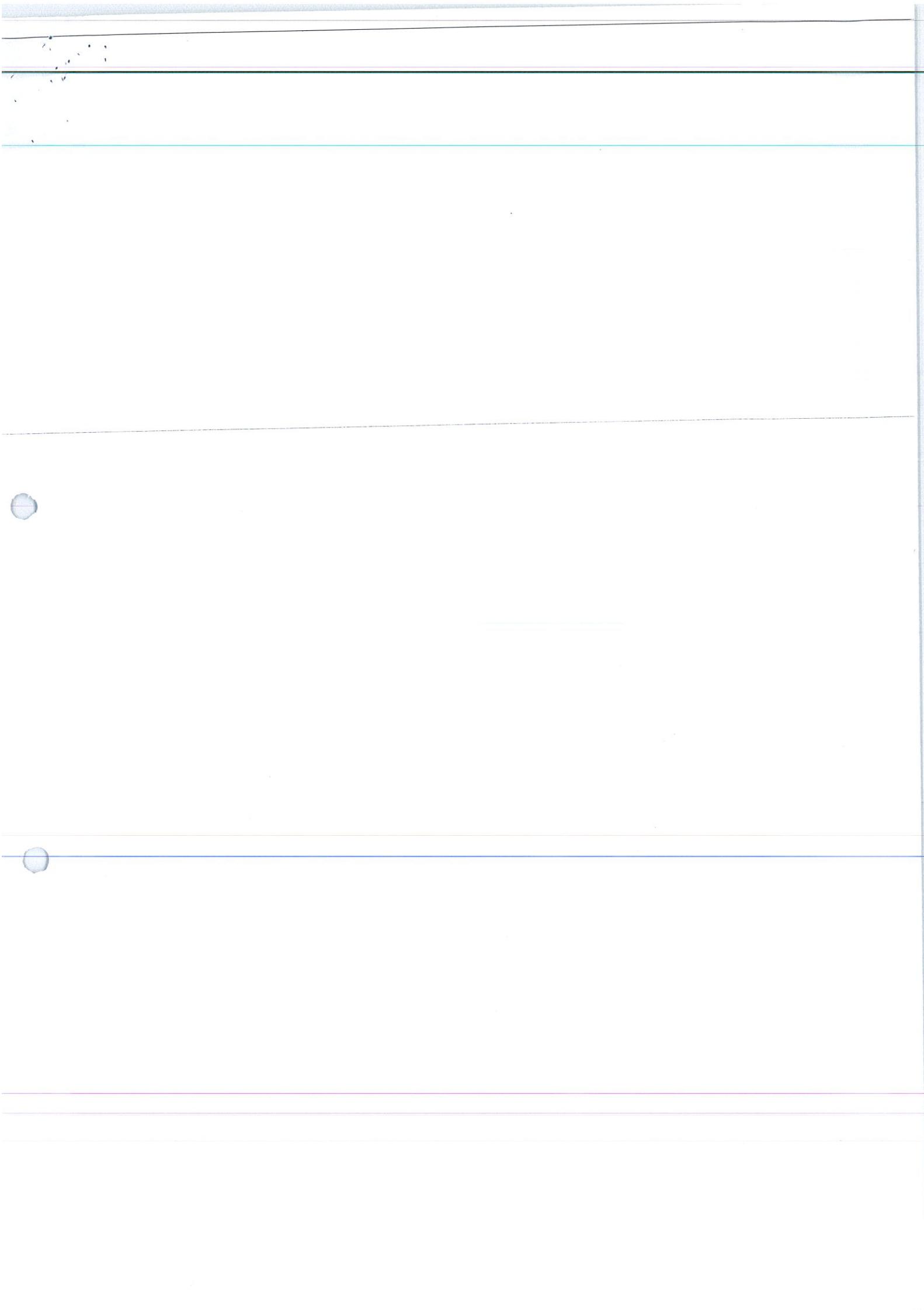
- (d) Mr. Gold is hiding a 1355 g of gold bar with a temperature of 35 °C inside a tank full of water with a temperature of 97 °C. If the mass of the water is 25 kg, calculate the final temperature of the gold bar. (Specific Heat Capacity of gold is 129 J/kg°C, water is 4200 J/kg°C)

Mr. Gold menyembunyikan 1355 g jongkong emas dengan suhu 35 °C ke dalam tangki dipenuhi air dengan suhu 97 °C. Jika jisim air tersebut ialah 25 kg, kira suhu akhir jongkong emas tersebut. (Muatan Haba Tentu jongkong emas 129 J/g°C, air 4200 J/g°C)

[10marks]

[10markah]

SOALAN TAMAT



FORMULA DBS1012
ENGINEERING SCIENCE

$$g = 9.81 \text{ m/s}^2$$

$$W = mg$$

$$v = u + at$$

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

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

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

$$F = mg$$

$$F = ma$$

$$F = mg \sin\theta$$

$$F_x = F \cos\theta$$

$$F_y = F \sin\theta$$

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

$$\theta = \tan^{-1} \left(\frac{F_y}{F_x} \right)$$

$$M = Fd$$

$$E_p = mgh$$

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

$$W = Fs$$

$$W = F \cos\theta$$

$$P = \frac{W}{t}$$

$$P = FV$$

$$\rho = \frac{m}{V}$$

$$\rho_{relative} = \frac{\rho_{substance}}{\rho_{water}}$$

$$p = \frac{F}{A}$$

$$p = \rho gh$$

Pascal's Principle,

$$\frac{F_1}{A_1} = \frac{F_2}{A_2}$$

$$F_B = \rho V g$$

$$Q = mc\theta$$

$$C_{water} = 4,200 \text{ J/kg}^\circ\text{C}$$

$$\rho_{water} = 1,000 \text{ kg/m}^3$$