

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

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

Berikan takrif dan unit SI bagi istilah berikut:

CLO2

C1

- i. Density

Ketumpatan

[2 marks]

[2 markah]

- ii. Relative Density

Ketumpatan Relatif

[2 marks]

[2 markah]

- iii. Pressure

Tekanan

[2 marks]

[2 markah]

CLO2

C2

- b) i. State **TWO (2)** differences between solid, liquid and gas.

Nyatakan TWO (2) perbezaan antara pepejal, cecair dan gas.

[6 marks]

[6 markah]

- ii. A typical brick has a mass of 2268g and occupies a volume of $1.23 \times 10^{-6} \text{ m}^3$. Find the density of the brick.

Sebiji bata berjisim 2268 g mempunyai isipadu $1.23 \times 10^{-6} \text{ m}^3$. Carikan nilai ketumpatan bagi batu tersebut.

[4 marks]

[4 markah]

- c) Figure 1(c) shows a simple hydraulic system.

Gambarajah 1(c) menunjukkan system hidraulik yang mudah.

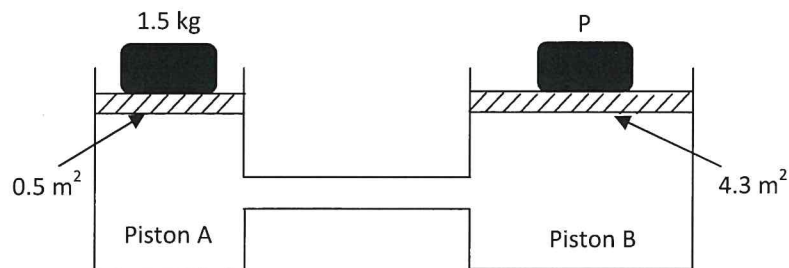


Figure 1(c)

- i. Calculate the force that will be applied at Piston B.

Kirakan daya yang bertindak pada Piston B.

[5 marks]

[5 markah]

- ii. If Piston A moved down by 3.12 m when force is applied, calculate the distance of Piston B when it moved upward.

Jika Piston A bergerak turun sebanyak 3.12 m apabila daya dikenakan, kirakan jarak Piston B apabila ia bergerak ke atas.

[4 marks]

[4 markah]

QUESTION 2

SOALAN 2

CLO 2
C1

- a) State
- THREE (3)**
- differences between heat and temperature.

Nyatakan TIGA (3) perbezaan antara haba dan suhu.

[6 marks]

[6 markah]

CLO 2
C2

- b) i. Using a diagram, explain clearly on the process of thermal equilibrium.

Dengan menggunakan gambar rajah, terangkan dengan jelas proses keseimbangan haba.

[6 marks]

[6markah]

- ii. Calculate heat required to raise the temperature of 3kg aluminium with temperature differences of 25°C. (Given the specific heat capacity of aluminium is 900 J/kg°C)

Kirakan jumlah tenaga haba yang diperlukan untuk menaikkan suhu 3kg aluminium dengan perubahan suhu 25°C. (Di beri muatan haba tentu bagi aluminium adalah 900 J/kg°C)

[4 marks]

[4 markah]

CLO 2
C3

- c) A piece of 220g steak is resting on a 250g glass plate. The initial temperature of the steak and plate is 90°C and 24°C respectively. The specific heat capacity of the steak is approximately 500 J/kg°C while the specific heat capacity of the glass plate is 1200 J/kg°C . Calculate the final temperature when both objects achieve thermal equilibrium.

Sekeping stik 220g diletakkan di atas pinggan kaca 250g. Suhu awal stik dan pinggan masing-masing adalah 90°C dan 24°C. Muatan haba tentu bagi stik adalah 500 J/kg°C manakala muatan haba tentu bagi pinggan kaca adalah 1200 J/kg°C. Kirakan suhu akhir apabila kedua-dua objek berada dalam keadaan keseimbangan haba.

[9 marks]

[9 markah]

QUESTION 3**SOALAN 3**CLO 2
C1

a) Give the definition for the following terms:

Berikan definisi bagi istilah yang berikut:

- | | | |
|------|------------------|------------|
| i. | Current | [2 marks] |
| | <i>Arus</i> | [2 markah] |
| ii. | Voltage | [2 marks] |
| | <i>Voltan</i> | [2 markah] |
| iii. | Resistance | [2 marks] |
| | <i>Rintangan</i> | [2 markah] |

CLO 2
C2

b) Electric charge consists of electrons and protons. With the aid of diagrams, explain each type of charge.

Cas elektrik terdiri daripada elektron dan proton. Dengan bantuan gambarajah, terangkan setiap jenis cas tersebut.

[10 marks]

[10 markah]

CLO 2
C3

- c) Three resistor, $R_1=150 \Omega$, $R_2=300 \Omega$ and $R_3= 600 \Omega$ are connected in parallel with a 9.0 V battery.

Tiga perintang, $R_1=150 \Omega$, $R_2=300 \Omega$ dan $R_3= 600 \Omega$ disambung secara selari dengan bateri 9.0V.

- i. Draw a circuit diagram to show the arrangement.

Lukis gambarajah litar untuk menunjukkan susunannya.

[3 marks]

[3 markah]

- ii. Calculate the total resistance of the circuit.

Kirakan jumlah rintangan litar.

[3 marks]

[3 markah]

- iii. Calculate the current flows through each resistor.

Kirakan arus yang melalui setiap perintang.

[3 marks]

[3 markah]

QUESTION 4**SOALAN 4**

- CLO 2
C1
- a) i. What is the bar magnets? Name **TWO (2)** poles of bar magnets.
*Apakah magnet bar? Namakan **DUA (2)** kutub yang terdapat pada magnet bar.*
- [4 marks]
[4 markah]
- ii. Draw the pattern of magnetic field around a bar magnet.
Lukiskan corak medan magnet sekitar magnet bar.
- [2 marks]
[2 markah]
- CLO 2
C2
- b) Discuss about the Right Hand Grip Rules by using appropriate diagram.
Bincangkan tentang Petua Cengkaman Tangan Kanan dengan menggunakan gambar rajah yang sesuai.
- [10 marks]
[10 markah]
- CLO 2
C3
- c) By using a diagram, interpret the pattern of magnetic field lines for the following conductor:
Dengan menggunakan gambarajah, terangkan corak garis medan magnet bagi pengalir berikut:
- i. Around a coil.
Sekitar gegelung.
- [5 marks]
[5 markah]

- ii. Around a solenoid
Sekitar solenoid.

[4 marks]

[4 markah]

SOALAN TAMAT

FORMULA PBS 2014

BASIC ENGINEERING SCIENCE 2

1. $g = 9.81 \frac{m}{s^2}$

2. $\rho_{water} = 1000 kg / m^3$

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

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

5. $P = \frac{F}{A}$

6. $P = \rho gh$

7. *Pascal's Principle*, $\frac{F_1}{A_1} = \frac{F_2}{A_2}$

8. $A_1 h_1 = A_2 h_2$

9. $F_B = \rho V g$

10. $Q = mc \Delta \theta$

11. $I = \frac{Q}{t}$

12. $Q = ne$

13. $V = \frac{W}{Q}$

14. $V = \frac{E}{Q}$

15. $V = \frac{P}{I}$

16. $V = IR$

17. $R = \frac{\rho L}{A}$

18. For Series Circuit,

$$I = I_1 = I_2 = I_3$$

$$V = V_1 + V_2 + V_3$$

$$R = R_1 + R_2 + R_3$$

19. For Parallel Circuit,

$$V = V_1 = V_2 = V_3$$

$$I = I_1 + I_2 + I_3$$

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

20. Temperature conversion

$$T_C = \frac{5}{9}(T_F - 32^{\circ})$$

T_F

$$T_K = T_C + 273.15$$

$$T_C = T_K$$