Bab / *Chapter* 4 : Haba / *Heat*

1 Which of the following statement is correct about liquid-in-glass thermometer?
Pernyataan manakah adalah betul mengenai termometer cecair dalam kaca ?

I The thermometer applies the concept of thermal equillibrium.
Termometer itu mengaplikasikan konsep keseimbangan terma.

II Mercury is used in the thermometer because mercury is good heat conductor.
Merkuri digunakan dalam termometer itu kerana merkuri ialah konduktor haba yang baik.

III The smaller diameter of capillary tube makes the thermometer more sensitive.
Diameter tiub kapilari yang lebih kecil menjadikan termometer itu lebih peka.

IV The thermometer can be used without calibration.
Termometer itu boleh digunakan tanpa membuat tentu-ukur.

A I, II, III
B II, III, IV
C I, II, IV
D I, II, III, IV

2 A piece of metal with a mass of 100 g and at a temperature of 100 °C is placed in a beaker of ice at 0 °C. 10 g of the ice has melted while temperature of the metal decreases to 60 °C. What is the specific heat capacity of the metal in the unit J kg^{-1} $^0C^{-1}$? Assume no heat loss to the surrounding.
(Latent heat of fusion of ice = 3.34 x 10^5 J kg^{-1})

Sekeping logam dengan jisim 100 g *dan suhu* 100 °C *dimasukkan ke dalam sebikar ais pada* 0 °C. *Didapati* 10 g *daripada ais tersebut melebur dan suhu logam turun ke* 60°C. *Berapakah muatan haba tentu logam itu dalam unit,* J kg^{-1} $^0C^{-1}$?
Andaikan tiada haba terbebas ke persekitaran.
(Haba pendam pelebur ais = 3.34 x 10^5 J kg^{-1} *)*

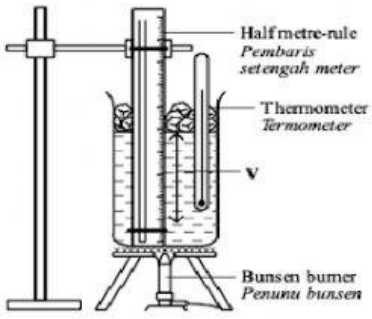
A 910

B 835

C 334

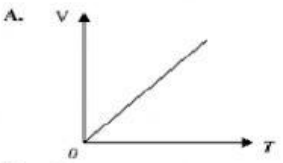
D 299

3 Rajah 11 di bawah menunjukkan suatu susunan radas untuk mengkaji hubungan antara isipadu turus udara, V dan suhu, T bagi suatu jisim udara yang malar.
Diagram 11 below shows an arrangement of apparatus to investigate the relationship between the volume of air column, V and the temperature, T for a fixed mass of air.



Rajah 11
Diagram 11

Graf yang manakah menunjukkan hubungan V dengan **T**, di mana T ialah suhu dalam unit Kelvin?
Which of the following graphs shows the relationship between V and T, where T is temperature measured in Kelvin?

A.


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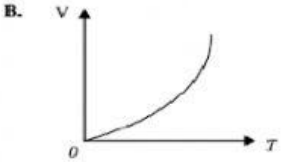

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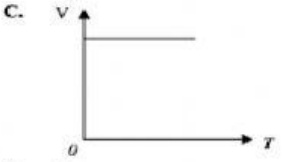

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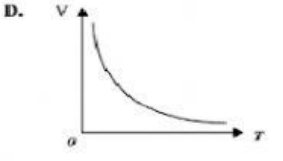


LIVEWORKSHEETS

4 Gas yang berada dalam bekas tertutup mempunyai tekanan 125 kPa pada suhu 30 °C. Tentukan suhu gas di dalam bekas itu jika tekanannya meningkat kepada 201 kPa.
A gas in a sealed container has a pressure of 125 kPa at 30 °C. Determine the temperature of the gas in the container if the pressure is increased to 201 kPa.

A 48 °C
B 214 °C
C 487 °C
D 838 °C

5 Suhu badan pesakit dapat ditentukan oleh seorang doktor apabila berlaku keseimbangan terma antara badan pesakit dan termometer klinik.
The patient's body temperature can be determined by a doctor when thermal equilibrium occur between patient's body and clinical thermometer.

Apakah yang dimaksudkan dengan keseimbangan terma?
What is the meaning of thermal equilibrium?

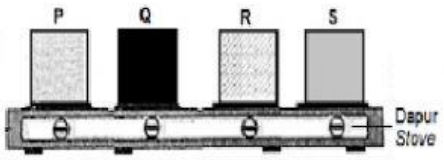
A Kadar pemindahan haba bersih antara dua objek adalah sifar
Net rate flow of heat between two objects is zero

B Jumlah haba yang diperlukan untuk menaikkan suhu sebanyak 1°C bagi 1 kg bahan
Amount of heat required to increase the temperature by 1°C for 1 kg substance

C Jumlah haba yang diperlukan untuk menukar 1 kg bahan dari keadaan cecair kepada gas tanpa perubahan suhu
Amount of heat required to change 1 kg substance from liquid to gas without change in temperature

D Jumlah haba yang diperlukan untuk menukarkan1 kg bahan dari keadaan pepejal kepada cecair tanpa perubahan suhu
Amount of heat required to change 1 kg substance from solid to liquid without change in temperature

6 Rajah 6 menunjukkan empat blok, P, Q, R dan S, dengan muatan haba tentu yang berbeza tetapi mempunyai jisim dan suhu awal yang serupa, dipanaskan di atas dapur dengan jumlah tenaga haba yang sama.
Diagram 6 shows four blocks, P, Q, R and S with different specific heat capacity but have the same mass and initial temperature, were heated on the stove by the same amount of heat energy.



Rajah 6
Diagram 6

Specific heat capacity, c:
Muatan haba tentu, c:
P = 900 $Jkg^{-1}°C^{-1}$
Q = 500 $Jkg^{-1}°C^{-1}$
R = 390 $Jkg^{-1}°C^{-1}$
S = 130 $Jkg^{-1}°C^{-1}$

Blok manakah yang akan mempunyai kenaikan suhu yang paling tinggi selepas dipanaskan selama 10 minit?
Which block will have the highest increase in temperature after being heated for 10 minutes?

A P
B Q
C R
D S

LIVEWORKSHEETS

7 Kuantiti tenaga haba yang sama diberikan kepada dua objek X dan Y. Kenaikan suhu objek X kurang daripada kenaikan suhu objek Y.
The same quantity of heat energy is given to two objects X and Y. The temperature rise of object X is less than the temperature rise of object Y.

What accounts for this difference?
Apa yang menjelaskan perbezaan ini?

A. Objek Y adalah konduktor haba yang lebih baik daripada objek X
Object Y is a better thermal conductor than object X

B Objek X adalah konduktor haba yang lebih baik daripada objek Y
Object X is a better thermal conductor than object Y

C. Objek Y mempunyai muatan haba tentu yang lebih besar daripada objek X
Object Y has a larger specific heat capacity than object X

D. Objek X mempunyai muatan haba tentu yang lebih besar daripada objek Y
Object X has a larger specific heat capacity than object Y

8 Diagram 7 shows a boy walking on the sand and another boy walking in sea water.

Diagram 7

Which of the following statement can explain the situation in Diagram 9?

A The specific heat capacity of sand is lower than specific latent heat of sand.
B The latent heat of sand is lower than latent heat of sea water.
C The specific latent heat of sand is higher than specific latent heat of sea water.
D The specific heat capacity of sand is lower than specific heat capacity of sea water.

9 Diagram 8 shows alcohol is blown repeatedly by using drinking straw. It was found that the outside of the beaker became cold.

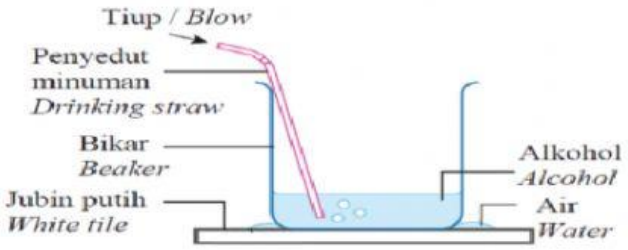


Diagram 8

Which of the following statement is correct?

A Absorption of heat capacity during evaporation gives cooling effect.
B Absorption of latent heat during evaporation process gives cooling effect.
C Alcohol has low specific heat capacity.
D Alcohol has low specific latent heat.

LIVEWORKSHEETS

10 Diagram 9.1 and Diagram 9.2 shows two identical syringes with their nozzles closed. When the volume of air trapped in the syringe is 3 ml, the pressure is $1\times10^5\ Pa$. Then the piston is pushed slowly until its volume is 0.45 ml.

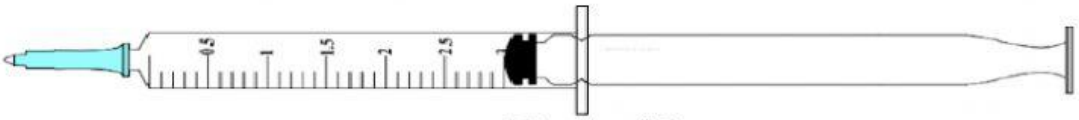


Diagram 9.1

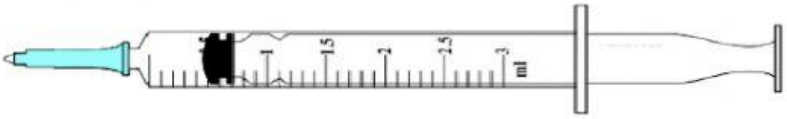
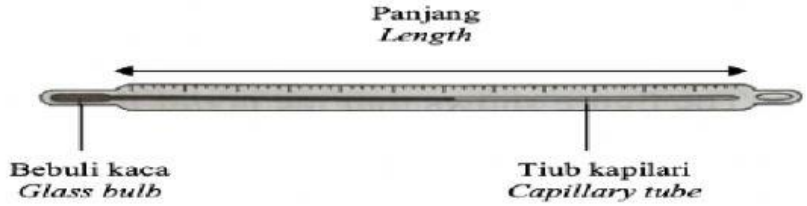


Diagram 9.2

What is the pressure of trapped air?

A $8.0\times10^5\ Pa$
B $7.67\times10^5\ Pa$
C $5.67\times10^5\ Pa$
D $6.67\times10^5\ Pa$

11 **Rajah 5 menunjukkan sebuah termometer merkuri.**
Diagram 5 shows a mercury thermometer.



Rajah 5
Diagram 5

Antara yang berikut, yang manakah akan menambahkan kepekaan termometer itu?
Which of the following will increase the sensitivity of the thermometer?

A Gunakan tiub kapilari yang lebih panjang
Use a longer capillary tube
B Gunakan bebuli kaca yang berdinding lebih tebal
Use a glass bulb with thicker wall
C Gunakan batang kaca yang berdinding tebal
Use a glass rod with thicker wall
D Gunakan kapilari yang berdiameter lebih kecil
Use a capillary with smaller diameter

12 Jadual 1 menunjukkan muatan haba tentu bagi empat bahan P, Q, R dan S.
Table 1 shows the specific heat capacity of four materials P, Q, R *and* S.

Bahan *Material*	**Muatan haba tentu** *Specific heat capacity* (J kg^{-1} $°C^{-1}$)
P	800
Q	900
R	1300
S	1600

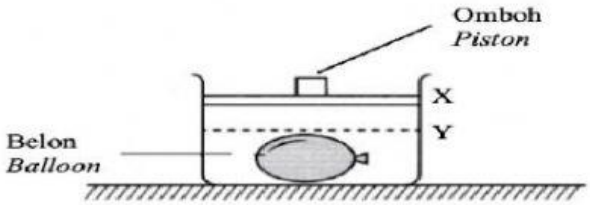
Jadual 1
Table 1

Antara yang berikut, yang manakah bahan yang paling sesuai dibuat sebagai pemegang periuk?
Which of the following material is the most suitable in making the handle of a pot?

A P
B Q
C R
D S

LIVEWORKSHEETS

13 Rajah 6 menunjukkan sebiji belon yang diletakkan di dalam bekas kedap udara.
Diagram 6 shows a balloon which is placed in an air-tight container.

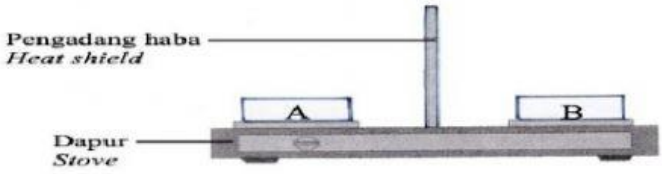


Rajah 6
Diagram 6

Jika omboh dipindahkan dari X ke Y, apakah yang akan berlaku kepada belon?
If the piston is moved from X to Y, what will happen to the balloon?

A Ia pecah
It break
B Ia bergetar
It vibrates
C Ia mengecut
It contracts
D Ia mengembang
It expands

14 Rajah 4 menunjukkan blok pepejal A dan B yang berjisim sama sedang dipanaskan. Suhu awal A dan B adalah sama dan dipanaskan dengan jumlah tenaga yang sama.
Diagram 4 shows solid blocks A and B of equal mass, are being heated. The initial temperature of A and B is the same and they are heated by the same amount of energy.



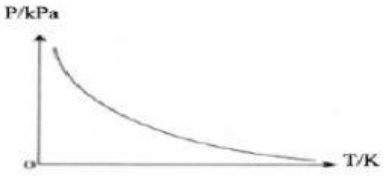
Rajah 4
Diagram 4

A diperhatikan lebih cepat panas daripada B. Pemerhatian ini adalah disebabkan oleh perbezaan dalam
It is observed that A is hotter faster than B. This observation is due to the difference in

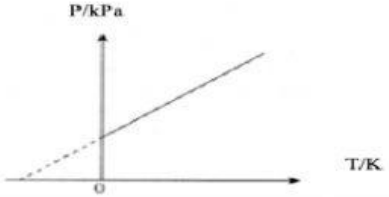
A takat lebur
melting point
B ketumpatan
density
C muatan haba tentu
specific heat capacity
D haba pendam tentu pelakuran
latent heat of fusion

15 Antara graf berikut, yang manakah adalah berkaitan dengan Hukum Gay-Lussac?
Which of the following graphs is related to Gay-Lussac's Law?

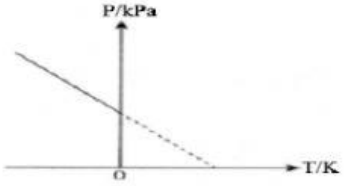
A



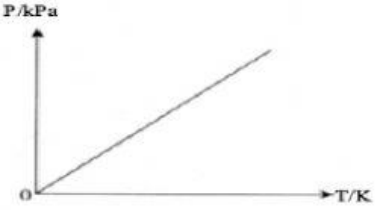
B



C



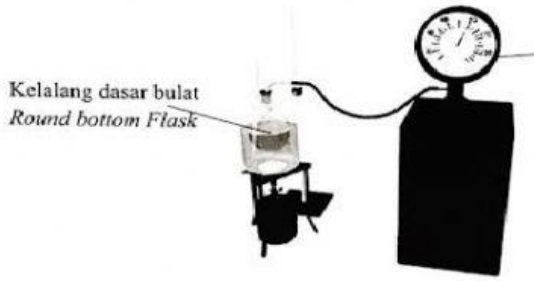
D



LIVEWORKSHEETS

16 Rajah 6 menunjukkan bacaan tolok tekanan di dalam sebuah kelalang yang berisi gas pada bilik yang bersuhu 20°C ialah 80 kPa. Apabila dipanaskan sehingga peningkatan suhu sebanyak 30°C, bacaan tolok tekanan menunjukkan perubahan.

Diagram 6 shows the reading of the pressure gauge in a flask containing gas in a room at temperature of 20 °C *is* 80 kPa. *When heated to the increase of the temperature by* 30° C, *the readings of the pressure gauge show a change.*



Rajah 6
Diagram 6

Apakah bacaan tolok tekanan pada suhu yang baru?
What is the pressure gauge reading at the new temperature?

A 82 733 Pa

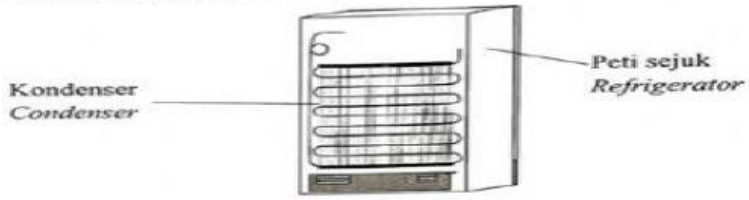
B 88 191 Pa

C 120 000 Pa

D 200 000 Pa

17 Rajah 7 menunjukkan pandangan belakang sebuah peti sejuk. Selepas gas penyejuk dimampatkan oleh pemampat, ia akan melalui satu bahagian yang dikenali sebagai kondenser. Perubahan keadaan jirim berlaku kepada gas tersebut semasa ia melalui kondenser dan ia bertukar menjadi cecair bagi membolehkan haba terbebas ke persekitaran.

Diagram 7 shows the rear view of a refrigerator. After the refrigerant gas is compressed by the compressor, it will pass through a section known as the condenser. The change of state of matter occurs to the gas as it passes through the condenser and it turns into a liquid to allow heat to be released to the surrounding.



Rajah 7
Diagram 7

Haba manakah yang terlibat semasa perubahan keadaan jirim tersebut?
Which heat is involved during the change of state of the matter?

A Muatan haba tentu
Specific heat capacity

B Haba pendam tentu pelakuran
Latent heat of fusion

C Haba pendam tentu pengewapan
Latent heat of vaporization

18 Rajah 6 menunjukkan susu sejuk dituangkan ke dalam kopi panas.
Diagram 6 shows cold milk being poured into hot coffee.

Rajah 6
Diagram 6

Pernyataan manakah yang betul apabila campuran itu berada dalam keadaan keseimbangan terma?
Which statement is correct when the mixture is at the thermal equilibrium?

A Suhu campuran itu lebih rendah daripada suhu susu sejuk
Temperature of mixture is lower than cold milk

B Suhu campuran itu lebih tinggi daripada suhu kopi panas
Temperature of mixture is higher than hot coffee

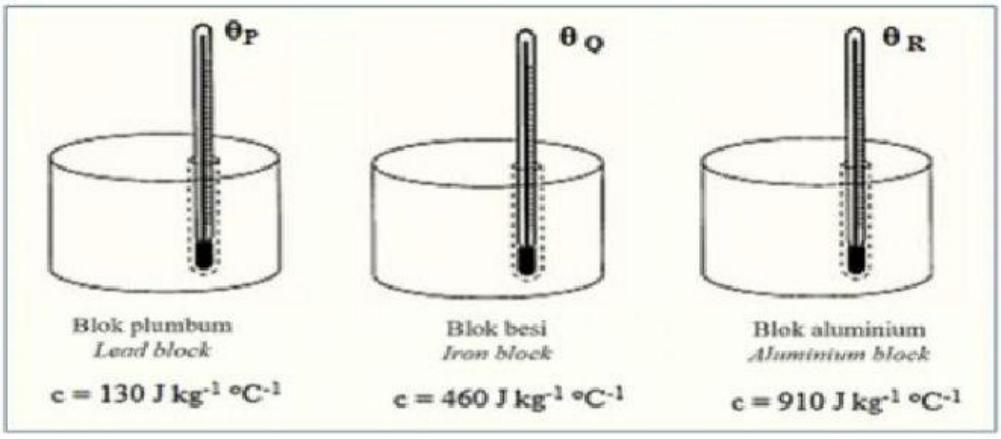
C Kadar pemindahan haba susu sejuk adalah lebih rendah daripada kopi panas
Net rate of heat transfer of the cold milk is lower than the hot coffee

D Kadar pemindahan haba bersih antara susu sejuk dan kopi panas adalah sifar
Net rate of heat transfer between the cold milk and the hot coffee is zero

LIVEWORKSHEETS

19 Rajah 7 menunjukkan satu blok plumbum, satu blok besi dan satu blok aluminium. Semua blok itu mempunyai jisim dan suhu awal yang sama dan dibiarkan menyejuk. Ketiga-tiga logam itu mempunyai muatan haba tentu, c yang berbeza. Selepas 15 minit suhu ketiga-tiga logam itu di rekodkan.

Diagrams 7 shows a lead block, an iron block and aluminium block. All the blocks has the same mass and same initial temperature and let to be cold. All the blocks have different specific heat capacity, c. After 15 minutes the temperature of the blocks are recorded.



Rajah 7
Diagram 7

Perbandingan yang manakah betul tentang perubahan suhu bagi blok plumbum, θ_P, blok besi, θ_Q, dan blok aluminium, θ_R ?
Which comparison is correct about the change in temperature temperature of lead block, θ_P, iron block, θ_Q, and aluminium block, θ_R is correct?

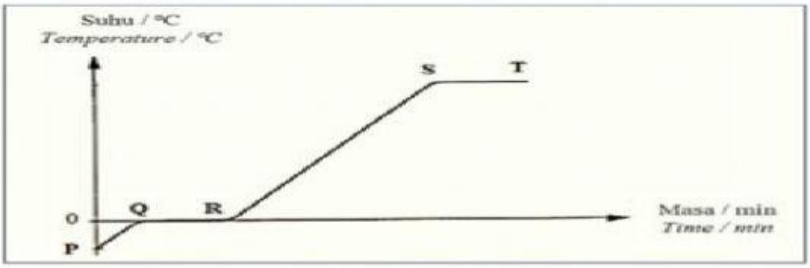
A $\theta_P > \theta_Q > \theta_R$

B $\theta_Q > \theta_P > \theta_R$

C $\theta_R > \theta_P > \theta_Q$

D $\theta_R > \theta_Q > \theta_P$

20 Rajah 8 menunjukkan lengkung pemanasan suatu bahan.
Diagram 8 shows the heating curve of a substance.



Rajah 8
Diagram 8

Pernyataan manakah betul tentang haba yang diserap oleh bahan itu?
Which statement is correct about the heat absorbed by the substance?

	Peringkat *Stages*	Pernyataan *Statement*
A	PQ	Menguatkan ikatan antara molekul bahan *It strengthen the bonds between the substance molecules*
B	QR	Memutuskan ikatan antara molekul bahan *It breaks the bonds between the substance molecules*
C	RS	Menurunkan tenaga kinetik molekul bahan *It decreases the kinetic energy of the substance molecules*
D	ST	Melemahkan daya antara molekul bahan *It weakens the forces between the substance molecules*

LIVEWORKSHEETS

21 Apakah konsep yang digunakan dalam pengukuran suhu badan manusia menggunakan termometer?

What is the concept used in the measurement of human body temperature using a thermometer?

A Muatan haba tentu
Specific heat capacity

B Haba pendam tentu
Spesific latent heat

C Keseimbangan terma
Thermal equilibrium

D Perolakan terma
Thermal convection

22 Jadual 1 dibawah menunjukkan muatan haba tentu bagi bahan-bahan R, S, dan T.
Table 1 shows specific heat capacity for materials R, S and T.

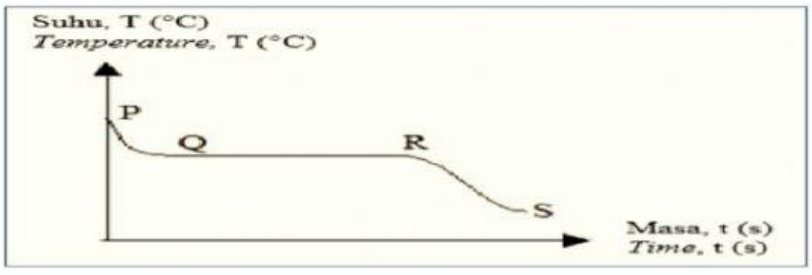
Bahan Materials	Muatan haba tentu/ J kg^{-1} $°C^{-1}$ *Specific heat capacity/J kg^{-1} $°C^{-1}$*
R	428
S	850
T	3500

Jadual 1
Table 1

Antara pasangan berikut, yang manakah adalah paling sesuai untuk dijadikan dasar dan pemegang bagi kuali memasak?
Which of the following pairs is most suitable for making tha base and the handle of the frying pan?

	Dasar kuali memasak *Base of the frying pan*	Pemegang kuali memasak *Handle of the frying pan*
A	R	T
B	T	R
C	S	T
D	T	S

23 Rajah 6 menunjukkan lengkung penyejukan bagi suatu bahan.
Diagram 6 shows the cooling curve of a substance.



Rajah 6

Antara yang berikut, peringkat manakah haba dibebaskan?
Which of the following stages heat being released by the substance?

A QR
B PQ dan RS
PQ and RS
C QR dan RS
QR and RS
D PQ, QR dan RS
PQ, QR and RS

LIVEWORKSHEETS

24 Rajah 5 menunjukkan termometer klinik digunakan untuk mengukur suhu badan seorang pesakit.
Diagram 5 shows a clinical thermometer used to measure a patient's body temperature.

Rajah 5
Diagram 5

Apakah konsep fizik yang diaplikasikan dalam termometer?
What is the physics concept that is applied in the thermometer?

A Muatan haba tentu
Specific heat capacity
B Keseimbangan terma
Thermal equilibrium
C Haba pendam tentu pelakuran
Specific latent heat of fusion
D Haba pendam tentu pengewapan
Specific latent heat of vaporisation

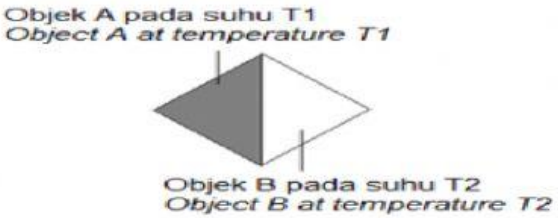
25 Rajah 6 menunjukkan satu picagari tertutup yang mengandungi udara terperangkap dipanaskan di dalam bikar berisi air. Selepas pemanasan, kedudukan omboh didapati bergerak ke atas.
Diagram 6 shows a sealed syringe containing air trapped is heated in a beaker filled with water. After heating the position of the piston moves upward.

Rajah 6
Diagram 6

Berdasarkan pemerhatian dalam Rajah 6, di dapati
Based on the observations in Diagram 6, it is found that

A haba dibekalkan kepada air menyebabkan suhu dan jisim udara terperangkap meningkat
the heat supplied to the water causes the temperature and mass of trapped air increases
B tekanan udara terperangkap bertambah disebabkan pertambahan suhu udara terperangkap apabila dipanaskan
the pressure of trapped air increases due to the increase in temperature of the trapped air when heated
C apabila suhu bertambah, isipadu udara terperangkap bertambah, tetapi tekanan udara terperangkap adalah malar.
as the temperature increases, the volume of trapped air increases, but the pressure of trapped air is constant.
D isipadu udara terperangkap bertambah dan tekanan bagi udara terperangkap berkurang apabila udara terperangkap dipanaskan.
the volume of trapped air increases and the pressure of trapped air decreases as the trapped air is heated.

26 **Rajah menunjukkan objek A dan objek B dengan suhu T1 dan T2 masing-masing. Haba mengalir dari A ke B sehingga keseimbangan terma dicapai pada suhu T.**
The diagram shows object A and object B with temperatures T1 and T2 respectively. Heat flows from A to B until thermal equilibrium is reached at temperature T.



Hubungan manakah antara T1, T2 dan T adalah benar?
Which relationship between T1, T2 and T is true?

A T1 > T2 > T
B T2 > T1 > T
C T1 > T > T2
D T2 > T > T1

LIVEWORKSHEETS