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الملف حل أسئلة الاختبار التجريبي باللغة الانجليزية
موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف الحادي عشر العام ⇦ فيزياء ⇦ الفصل الثالث

روابط مواقع التواصل الاجتماعي بحسب الصف الحادي عشر العام			
روابط مواد الصف الحادي عشر العام على تلغرام			
التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات

المزيد من الملفات بحسب الصف الحادي عشر العام والمادة فيزياء في الفصل الثالث	
1	حل مراجعة نهائية وفق الهيكل الوزاري
2	حل أسئلة الامتحان النهائي الالكتروني بريدج
3	حل مراجعة وفق الهيكل الوزاري الجديد
4	كتاب الطالب باللغة الانجليزية
5	كتاب دليل المعلم

مبادرة نطاق 6.5

" نستعد للتحدي "

الاختبـــــــار التجريبي للفصل الدراسي الثاني في مادة الفيزياء

2022-2023

Physics Mock Exam Term 3

Cluster 6.5

Grade 11 General

مؤسسة الإمارات للتعليم المدرسي
EMIRATES SCHOOLS ESTABLISHMENT

Answer Key

Total Marks = 100

Student name / اسم الطالب :

Grade / الصف :

$g = 9.8\ m/s^2$

Thermal Energy	States of Matter	Vibrations and Waves
$\Delta E = Q = mC\Delta T = mC(T_f - T_i)$	$P = \frac{F}{A}$	$F = -kx$
$Q = \pm mH_f$	$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$	$PE_{spring} = \frac{1}{2}kx^2$
$Q = \pm mH_v$	$\frac{V_1}{T_1} = \frac{V_2}{T_2}, P\ constant$	$T_{pendulum} = 2\pi\sqrt{\frac{\ell}{g}}$
$\Delta U = Q - W$	$PV = nRT$	$\vartheta = \frac{\Delta d}{\Delta t}$
	$\frac{F_2}{A_2} = \frac{F_1}{A_1}$	$f = \frac{1}{T}$
	$P = \rho hg$	$\lambda = \frac{\vartheta}{f}$
	$F_{buoyant} = (F_{bottom} - F_{top})$ $F_{buoyant} = \rho_{(fluid)}Vg$	
	$R = 8.31\ Pa.\frac{m^3}{mol.K}$	

Part 1

(Answer all the questions below. Each question carries 5 marks.)

1. How can a calorimeter be used to determine energy transfers?

   a. measuring thermal energy changes

   b. mixing solutions

   c. measuring volume

   d. maintaining constant temperature

2. Which of the following equation is used to measure the amount of heat energy required to melt a solid?

    a. $Q = mH_v$

    b. $Q = mH_f$

    c. $Q = mC\Delta T$

    d. $Q = m+H_f$

3. Which law is represented by the formula?

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

    a. ideal gas law

    b. Charles's law

    c. Boyle's law

    d. law of inertia

4. According to Pascal's principle, what happens to the pressure at the top of a container if the pressure at the bottom is increased?

    a. The pressure at the top decreases

    b. The pressure at the top increases

    c. The pressure at the top stays same

    d. The pressure at the top doubles

5. A spring with k = 144 N/m is compressed by 16.5 cm. What is the spring's elastic potential energy?

    a. 196 J

    b. 3.92 J

    c. 1.96 J

    d. 11.88 J

6. What type of wave is a sound?

    a. Transverse Wave

    b. Electromagnetic wave

    c. Ocean wave

    d. Longitudinal wave

Part II

(Answer all the questions below. Each question carries 5 marks.)

7. Which type of heat transfer (if any) would be possible in the vacuum of space?

    a. Conduction

    b. Convection

    c. Radiation

    d. No heat transfer is possible in the vacuum of space.

8. Which temperature conversion is incorrect?

    a. −273°C = 0 K

    b. 273°C = 546 K

    c. 88 K = −185°C

    d. 298 K = 571°C

9. Nitrogen gas at standard atmospheric pressure, 101.3 kPa, has a volume of 0.090 m 3. If there are 3.4 mol of the gas, what is the temperature?

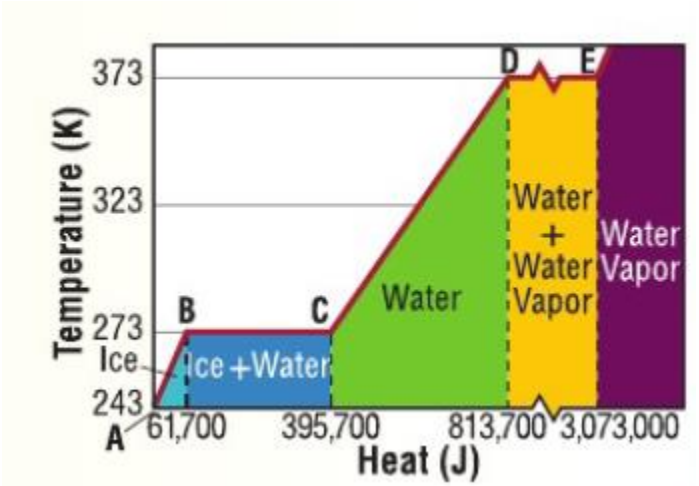
    a. 322 K

    b. 270 K

    c. 322°C

    d. 270°C

10. Use the figure below to calculate the heat of fusion and heat of vaporization of water in J/kg.



a. heat of fusion = 61700 J, heat of vaporization = 813700 J

b. heat of fusion = 395700 J, heat of vaporization = 3073000 J

c. heat of fusion = 61700 J, heat of vaporization = 418000 J

d. heat of fusion = 334000 J, heat of vaporization = 2259300 J

11. When a refrigerator is working, in which direction does thermal energy transfer occur?

a. from the hot reservoir to the cold reservoir

b. from the cold reservoir to the hot reservoir

c. from the cold reservoir to the water

d. from the hot reservoir to the surroundings

12. A mechanic exerts a force of 72 N on a 0.017 m^2 hydraulic piston to lift a small automobile. The piston the automobile sits on has an area of 2.4 m^2. What is the weight of the automobile?

a. 7.7×10^3 N

b. 8.8×10^3 N

c. 1.02×10^3 N

d. 1.9×10^2 N

13. Which of the following is NOT an example of simple harmonic motion?

a. Oscillating pendulum.

b. Spring-mass system.

c. movement of the cradle.

d. A moving train

14. How long must a pendulum be on the Moon, where g = 1.6 N/kg, to have a period of 2.1 s?

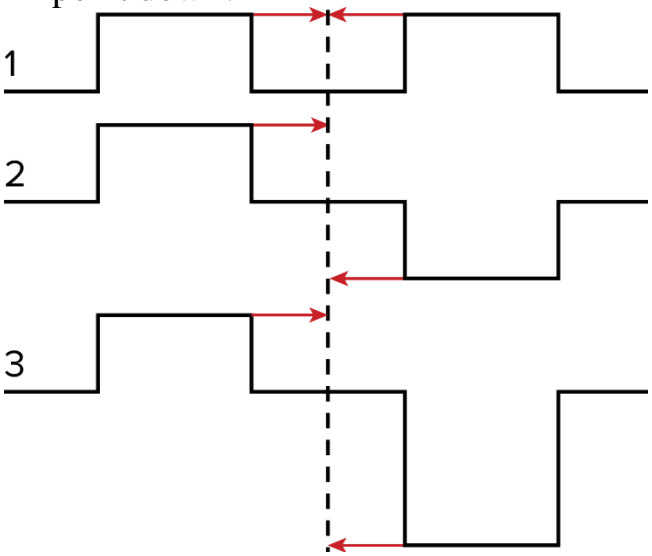
a. 0.16 m

b. 1.18 m

c. 0.18 m

d. 2.2 m

15. In which of the cases shown in the diagram would the resulting wave at the dotted line point down?



a. None of them

b. 1

c. 2

d. 3

16. If a string is vibrating in four parts, there are points where it can be touched without disturbing its motion. How many of these points exist?

a. four nodal points

b. five nodal points

c. six nodal points

d. can't touch anywhere without disturbing its motion.

Part III - Writing

(Answer all the questions below. Each question carries 5 marks.)

17. Sometimes a short circuit in an electrical wiring system can produce enough thermal energy to melt a wire. How much thermal energy must be transferred to a 20.0-g piece of copper wire to raise it from room temperature (25.0°C) to its melting temperature (1085.0°C)? (C_{cu} = 385 J/kgK)

Answer:-

KNOWN **UNKNOWN**

m = 0.0200 kg Q = ?

T_i = 25.0°C

T_f = 1085.0°C

C_{Cu} = 385 J/(kg·°C)

$$Q = mC_{Cu}(T_f - T_i)$$

$$= (0.0200\ \text{kg})\left(385\ \frac{\text{J}}{\text{kg}\cdot^\circ\text{C}}\right)(1085.0^\circ\text{C} - 25.0^\circ\text{C})$$

$$= 8162\ \text{J}$$

18. 1.0 kg of water is warmed from room temperature (25.0°C) to boiling, then half of its initial volume is vaporized. How many joules of thermal energy must the stove provide to do this? (C_{water} =4180 J/kgK, $H_{v(vater)} = 2.26 \times 10^6$ J/kg)

KNOWN **UNKNOWN**

m = 1.0 kg $m_{vapor} = ½m$ Q = ?

T_i = 25.0°C T_f = 100.0°C

$C_{water} = 2.26\times10^6$ J/(kg·°C)

$H_{v,\ water} = 2.26\times10^6$ J/kg

$$Q = Q_{heating} + Q_{boiling} = mC\Delta T + \left(\tfrac{1}{2}m\right)H_V$$

$$= (1.0\ \text{kg})\left(4180\ \frac{\text{J}}{\text{kg}\cdot^\circ\text{C}}\right)(100.0^\circ\text{C} - 25.0^\circ\text{C})$$

$$+ \left(\tfrac{1}{2}\right)(1.0\ \text{kg})\left(2.26\times10^6\ \frac{\text{J}}{\text{kg}}\right)$$

$$= 1.4\times10^6\ \text{J}$$

19. A sound wave produced by a clock chime is heard 515 m away 1.50 s later.

a. Based on these measurements, what is the speed of sound in air?

b. The sound wave has a frequency of 436 Hz. What is the period of the wave?

c. What is its wavelength?

Knowns
d = 515 m
t = 1.50s
f = 436 Hz

Unknowns
V = ?
T = ?
λ = ?

a.

$$v = \frac{d}{t} = \frac{515\ \text{m}}{1.50\ \text{s}} = 343\ \text{m/s}$$

b.

$$T = \frac{1}{f} = \frac{1}{436\ \text{Hz}} = 2.29 \times 10^{-3}\ \text{s}$$

c.

$$\lambda = \frac{v}{f} = \frac{343\ \text{m/s}}{436\ \text{Hz}} = 0.787\ \text{m}$$

20. A 560-N cyclist sits on a bicycle seat and compresses the two springs that support it. The spring constant equals 2.2×10^4 N/m for each spring.

a. How much is each spring compressed?

b. By how much does the compression increase each spring's elastic PE?

Answer:-

KNOWN	**UNKNOWN**
$F_{sp} = F_g/2 = 280$ N	x = ?
$k = 2.2\times10^4$ N/m	PE_{sp} = ?

Use Hooke's law to find the compression of each spring

$$F_{sp} = kx$$

$$x = \frac{F}{k} = \frac{\frac{1}{2}F_g}{k} = \frac{\frac{1}{2}(560\ \text{N})}{2.2\times10^4\ \text{N/m}} = 1.3\times10^{-2}\ \text{m}$$

Use the relationship among potential energy, the spring constant, and the displacement.

$$PE_{sp} = \frac{1}{2}kx^2$$

$$= \frac{1}{2}(2.2\times10^4\ \text{N/m})(1.3\times10^{-2}\ \text{m})^2 = 1.9\ \text{J}$$

Bonus Questions

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21. The average molar mass of the components of air (mainly diatomic nitrogen gas and diatomic oxygen gas) is about 29 g/mol. What is the volume of 1.0 kg of air at atmospheric pressure and 20.0°C?

$$PV = nRT$$

$$V = \frac{nRT}{P}$$

$$\text{where } n = \frac{m}{M} = \frac{1.0\times10^3\ \text{g}}{29\ \text{g/mol}}$$

$$\text{and } T = 20.0°\text{C} + 273 = 293\ \text{K}$$

$$V = \frac{\left(\frac{1.0\times10^3\ \text{g}}{29\ \text{g/mol}}\right)(8.31\ \text{Pa gm}^3/\text{mol gK})(293\ \text{K})}{1.013\times10^5\ \text{Pa}}$$

$$= 0.83\ \text{m}^3$$

22. A 4.00×10^2-g sample of water at 15.0°C is mixed with 4.00×10^2 g of water at 85.0°C. After the system reaches thermal equilibrium, 4.00×10^2 g of methanol at 15°C is added. Assume there is no thermal energy lost to the surroundings. What is the final temperature of the mixture? (C_{water} = 4180J/KgK)

Step 1:

$$m_A C_A (T_f - T_{Ai}) + m_B C_B (T_f - T_{Bi}) = 0$$

Since in this particular case, $m_A = m_B$, the masses cancel and

$$T_f = \frac{c_A T_{AI} + c_B T_{BI}}{c_A + c_B}$$

$$= \frac{(4180\ \text{J/kg·K})(15.0°\text{C}) + (4180\ \text{J/kg·K})(85.0°\text{C})}{4180\ \text{J/kg·K} + 4180\ \text{J/kg·K}} = 50.0°\text{C}$$

Step 2:

$$m_W C_W (T_f - T_{Wi}) + m_M C_M (T_f - T_{Mi}) = 0$$

$$T_f = \frac{m_W c_W T_{WI} + m_M c_M T_{MI}}{m_W c_W + m_M c_M}$$

$$= \frac{(0.800\ \text{kg})(4180\ \text{J/kg·K})(50.0°\text{C}) + (0.400\ \text{kg})(2450\ \text{J/kg·K})(15.0°\text{C})}{(0.800\ \text{kg})(4180\ \text{J/kg·K}) + (0.400\ \text{kg})(2450\ \text{J/kg·K})} = 42.1°\text{C}$$