Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023

COURSE NAME	:	PHYSICS
COURSE CODE	:	BNS 10602
PROGRAMME CODE	:	BNS
DATE	:	JULY/AUGUST 2023
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS. 2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK.** 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

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Q1 (a) Differentiate the different between displacement and distance, based on these criteria:

(i) Definition
(ii) Derived unit
(iii) Type of quantity

(5 marks)

(b) The velocity-time graph represents the motion of a car, x shown in **Figure Q1 (b)**. Therefore:

(i) Describe the motion of the car at A, B and C.

(5 marks)

(ii) Calculate the acceleration of the car at A, B, C and D.

(4 marks)

(iii) Calculate the total displacement travelled by the car.

(4 marks)

(iv) Calculate the average velocity through the journey.

(2 marks)

Q2 (a) A plane progressive wave which is travelling to the right and is represented by the equation, $y = 0.4 \sin\ (50\pi t - \frac{10\pi x}{17})$, where y in cm, t in seconds and x in meter.

(i) Calculate the frequency, wavelength and speed of the wave.

(6 marks)

(ii) Calculate and write the new wave equation of progressive wave, when the wave moving with the same speed in the opposite direction, having twice the amplitude and half the frequency.

(4 marks)

(b) Differentiate these terminologies based on its definition and diagram, and give **ONE (1)** example for each terminologies:

(i) Transverse wave
(ii) Longitudinal wave

(5 marks)

(c) List out **FIVE (5)** usage of ultrasound.

(5 marks)

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Q3 (a) **Figure Q3 (a)** shows a heating element used in an electric toaster. Meanwhile, **Table Q3 (a)** shows the specifications of **FOUR (4)** heating elements that can be used as the heating element of an electric toaster. You are required to determine the most suitable heating element and give **FOUR (4)** explanations for your choice.

(10 marks)

(b) **Table Q3 (b)** shows all types of electrical appliances used in a home for one day. If the cost of 1 unit of electrical energy is RM0.22 for first 100 units and RM0.18 for the subsequent units, calculate the cost of electrical energy usage of the electrical appliances for 30 days.

(10 marks)

Q4 (a) Safety precautions should be very important when someone is working in a nuclear power plant. Assume you are safety manager in a nuclear power plant, describe **ONE (1)** safety measures to be followed based on the following aspects:

(i) Handling radioactive sources
(ii) Radioactive waste management
(iii) Location of the nuclear power plant
(iv) Safety measures
(v) Safety feature for leakage of radioactive radiation

(10 marks)

(b) Radioactive rays are penetrating and ionizing which may destroy living cells. Small dose of radiation over an extended period may cause cancer and eventually death. Marie Curie and Enrico Fermi died due to exposure to radiation. Identify **FIVE (5)** safety precautions workers who work in the nuclear medicine field must take against radioactive materials.

(10 marks)

- END OF QUESTIONS –

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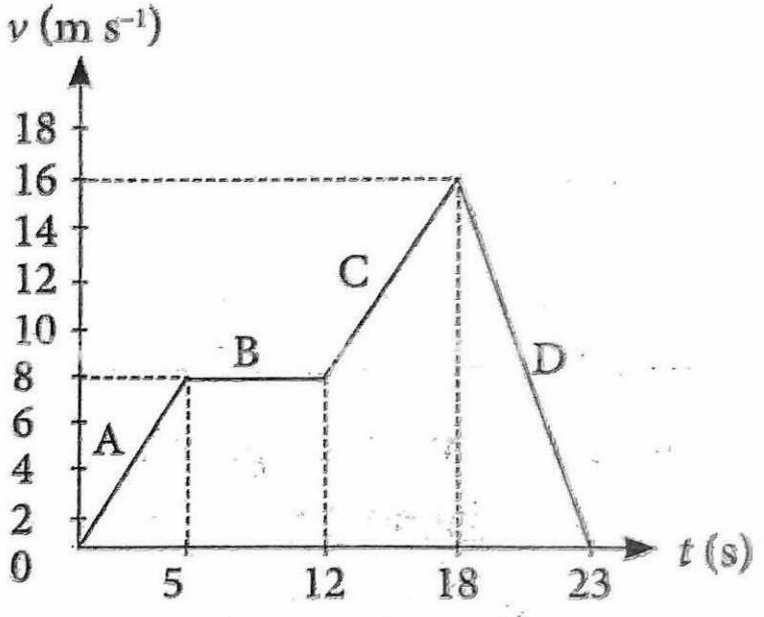

Figure Q1 (b)

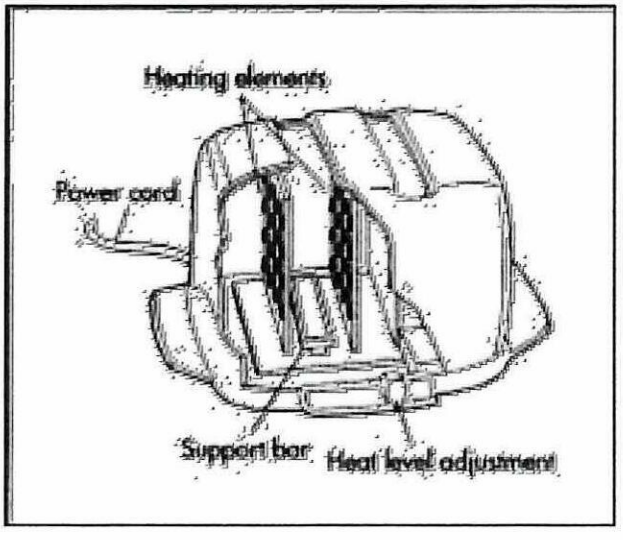

Figure Q3 (a) Electric toaster

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Table Q3 (a) Specification of four elements that can be used as the heating element of an electric toaster

Type/ Characteristic	Number of turns of the coil	Diameter of the wire of the coil	Melting point of wire of the coil (^{0}C)	Rate of oxidation of the heating element
J	High	0.5	7500	High
K	Low	0.5	8050	High
L	Low	0.2	8500	Low
M	High	0.2	9000	Low

Table Q3 (b) Types of electrical appliances used in a home for one day

Appliance	Power (W)	Time (Hour)
Television	2800	3
Light bulb	600	6
Air conditioner	1200	6
Washing machine	1800	1
Fan	80	6
Electrical water kettle	4500	1

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GIVEN EQUATION:

$$Velocity, v = \frac{s}{t}$$

$$Average\ Velocity, v_{ave} = \frac{\Delta s}{\Delta t}$$

$$Speed, v = \frac{d}{t}$$

$$Acceleration, a = \frac{v - u}{t}$$

$$Progressive\ wave, y\ (x, t) = A \sin(\omega t \pm kx)$$

$$Frequency, f = \frac{1}{T}$$

$$Angular\ frequency, \omega = \frac{2\pi}{T}$$

$$Wavelength, \lambda = \frac{2\pi}{k}$$

$$Wave\ number, k = \frac{2\pi}{\lambda}$$

$$Speed\ of\ wave, v = f\lambda$$

$$Energy\ consumed, E = Pt$$

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