UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2018/2019

COURSE NAME	:	BASIC OF SCIENCE ENGINEERING
COURSE CODE	:	BPD 24002
PROGRAMME CODE	:	BPC
EXAMINATION DATE	:	DECEMBER 2018 / JANUARY 2019
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

Q1 (a) Calculate the amount of heat required to raise the temperature of an empty 30kg steel beaker from 8°C to 88°C.

(5 marks)

(b) Describe the phenomena of convection and conduction in a building.

(10 marks)

(c) Explain **TWO (2)** phases of transition in the development of steam.

(10 marks)

Q2 (a) A steel measuring tape is 60m long at a temperature of 20^0C. The coefficient of linear expansion, $\alpha_{steel} = (1.2 \times 10^{-5})^0$C.

Calculate its length on a hot day when the temperature is 40^0C.

(10 marks)

(b) A rectangular sheet of metal has a circular hole. At 20^0C, a hole in a sheet of brass has an area of 2.00mm^2. The coefficient of linear expansion of brass is $(1.2 \times 10^{-5})^0C^{-1}$.

Calculate the expansion in area of the hole at 40^0C.

(10 marks)

(c) Relate the effect of thermal expansion with the construction of roads and bridges.

(10 marks)

Q3 (a) Calculate the kinetic energy of a 85kg person walking at 1.5m/s under the heat of a sun.

(5 marks)

(b) Calculate the work when 20kg crate is pulled 50m horizontally by a 100N force.

(5 marks)

(c) The change in the kinetic energy of an object is equal to the net work done on the object. This fact is referred to as the Work-Energy Principle and is often a very useful tool in mechanics problem solving.

Discuss with example the application of Work-Energy Principle at the construction site.

(10 marks)

Q4 (a) The concepts of Pascal's law and Archimedes' principle are important in engineering and technology applications which include aerodynamics, hydrodynamics and hydraulics of a floating vessel.

Discuss Pascal's Law and Archimedes Principle with regards to buoyancy of a floating vessels.

(10 marks)

(b) Analyse **THREE (3)** types of waves which are characterised as disturbance that travels away from its source.

(15 marks)

- END OF QUESTIONS –