MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER BSC. HEALTH SCIENCE DEGREE EXAMINATION - JUNE 2023 SUBJECT: BHS-204 - PHYSICS II

Marks: 75 **Duration: 180 mins.**

1. Answer the following questions briefly:

1A) Write the zeroth law of thermodynamics. (2)

1B) A heat engine takes 80 J heat and rejects 50 J heat. Calculate the efficiency of the engine. (2)

1C) A long solenoid is formed by winding 20 turns/cm. What current is necessary to produce a magnetic field 20 m/T inside the solenoid? (2)

1D) A radio set operates at 6V DC. A transformer with 18 turns in the secondary coil is used to step down the input 220 V AC emf to 6 V AC emf. This AC emf is the rectified by another circuit to give 6 V DC which is fed to the radio. Find the number of turns in the primary. (2)

1E) Write the Faraday's law of induction. (2)

1F) How Cp and Cv effect adiabatic processes? (2)

1G) Write the relation between ideal gas constant and Avogadro number. (2)

1H) What is heat convection? Explain. (2)

1I) What is electric field? Write some of its properties. (2)

1J) Write Kirchoff's second law for electric circuits. (2)

1K) Draw a phase diagram between current and potential across a capacitor in an AC circuit. (2)

1L) What do you mean by work function? (2)

1M) Write atleast three properties of alpha particles. (2)

1N) Write the de Broglie hypothesis. (2)

2.. Answer the following questions.

2A. What is a solenoid? Show the magnetic field produced by it with a neat diagram. Write the expression of magnetic field produced by it.

2B. Dry air at 15^{o}C and 10 atm is suddenly released at atmospheric pressure. Find the final temperature of the air. (Cp/Cv=1.41)

2C) What do you mean by nuclear fission? Explain it with a neat diagram. (3)

2D) Calculate the binding energy of an alpha particle from the following data:

mass of a $_{1}H^{1}$ atom = 1.007825 u

mass of a neutron = 1.008665 u

mass of $_{2}He^{4}$ = 4.00260 u.

3.. Answer the following questions.

3A) Write the experimental observations of photo-electric effect. (5)

3B) Explain the working of an AC generator. Draw a neat schematic diagram. (5)