VIVEKANANDA COLLEGE, ALIPURDUAR

B.sc 1st Semester-2022

PHYSICS   DSC(P)   F.M: 10

Internal assessment

Answer the following questions

1. If the earth were a homogeneous sphere of radius R and a straight hole bored in it through its centre, show that a body dropped into the hole will execute SHM and find its time period.   (2)

2. Write down differential equation of simple harmonic motion. Also discuss the solution of it.   (3)

3. Briefly discuss about Doppler Effect on the basis of relativity.   (3)

4. Given $\vec{F} = \hat{\imath}\ (z^2 + 2xy) + \hat{\jmath}\ (x^2) + \hat{k}\ (2xz)$

   Prove that $\vec{F}$ is conservative and also find the potential on force at (x,y,z) point.   (2)

VIVEKANANDA COLLEGE, ALIPURDUAR

B.sc 3rd Semester-2022

PHYSICS   SEC   F.M: 10

Internal assessment

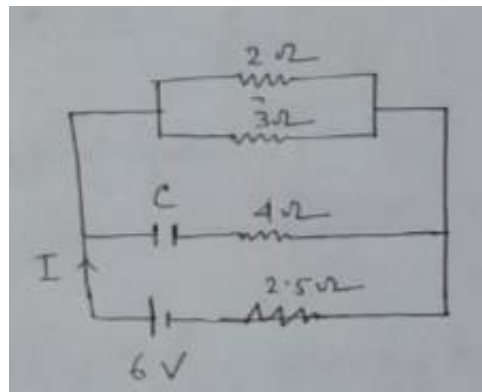**Answer the following Questions (each questions carries 2 marks)**

1. What is the main difference between AC and DC electricity? What are the advantages AC over DC?

2. What is power factor?

3. Draw a basic design of DC motor and label it.

4. How to prepare extension board.

   Or

   Define voltage drop.

5. Find the value of DC current across 2 Ω resistor.

   Also given C = 0.2 µF and neglect the internal resistance of Battery.

Answer the following questions

1. Discuss Maxwell's distribution of molecular speed for a gas. Draw number of molecules vs. speed(v) graph.   (3)

2. Show that, the slope of adiabatic curve at any points is ɣ times the slope of an isothermal curve at the corresponding point.   (2)

3. Deduce Wien's Distribution law and Rayleigh-Jeans law from Plank's law of radiation.   (2)

4. Prove that, S = k ln w (3)

Answer the following questions (each carry 2 marks)

1. Define packing fraction and explain the utility of packing fraction curve.

    Or

    The mass of hydrogen atom and neutron are 1.008142 a.m.u and 1.008982 a.m.u respectively. Calculate the mass defect and binding energy per nucleon of O^{16} nuclei.

2. Using semi empirical binding energy formula, find the atomic number of the most stable nucleus for a given mass number A.

3. What is the mass and spin of anti neutrino? Write a short note on Helicity.

4. Calculate the Q-values of the following reaction:

    $^{14}_{7}N + ^{4}_{2}He \rightarrow ^{17}_{8}O + ^{1}_{1}H$
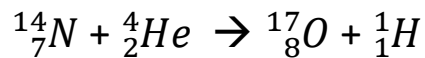
5. Write a short note on Quark model.

    Or

    Check the following reaction is allowed or forbidden

    $\pi^{-} + p \rightarrow A^{0} + \pi^{0}$

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ALIPURDUAR

DATED- 20-01-2022

N O T I C E

This is to notify that the Students of **1st**, **3rd and 5th** Semester examination-2022 are directed to
Collect the Question papers for Internal Assessment of different subjects from the College Website
on **29-01-2022** and upload their Answer Sheets to the following Departmental E.mai ID 's on or
before **08-02-2022.**

(DR. GOBINDA RAJBANSHI)
VICE PRINCIPAL

BENGALI:- bengalivc@gmail.com

ENGLISH:- englishapdvc@gmail.com

 HISTORY- historyapdvc@gmail.com

POLSCIENCE- polsciencevc@gmail.com

EDUCATION-eduacationapdvc@gmail.com

PHILOSOPHY-philosophyvc@gmail.com

SANSKRIT-sanskritapdvc@gmail.com

GEOGRAPHY/ENVIRONMENT-environmentvc@gmail.com

Sociology- sociologyvc@gmail.com

Physical Education- physicaleducationvc@gmail.com

SCIENCE:- sciencevcapd@gmail.com