**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**HIGHER SECONDARY SCHOOL CERTIFICATE**

**CLASS XII**

**MODEL EXAMINATION PAPER 2023 AND ONWARDS**

**Physics Paper II**

**Time: 1 hour 30 minutes Marks: 35**



**INSTRUCTIONS**

**Please read the following instructions carefully**.

1. Check your name and school information. Sign if it is accurate.

| **I agree that this is my name and school.**<br>**Candidate's Signature** |
|---|
| |

**RUBRIC**

2. There are TEN questions. Answer ALL questions. Questions 9 & 10 each offers TWO choices. Attempt any ONE choice from each.

3. When answering the questions:

   Read each question carefully.
   Use a black pointer to write your answers. DO NOT write your answers in pencil.
   Use a black pencil for diagrams. DO NOT use coloured pencils.
   DO NOT use staples, paper clips, glue, correcting fluid or ink erasers.
   Complete your answer in the allocated space only. DO NOT write outside the answer box.

4. The marks for the questions are shown in brackets ( ).

5. You may use a scientific calculator if you wish.

Q.1. (Total 3 Marks)

If the electric potential is constant throughout a given region of space, then is it possible that the electrical field intensity becomes zero in this region? Justify your answer with the help of mathematical evidence.

Q.2. (Total 3 Marks)

An ammetre is connected with an electrical circuit.

a. State the reason for connecting the device in series combination. (1 Mark)

b. Mention the reason for keeping its resistance very low. (1 Mark)

c. How can a galvanometre be converted into an ammetre? (1 Mark)

Q.3. (Total 3 Marks)

Does the induced electromotive force (e.m.f.) always act to decrease the magnetic flux through an electric circuit? Explain your answer in TWO points.

Q.4. (Total 2 Marks)

Write any TWO advantages of using three phase alternating current (A.C) supply in a house.

1.

2.

Q.5. (Total 2 Marks)

Describe the formation of the following energy bands in solids.

a. Valence energy band: (1 Mark)

b. Conduction energy band: (1 Mark)

Q.6. (Total 3 Marks)

How a depletion region is formed in a p-n junction diode?

Q.7. (Total 2 Marks)

Is energy conserved when an atom emits a photon of light? Justify your answer.

Q.8. (Total 3 Marks)

How does the length and shape of the tracks of a radioactive incident particle in Wilson cloud chamber indicate the nature of particle, i.e. alpha, beta or gamma?

Q.9. (Total 7 Marks)

**EITHER**

a. A number of 88 Ω resistors are connected for the purpose of flowing 20 A current from a 220 V source.

By mathematical calculations, determine

i. whether the resistors should be connected in parallel or series. (4 Marks)

ii. the number of resistors with the resistance of 88 Ω. (3 Marks)

**OR**

b. Two identical cells of electromotive force (e.m.f.) 2.0 V are joined together in parallel combination. They provide power to an external circuit consisting of two resistors of 12 Ω each which are joined in parallel combination with a circuit and a voltmetre which reads a voltage of 1.6 V.

Calculate the internal resistance of each cell and the power dissipated by the internal resistance. (7 Marks)

Q.10. (Total 7 Marks)

**EITHER**

a. In light of Plank's hypothesis, which one of the photon corresponding to red, green and blue light carries

i. the most energy. (4 Marks)

ii. the most momentum. (3 Marks)

Explain your answer by providing mathematical evidence.

**OR**

b. Describe the characteristics of a photoelectric effect in SEVEN points. (7 Marks)



END OF PAPER

# Please use this page for rough work

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