

SCOBA
S.5 PHYSICS PAPER ONE

1. a) i) Define dimensions of a physical quantity. (1 mk)
- ii) In the gas equation $\left(p + \frac{a}{v^2}\right)(v - b) = RT$
Where P = pressure, V = gas constant, what are the dimensions of the constants a and b? (4 mks)
- b) What is meant by
- i) Displacement (1 mk)
- ii) Uniform accelerated motion (1 mk)
- c) i) Draw a velocity time graph and a displacement time graph that represents uniformly accelerated motion. (2 mks)
- ii) Using a velocity time graph, derive the relation $S = Ut + \frac{at^2}{2}$ and show that the equation is dimensionally consistent. (6 mks)
- d) i) Define resultant force (1 mk)
- ii) Calculate the magnitude and direction of the resultant of the forces show in the figure below. (4 mks)
2. a) Define the following terms as applied to thermometry
- i) Upper fixed point (1 mk)
- ii) Triple point of water (1 mk)

- iii) Thermometric property (1 mk)
- b) i) Define a Celsius scale of temperature. (1 mk)
ii) Describe the steps involved in setting up a Celsius scale of temperature. (4 mks)
- c) State the desirable properties a material must have to be used as a thermometric substance. (2 mks)
- d) i) Draw a labeled diagram to show the structure of a simple constant volume gas thermometer. (3 mks)
- ii) Describe how a simple constant volume gas thermometer can be used to establish a Celsius scale of temperature. (4 mks)
- iii) State two advantages and two disadvantages of the thermo – couple thermometer. (2 mks)
- iv) The resistance of the element of a platinum resistance thermometer is 4.00Ω at a ice point and 5.46Ω at the steam point. What temperature on the platinum resistance scale would correspond to a resistance of 9.84Ω ? (4 mks)
- e) Explain why temperature measured using different thermometer may not give the same reading. (2 mks)

END.