

OUR LADY OF GOOD COUNSEL S.S.S GAYAZA

HOLIDAY WORK TERM ONE, 2020

S.4 PHYSICS

1. a) Define the term velocity ratio as applied to machines. (1 mark)

(b). A block and tackle system has two pulleys in the lower block and three pulleys in the upper block. Sketch,
 - i. The diagram showing the pulley system (2 marks)
 - ii. A graph showing the variation of mechanical advantage with load (2 marks)
 - iii. Explain why the efficiency of such a system is always less than 100%. (2 marks)(c). what effort will be needed to raise a load of 480 N using the pulley system in (b) above if its efficiency is 75% (2 marks)

(d). name any two uses of such a pulley system in 1 (b) above. (2marks)
- 2). (a) Define the following terms:
 - i. Hard magnetic material, (1 mark)
 - ii. Soft magnetic material. (1 mark)(b) (i) Describe the electrical method of magnetizing a steel bar. (3 marks)

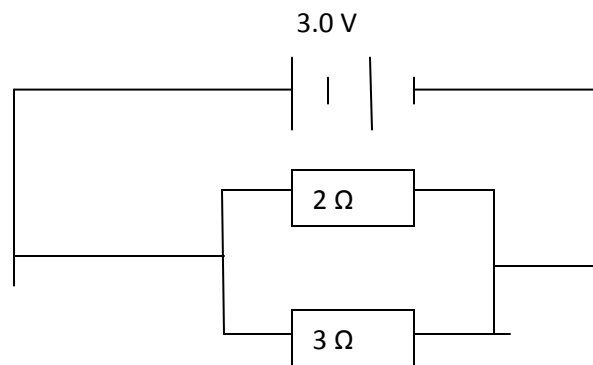
(ii) State any two ways of demagnetizing a bar magnet. (2 marks)

(c) Sketch the magnetic field pattern around a bar magnet with its South Pole pointing north in the earth's magnetic field and use it to define a neutral point in a magnetic field. (3 marks)
- 3) (a) (i) What is meant by focal length of a lens? (1 mark)

(ii) calculate the power of a lens of focal length 20 cm. (2 marks)

(b) An object of height 7.5 cm is placed at a distance of 15 cm from a convex lens of focal length 20cm. By graphical construction , determine the;
 - i. Height of the image.
 - ii. Image distance
 - iii. Linear magnification (6 marks)(c) Describe an experiment to determine the focal length of a convex lens using an illuminated object and a plane mirror. (5 marks)

- (d) Outline the main differences between the operation of a lens camera and that of the human eye. (2 marks)
- 4) (a) (i) Define an echo. (1 mark)
- (ii) State the conditions required for a stationary wave to be formed. (2 marks)
- (b) List the factors on which the frequency of a wave on a vibrating string depends. (3 marks)
- (c) Describe an experiment to demonstrate resonance in a closed pipe. (5 marks)
- (d) A student stood between two cliffs and made a loud sound. If the student heard the first echo after 1.5s and the second echo after 2.0s, find the distance between the cliffs. (speed of sound in air = 320 ms^{-1}) (5 marks)
- 5) (a). sketch graphs of current against voltage for the following devices:
- Ohmic conductor. (1 mark)
 - Semi conductor. (1 mark)
- (b) Explain the differences between a voltmeter and an ammeter in terms of their;
- Construction (2 marks)
 - use. (2 marks)
- (c) State three physical properties that affect the resistance of a solid conductor. (3 marks)



Two cells each of 1.5v and negligible internal resistance are connected in series across two resistors of 2 ohms and 3 ohms as shown in the figure 3 above. Calculate;

- The current supplied by the two cells. (4 marks)
- The power dissipated in the 3 ohm resistor. (3 marks)

- 6) (a). (i) Define specific latent heat of fusion of a solid. (1 mark)
- (ii) Describe an experiment to determine the specific latent heat of fusion of ice, stating clearly any precautions taken. (8 marks)
- (b) Use the kinetic theory of matter to explain the occurrence of latent heat of fusion. (2 marks)
- (c) An ice making machine removes heat from water at a rate of 20 Js^{-1} . How long will it take to convert 0.5kg of water at 20°C to ice at 0°C (5 marks)