FORM 4 PHYSICS PAPER I. ENDOF TERM I EXAMINATION 2015. TIME 2 HOURS.

SECTION A (25 MARKS)

1. Name the instrument that would be most suitable for measuring the thickness of one sheet of this question paper.   (2mks

2.   One property of a liquid that is considered when constructing a liquid – in – glass thermometer is that the liquid expands more than the glass for the same temperature change. State any other two properties.   (3mks

3.   What property of light is suggested by the formation of shadows?   (2mks

4.   Light travels through glass of refractive index 1.5 with a speed V. If the speed of light in air is 3.0×10^8m/s, determine the value of V.   (3mks
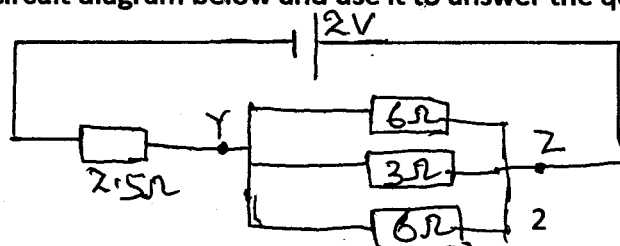
5.   A ray of light is incident on the surface of a glass prism and is observed to behave as shown in the diagram below.
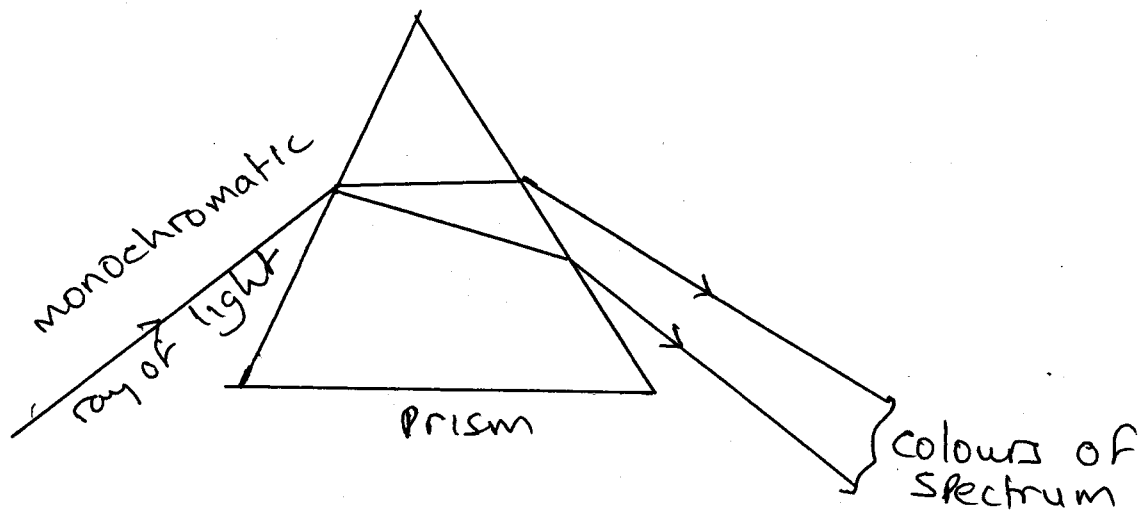
What phenomenon is shown by the behaviour of light?   (2mks

6.   Study the circuit diagram below and use it to answer the questions that follow

i)Calculate the effective resistance between Y and Z   (3mks

ii)Determine the current through the   3 Ω resistor.   (4mks

iii)One of the   6 Ω resistor has a length of 1.0m and a cross-sectional area of
5.0 x 10^{-6} Ωm^2. Calculate the resistivity of the material.   (3mks

7.   An object placed in front of a convex lens of focal length 10cm produces an image at a
distance of 15cm from the lens and on the same side as the object. Determine the position of
the object.   (3mks

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SECTION 'B' (55 MARKS)
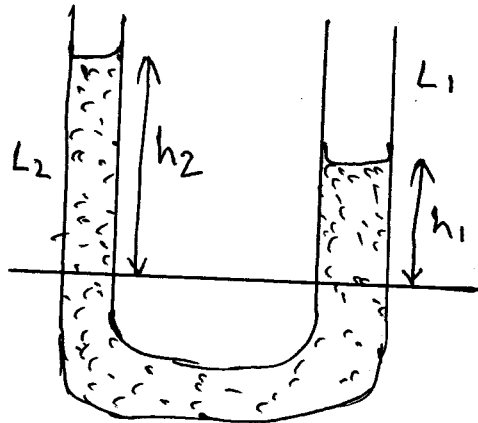
The figure shows a U - tube containing two liquids L_1 and L_2 of densities $0.8g/cm^3$ and $1.8g/cm^3$ respectively in equilibrium. Given that h2 = 8cm determine the value of L_1. (4mks

9.   A girl heats 5kg of water to a temperature of 80^oC. When she adds M kg of water at 15^oC the mixture attains a temperature of 40^oC. Determine the value of M. ignore heat lost to the container.   (4mks

10.   In some Petrol engines where spark plugs are used, a capacitor is connected to the distributor. Suggest the function of the capacitor.   (2mks

c) The figure below shows three capacitors connected between two points A and B.
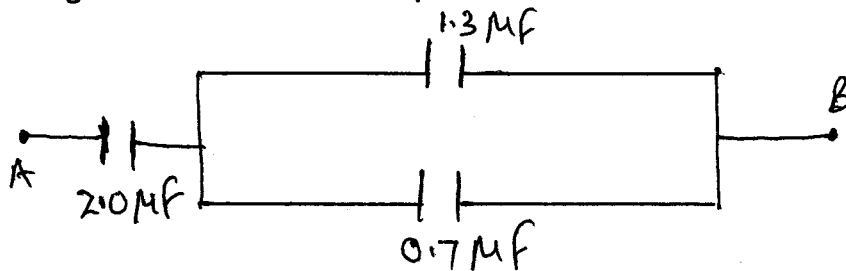
Determine the capacitance across AB.   (3mks

11.   A lady holds a large concave mirror of focal length 1m a distance of 80cm from her face. State two characteristics of her image in the mirror.   (2mks

b)   A concave mirror has a focal length of 10cm. An object 6cm tall, is placed 18cm from the mirror. Find by calculation

i)Image distance   (2mks

ii)Size of the image   (2mks

12.   A house in which a cylinder containing cooking gas is kept, accidentally catches fire, The cylinder explodes. Give an explanation for the explosion.   (2mks

13a)Describe an experiment used to determine the specific heat capacity © of a block of aluminium with two holes drilled in it, to accommodate a thermometer and an electric immersion heater.   (3mks

b)   State two precautions that should be taken in this experiment.   (2mks

c)A copper calorimeter of mass 60g is filled with 100g of water at 25°C. Steam at a normal temperature and pressure is passed through the water until a temperature of 45°C is attained,. The final mass of the calorimeter and its contents was found to be 163.5g. Calculate the specific latent heat of vaporization (L_V) of water.   (6mks

14.   Two lenses L_1 and L_2 are separated by a distance of 8cm. The focal length of L_1 = 2cm and of L_2 = 2.8cm. An object 1.0cm high is placed 3cm from L_1. Determine
a)the position of the first image.   (3mks

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b)the position of the final image. (3mks

c)the magnification produced by the system of lenses. (3mks

d)the size of the final image. (2mks

15. The following results were obtained in an experiment using a spiral spring.

Force (N)	1	2	3	4	5	6	7	8
Extension (mm)	21	40	59	81	99	129	182	248

On the grid provided plot a graph of
Force against extension. Mark on the graph with the letter H the point where Hooke's law ceases
to apply to the spring. (5mks

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ii)Use the graph to find the force constant in N/M of the spring.   (2mks

16.   A spiral spring produces an extension of 6mm when a force 0.3N is applied to it.
Calculate the spring constant for a system when two such spring are arranged in
a) series   (3mks

b)Parallel   (2mks.

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