Name ……………………………………….....................Class…………......H'se………

MID TERM ONE FOR S5 2018

S.5 PHYSICS 2

## 1 hour 30 minutes

Instructions

- Attempt all the questions

- Use $\dfrac{1}{4\pi\varepsilon_0} = 9 \times 10^9 \, \text{Fm}^{-1}$

- Use acceleration due to gravity = 9.81 ms^{-2}

Write the question numbers attempted in the table below.

QUESTION				MARKS
MARKS				

1. (a) What is meant by:

        (i)   a ray of light   (1)

        (ii)   glancing angle   (1)

        (iii)   lateral inversion as far as images are concerned?   (1)

  (b)   (i)   State the laws of reflection   (2)

        (ii)   With the aid of a ray diagram show that the image formed by a plane mirror is the same distance behind the mirror as the object is in front of the same mirror   (4)

  (c)   (i)   With the help of a ray diagram explain how diffuse reflection occurs   (3)

(d)
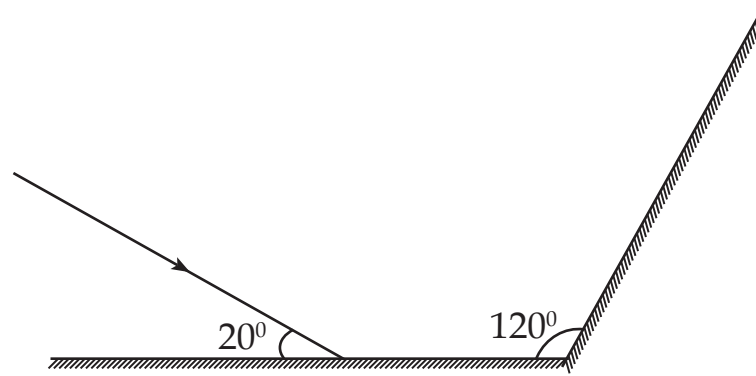
The figure above shows two plane mirrors, M_1 and M_2, inclined at 120^0 to each other. A ray OP is incident on M_1 at a glancing angle of 20^0. After reflection on M_2, what will be the angle between the reflected ray and the mirror M_1? Copy and complete the ray diagram (3)

(e) A student whose height is 1.46m, plans to fix a plane mirror on a vertical wall in her room so that she sees the image of the whole of herself. If her eyes are 12 cm below the top of her head, find

(i) how high above the floor the lowest edge of the mirror should be. (3)

(ii) the minimum vertical dimension of the mirror. (2)

2. (a) (i) State the principle applied in the optical lever mirror galvanometer? (1)

(ii) With the aid of a diagram explain how an optical lever galvanometer works to increase the sensitivity in measurement of current (4)

(b) For a spherical mirror, what is meant by:

(i) radius of curvature (1)
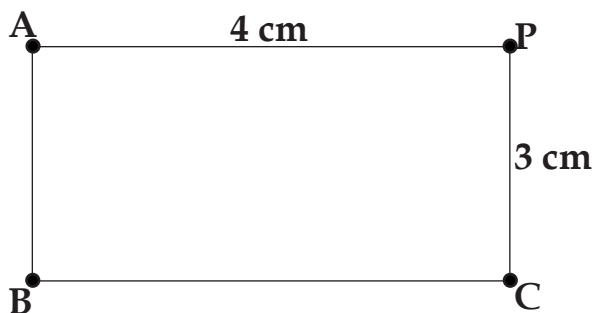
(ii) principle focus (1)

(ii) Show that the focal length of a spherical reflector is half the radius of curvature. (3)

(c) Derive the mirror formula for a concave mirror when a point object is placed at a point on the principal axis of the mirror (5)

(ii) An object is placed 20 cm in front of a convex mirror of radius of curvature 30 cm. Find the distance of the image from the mirror (2)

(e) Give one case where a convex mirror is more convenient to use than a plane mirror of the same aperture and briefly explain with ray diagrams why it is more convenient. (3)

3. (a) (i) What is meant by electrostatic induction? (1)

(ii) Explain the attraction of an uncharged conductor by a charged body. (3)

(b) (i) State the law of force between two electrically charged bodies placed in an electrostatic field. (1)

(ii) Point charges of +16μC, -10μC and +9μC are placed at points A, B and C respectively in air as shown below.

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A          4 cm          P
●────────────────────────●
│                        │
│                        │ 3 cm
│                        │
●────────────────────────●
B                        C
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Calculate the resultant force on a charge of +8μC placed at a point P shown in the figure above (7)

(ii) Describe briefly how an uncharged conductor may be charged positively by induction (3)

(iii) With the aid of a diagram, describe the structure and action of a Van de Graaf generator (5)

END