



FACULTY OF ALLIED HEALTH SCIENCES
UNIVERSITY OF RUHUNA
Department of Medical Laboratory Science
Year End Examination, Year 1 – 10th Batch - 2019



10th Batch – Basic Sciences (MLS 1101) – Physics – Theory

Tuesday 05th February 2019 Time: 9.00 a.m. - 10.30 a.m. Duration: 1 hour and 30 minutes

Index Number:

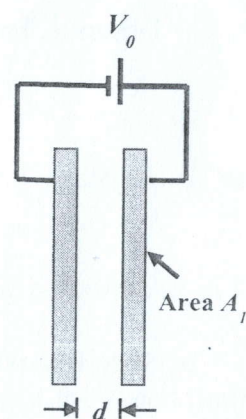
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Answer all questions.

1. a) Describe the usage and importance of a capacitor.

b) Two large flat metal plates are separated by a distance d . The plates are connected to a battery as shown in the figure. The surface area of the face of each plate is A_1 and a vacuum is maintained between the plates.

Write an expression for the capacitance in terms of A_1 and d .



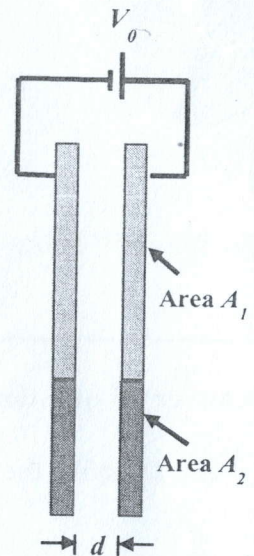
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c) A new capacitor is formed by attaching two uncharged metal plates, each with area A_2 , to the capacitor as shown. The battery remains connected.

(i) Sketch the direction of the electric field between the plates.

(ii) Write an expression for the work done by the electric field on a charge $+q_0$ as it travels from the left plate of the capacitor to the right in terms of the given variables.

(iii) Write an expression for the capacitance of the new capacitor. Hence, find the charge on one of the plates of the capacitor.



(iv) Explain, briefly, how you increase the capacitance of the new capacitor.

2. a) Describe, briefly, the dual nature of light.

b) State **five** properties of light.



c) Explain why you get a sunburn on a cloudy day, but you can't get a sunburn even on a sunny day if you are behind glass.

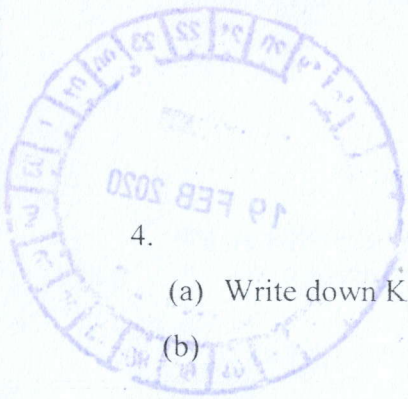
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d) What principal is used in optical fibers? State **two** uses of optical fibers.

e) State **two** properties of LASER light and **two** real world applications of LASER.

3. a) Would a head-on collision between two cars be more damaging to the occupants if the cars stuck together or if the cars rebound upon impact? Explain.
- b) If rain drops fall vertically at a speed of 3 ms^{-1} and you are running horizontally at a speed of 4 ms^{-1} , at what speed the rain drops hit your face?
- c) A destination of 200 km is posted on a highway sign at the entrance, and the speed limit is 100 km per hour. If you drive at the posted speed, can you reach the destination in two hours? Or more that two hours? Explain your answer.
- d) Why doesn't the moon fall towards the Earth?

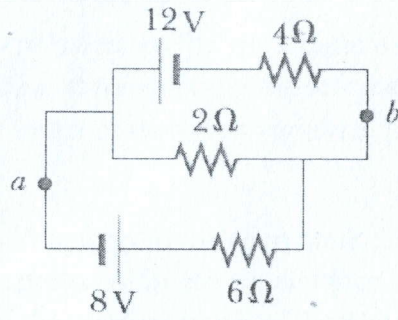
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4.

(a) Write down Kirchhoff's rules.

(b)



(i) Find the current in each resistor.

(ii) Calculate the potential difference between points *a* and *b*.