ST.BRUNO SS GGOLI

**END OF TERM I EXAMS 2020**

**S.6 PHYSICS P510 / 2 TIME: 2 ½ HOURS**

**Instructions:**

* Attempt any four questions.
* Assume where necessary;
* Electronic chare (e) is 1.6 x 10-19c
* Permittivity of free space = 8.85 x 10-12Fm-1
* Constant ¼ πεo is 9.0 x 109FM-1

1. (a) State the laws of electromagnetic induction (02 mk)

(b) Describe, with the aid of a labeled diagram, the structure and action of a

Transformer (6 mk)

(c) (i) Explain why high voltage is needed for long distance power

Transmission (01mk)

(ii) Give two advantages of a.c over d.c power transmission. (02mk)

(d) An electrical power of 16 KW is generated and transmitted through a cable

Of length 20km and resistance 0.025Ωkm-1 to a factory. If 10% of the electrical

Power is lost, calculate

(i) the voltage at which the generator operates (4mks)

(ii) The potential drop at the ends of the cable (02mk)

(iii) the electrical power available at the factory and suggest a way of

Increasing the power supplied to the factory. (3 mk)

2. (a) (i) What is electrostatic induction? (01mk)

(ii) Define the following terms: -

* Insulator (01mk)
* Conductor (01mk)

(b) Explain why a charged strip attracts an uncharged body or object. (02mks)

(c) (i) Draw a labeled diagram of a gold leaf electroscope and describe its mode of

operation. (06mks)

(ii) Define the term “Electrostatic shielding”. (01mk)

(iii) Explain how a hollow can when a body is lowered into it has the same charge as that on

the outside of the can. (05mks)

3. (a) (i) Describe how charges can be distributed on a body with both round and sharp

points. (04mks)

(ii) Why are lightening conductors used on buildings? (01mk)

(iii) How does a lightening proof conductor function? (05mks)

(b) Describe the mode of operation of a Vander graaf generator. (06mks)

4. (a) (i) State Coulombs law of electrostatic (03mks)

(ii) Define permittivity of free space. (01mk)

(b) (i) State the principle of super position? (01mk)

(ii) Find the net force exerted Q2 due to charge 1 and 3.

Q1 = -10μc Q2 = 15μc Q3 = 12μc (03mks)

(c) Charges -5μc , 5μc and +6μc are placed in a vacuum of P. Q and R respectively of a rectangle PQRS of sides 5cm x 12cm as shown below.

R = -5μc S

Calculate the resultant force on the +5μ charge.

(06mks)

5cm

Q = +6μc 12cm P = +5μc

5. (a) (i) Define the term “Electric field intensity” (01mk)

(ii) Draw field lines due to the following point charges: -

* Isolated positive charge (01mk)
* Positive and negative charge near each other. (01mk)

(b) Show that the effective capacitance, C of two capacitances C1 and C2 connected

In series is given by

C1C2

C =

C1 + C2

(c) Two points charges of +3.8μc and -4.6μc are placed in air at point P and Q as shown below.

P

Determine the electric field intensity at R

12cm

R

9cm

Q

6. (a) (i) Define the term “electromotive force” of a cell. (01mk)

(ii) State Kirchoff’s laws of electricity. . (03mks)

(b) (i) Calculate the current I, *i*1 and *i*2

10μ

*i* 1

I *i* 2

1.5v (06mks)

3.0v 10μ

10μ

1

(ii) What is the p.d across AB and BC in the circuit below?

200Ω

6.0V 200Ω 100Ω

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