

(c) State two safety precautions which must be observed when using each of the following. [4marks]

- (i) Hammer.
- (ii) Scriber.
- (iii) Machines with exposed rotating parts.
- (iv) Iron box.

3 (c) With the aid of schematic diagrams, show the improvement needed to enable the moving coil meter movement to measure the following. [11marks]

- (i) ac current,
- (ii) ac voltage.

(b) Define the following terms; [2marks]

- (i) Doping.

- (ii) Intrinsic conduction.

(iii) Pentavalent elements,

(iv) Extrinsic conduction.

(c) List two applications of each of the following

[3marks]

(i) P - N junction diode,

(ii) Zener diodes,

(iii) Light emitting diodes.

4. (a) With the aid of a labeled circuit diagram, explain the construction and operation of a double wound transformer.

[5marks]

(b) State two possible remedies for the following in fluorescent lamps:

[3marks]

(i) Lamp flickers repeatedly in an attempt to start,

(ii) Lamp electrodes glow continuously but lamp does not light,

(iii) Lamp does not light at all.

(c) Define the following terms;

[2marks]

(i) Malleability,

(ii) Ductility,

(iii) Discharge,

(iv) Lenz's Law.

5. (a) With the aid of a labeled circuit diagram, explain the operation of a split-phase motor. [5marks]

(c) List two advantages and two disadvantages of fluorescent lamps.

[2marks]

6. (a) Four inductors are connected as shown in figure 1 below. Calculate;

[2marks]

- (i) The equivalent inductance,
- (ii) The energy stored in the inductor  $L_2$  and  $L_4$ .

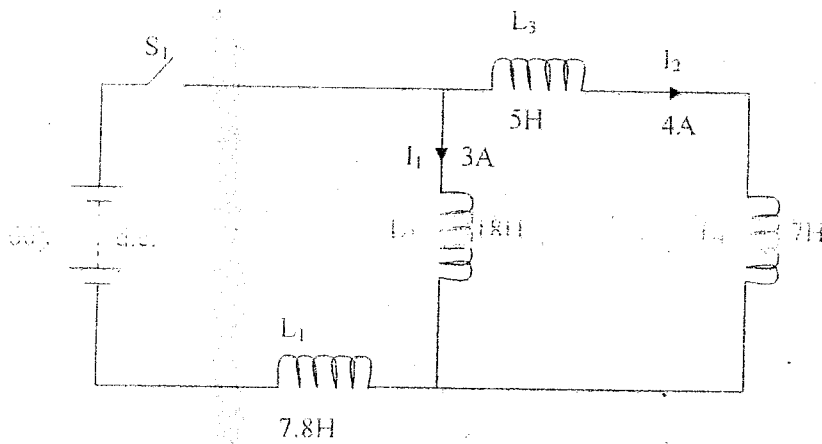


FIGURE 1

(b) List two applications of each of the following devices;

[4marks]

- (i) Electromagnets,
- (ii) Series motor,
- (iii) resistance start induction run motor,
- (iv) Shunt motor.

(iv) An earth lead.

8. (a) A multi-range meter movement has a full scale current of 0.9mA and a resistance of  $40\Omega$ . Calculate the; [6marks]

(i) Shunts enable the meter measure 100mA, 1A and 2A.

(ii) Multipliers to enable the meter measure 5V, 10V and 50V.

(iii) Draw the two multi-range meters.

(b) State two functions of using each of the following devices; [2marks]

(i) Choke in fluorescent lamps,

(ii) Capacitors in fluorescent lamps.

(c) Explain the following terms used in discharge lamps.

[1marks]

(i) Cold cathode,

(ii) Hot cathode.

7. (a) An ac/dc radio was observed to operate from dc batteries but not from live ac mains.

Outline four possible causes of the problem:

[2marks]

(b) Sketch a complete circuit diagram showing the connection of a forward bias and reverse bias P-N junction.

[2marks]

(c) State the purpose of the following.

[2marks]

(i) An earth electrode,

(ii) An armouring,

(iii) An earth continuity conductor.

(c) State the meaning of the following;

[2marks]

- (i) Fusing factor,
- (ii) Current rating,
- (iii) Earth lead,
- (iv) Earth electrode.

9. (a) Draw a labeled line diagram of the grid system and indicate all the voltages.

[4marks]

(b) List **three** characteristics of each of the following;

[3marks]

- (i) Parallel circuits,
- (ii) Series circuits.

(c) List three advantages of each of the following;

[3marks]

(i) Dc over ac,

(ii) Single phase over three phase.

10 (a) Figure 2 below show a voltage divider. Calculate;

[5marks]

(i) The source emf,

(ii) Power dissipated by resistors  $R_4$  and  $R_6$ .

(iii) Energy consumed by resistors  $R_3$  and  $R_7$  after working for 45minutes.

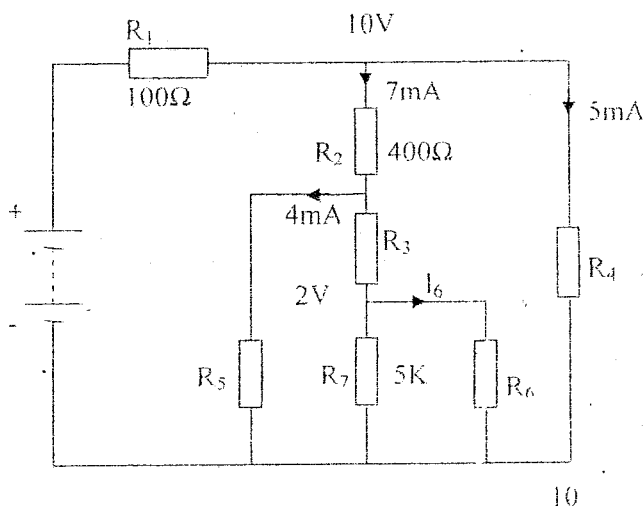


Figure 2



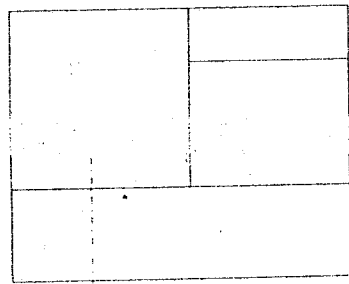
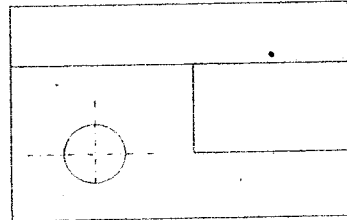
(b) With the aid of a labeled circuit diagram, describe the construction and operation of a magnetic pick - up. [4marks]



(c) Explain how the depletion layer is formed in a P - N junction diode. [2marks]



11.(a) Two views in figure 3 of a machine plate are drawn in 3<sup>rd</sup> angle orthographic projection.  
Draw an oblique pictorial view. Make edge y– y the lowest point. [4marks]



Y

Y

Figure 3