2021

ELECTRONICS — GENERAL

Paper : SEC-B-1

(Electrical Circuits and Network Skills)

Full Marks : 80

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer ***question no.*** **1** and ***any six*** questions from the rest.

1. Answer ***any ten*** questions : 2×10

(a) State Ohm's Law.

(b) Define Inductance.

(c) Draw the circuit diagram of a full wave bridge rectifier using diodes.

(d) What is a capacitor?

(e) List different types of capacitors.

(f) What is a Rectifier?

(g) What is the role of filter in a rectifier circuit?

(h) Why is transformer generally used in the rectifier circuits?

(i) What is meant by Ideal Voltage Source?

(j) Give the significance of back emf in a DC Motor.

(k) Explain what happens when a DC Motor is connected across an AC supply.

(l) State the applications of series DC Motor.

(m) State the applications of shunt DC Motor.

(n) State the condition for Maximum Efficiency of a DC Generator.

(o) Why is the transformer rating expressed in KVA?

2. (a) What is voltage sensitivity?

(b) What are the basic features of analog and digital multimeter?

(c) Explain the operations of a basic DC Ammeter. 2+(2+2)+4

3. (a) List out the various starting methods of a three phase induction motor.

(b) Why is starter necessary for a DC Motor? Give relevant expression.

(c) State the characteristics of DC Motor. 4+(2+2)+2

4. (a) Three equal resistors each of R Ω are connected in delta network. Derive the value of resistors in the equivalent star circuit.

(b) What are the essential requirements of a measuring instruments? 5+5

5. (a) Write the torque equation of DC Motor and explain.

(b) Derive the induced emf equation of a DC Generator. 5+5

6. (a) What is an Ideal Transformer?

(b) What are transformer losses?

(c) Name the various types of transformer losses.

(d) Why is the current in the transformer secondary should not be open when there is current flowing in the primary coil of the transformer? 2+2+3+3

7. (a) What is the difference between circuit breaker and isolator?

(b) Name the types of overload relay.

(c) What is the function of circuit breaker?

(d) What is Ground Fault Protection? 4+2+2+2

8. (a) What is a Relay? What is it used for?

(b) Name any two types of Relay.

(c) State two applications of Relay.

(d) What is a Fuse? (2+2)+2+2+2

9. (a) What is Ladder Diagram? What is it used for?

(b) What is use of control circuits?

(c) Explain the operation of a Full Wave Bridge Rectifier Circuit. (2+2)+2+4

10. (a) Name the different types of cables used in electrical wiring.

(b) What is a Voltage Drop?

(c) Explain how do we measure power in a DC circuit. 4+2+4

11. (a) What is the difference between single phase and three phase power supplies?

(b) Explain with a neat sketch how speed control of a DC Motor is done.

(c) Define commutation. 4+4+2

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2021

ELECTRONICS — GENERAL

Paper : SEC-B-2

(Technical Drawing)

Full Marks : 80

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Group - A

1. Answer ***any ten*** questions : 2×10

(a) What is RF?

(b) What are the differences between a Vernier and Diagonal scale?

(c) What is a conic section?

(d) Differentiate between picycloids and hypocycloid.

(e) Define directing circle.

(f) Define an involute.

(g) Name two systems of projection.

(h) Define vertical trace of a line.

(i) What is a regular polyhedron?

(j) How many faces does a octahedron and dodecahedron have?

(k) Define the axis of a pyramid.

(l) Define frustrum.

(m) What is truncated solid?

Group - B

Answer ***any six*** questions.

2. Construct a Diagonal scale of 1 : 5000 to show single metre and long enough to measure 300 meters. Mark on the scale a distance of 285.5 meters. 10

3. A circle of 60 mm diameter rolls on a horizontal line for half a revolution clock-wise and then on a line inclined at 60 degrees to the horizontal for another half, clock-wise. Draw the curve traced by a point P on the circumference the circle, taking the top most point on the rolling circle as generating point in the initial position. 10

4. A thin rectangular plate of sides 40 mm × 20 mm has its shorter side in the HP and inclined at an angle of 30º to VP. Project its front view when its top view is a perfect square of 20 mm side. 10

5. A cone of base 55 mm diameter and axis 65 mm long, rests with its base on HP. A section plane perpendicular to both HP and VP cuts the cone at a distance of 8 mm from its axis. Draw its top view, front view and sectional side view. 10

6. A cylinder of diameter of base 60 mm altitude 80 mm stands on its base. It is cut into two halves by a plane perpendicular to the VP and inclined at 30° to HP. Draw the development of the lower half. 10

7. A rectangular prism 30 × 20 × 60 mm lies on HP on one of its largest faces with its axis parallel to both HP and VP. Draw its isometric projection. 10

8. Draw the isometric projection of a square prism side of base 60 mm height 50 mm surmounted by a square pyramid whose base coincides with the top of the prism and whose height is 60 mm. 10

9. A hexagonal lamina of 25 mm side stands vertically on the ground plane and inclined at 50° to PP. The comer nearest to PP is 20 mm behind it. The station point is 45 mm in front of PP, 50 mm above the ground plane and lies in a central plane, which passes through the centre of the lamina. Draw the perspective view. 10
