Instructions: (1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Section - A

1. Attempt any SIX of the following: [12]
   (a) State Lenz’s law.
   (b) State alternating emf with mathematical and graphical representation.
   (c) Explain the following terms EMF, Current, Potential Difference, Power and Energy.
   (d) Define average value of an A.C.
   (e) State relation between phase and line current and voltages in a balanced star connection.
   (f) What are the different types of power in AC circuit? Explain.
   (g) Define frequency and time period of an alternating quality.

2. Attempt any THREE of the following: [12]
   (a) Draw power triangle. Write equations for different powers in power triangle.
   (b) Compare Electric and Magnetic Circuits.
   (c) The equation of an alternating current is $i = 62.35 \sin 628t$.
      Determine: (i) Frequency (ii) Time period
      (iii) Maximum value (iv) Angular velocity
   (d) Draw and explain B – H curve.

3. Attempt any TWO of the following: [12]
   (a) A capacitor of 30 µf is connected in series with resistor of 120 Ω. The circuit supplied with AC supply of 230 V, 50 Hz. Determine:
      (i) Capacitive reactance (ii) Impedance (iii) Current
      (iv) Circuit power (v) Power factor
      Draw circuit diagram.
   (b) Derive emf equation of transformer. State effect of frequency of supply on working of transformer.
   (c) Compare auto transformer with two winding transformer (any four).
Section - B

4. Attempt any FIVE of the following:
   (a) Calculate following resistor using colour coding:
       (i) Brown Black Red Silver
       (ii) Red Orange Black Gold
   (b) Define Active component. Give two examples.
   (c) Draw the symbol of PN-junction diode and give two applications
   (d) Draw the symbols of PNP and NPN transistor.
   (e) Draw the symbol of ideal voltage source and ideal current source.
   (f) Define $\alpha$ and $\beta$ of a transistor.

5. Attempt any THREE of the following:
   (a) Differentiate active and passive electronic components on any four points.
   (b) Related to P-N junction diode:
       (i) Draw symbol
       (ii) Draw forward characteristic
       (iii) Give direction of current
       (iv) Give one application
   (c) What are applications of LED?
   (d) Write short note on BJT Construction.
   (e) Explain with neat diagram how transistor can be used as a switch.

6. Attempt any TWO of the following:
   (a) What are the advantages of Integrated Circuits and What are the limitations of ICs?
   (b) Compare Half And Full Wave Rectifiers.
   (c) Draw the diagram of transistor operating regions.

S.Y. Diploma Sem-III: Paper Discussion Schedule

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<tr>
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<tr>
<td>Mechanical Group &amp; Civil Group</td>
<td>6 Nov. 2019</td>
<td>Wednesday</td>
<td>8 a.m. to 9 a.m.</td>
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<td>6 Nov. 2019</td>
<td>Wednesday</td>
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