

Time: 3 Hrs

Marks: 80

- Note:-
1. Question No. 1 is compulsory
  2. Attempt any three questions out of remaining five questions
  3. Assume suitable data if necessary & justify the same
  4. Figures to the right indicates marks

**Qu.1** Attempt any Four.

- (a) Explain Kando system of track electrification. What are the advantages and disadvantages of Kando system? [5]
- (b) State and explain the factors affecting to schedule speed [5]
- (c) Discuss the various protection schemes at traction substation. [5]
- (d) Explain the working of Pantograph collector. Give its advantages [5]
- (e) Explain block section concept. [5]

**Qu.2 (a)** Derive the equation for maximum speed in simplified trapezoidal speed-time curve. [10]

- (b) A Speed-time curve of a train consists of:
1. Uniform acceleration of 5 Km/Hr/sec for 20 sec.
  2. Free running for 20 minutes.
  3. Uniform deceleration of 6 Km/Hr/sec.
  4. A stoppage of 5 minutes.
- [10]

Calculate (1) Distance between stations (2) Average speed (3) Schedule speeds

**Qu.3 (a)** Discuss the operation of DC traction using chopper control drive. [10]

- (b) State the desirable characteristics of traction motor. How DC series motor are suitable for traction drive? Justify [10]

**Qu.4 (a)** Explain the feeding and sectioning arrangements with circuit diagram. [10]

- (b) Describe the working of booster transform in traction system. Also state the limitation of booster transformer [10]

**Qu.5 (a)** Discuss the design consideration of catenary wire in traction system. [10]

- (b) Explain the working of Automatic Weight Tension and Automatic Tensioning Device [10]

**Qu.6 (a)** What is Interlocking Principle? Explain various Techniques of interlocking. [10]

- (b) Derive an expression for specific energy output on a level track using simplified time- speed curve [10]

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