

Time: 3 Hours

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. | Marks |
|-----------------|--|--------------|
| (a) | Discuss advantages of Electric traction over other system of traction. | [5] |
| (b) | Draw speed time curve of urban and suburban services | [5] |
| (c) | How DC series motor is most suitable for traction? Discuss | [5] |
| (d) | Write a brief note on sectionalizing paralleling post | [5] |
| (e) | Write a note on Kando system | [5] |
| Qu.2 (a) | Draw trapezoidal type speed time curve and derive the expression for distance travelled. | [10] |
| (b) | Draw 132/25 KV traction substation layout and discuss its operation in detail | [10] |
| Qu.3 (a) | Discuss the operation of DC traction using chopper controlled drive | [10] |
| (b) | Explain booster transformer with return conductor in detail. | [10] |
| Qu.4 (a) | Discuss the protection provided for transformer & overhead lines in traction . | [10] |
| (b) | Define the Tractive efforts. Derive the expression for total tractive efforts | [10] |
| Qu.5 (a) | An electric train weighing 500 tonnes climbs up gradient with $G = 8$ and with following speed time curve | [10] |
| | <ol style="list-style-type: none"> 1. Uniform acceleration of 2.5 kmphs for 60 sec 2. Constant speed for 5 min 3. Coasting for 3 min 4. Dynamic braking at 3 kmphs to rest | |
| | Train resistance is 25 N/tonne, rotational inertia effect 10% and combined efficiency of transmission motor & power modulator is 80 %. Calculate the Specific energy consumption | |
| (b) | Explain the operation of power and auxiliary circuits use in traction | [10] |
| Qu.6 (a) | Discuss the current collection techniques used in overhead and underground system | [10] |
| (b) | Write a short note on DC and AC Track circuits | [10] |
