

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 <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	[10]
(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]
