Assignment-II (2018-19) on Electric Traction

UEE (EE/EL-444)

1. Explain the various types of electric traction system and services in railways. Give a short overview of overhead supply system adopted in the Indian Railways and major traction components for propulsion of train. What are the advantages & disadvantages of ac system over dc system. Explin the supply system adopted in Kando railway system.
2. Explain Adhesion weight, Dead weight and acceleration weights of Train. Define and explain the significance of adhesion co-efficient in railway traction.
3. Explain the typical speed-time characteristics of train considering the stages of rheostatic acceleration, acceleration on speed, free running, coasting and braking. How the distance is measured between the two stops from the curve. Draw the simple geometric speed-time characteristic curves for main line, suburban and urban services. How do you compute specific energy consumption in propelling the train.
4. Discuss the various electric braking principles in stopping the train with their merits and demerits.
5. How do you determine the total tractive effort for propulsion of train. Explain the essential requirements and features to be considered while selecting traction motors? Explain the traction motor control mechanisms for DC series motors, ac single phase and 3-phase induction motors.
6. Briefly discuss Buck-boost control , micro-processor control, thyristor control, principle of metadyn, phase converter and cycloconverter , principle of linear motors and magnetic traction in the propulsion of train.
7. The distance between two stations is 1.92kms.The scheduled speed and the duration of stops respectively are 40kmph and 20sec. Assume the quadrilateral approximation of the speed-time curve and the coasting and braking retardation as 0.16kmphps and 3.2kmphps respectively. Determine the acceleration if the speed at the end of the accelerating period is 60.8kmph.Find also the duration of the coasting period.
8. A train service consists of uniform acceleration of 1kmphps for 2 minutes, Free running for 30 minutes, Coasting for 2 minutes at a deceleration of 0.1kmphps,and Uniform braking at 1.2 kmphps to stop the train. Stopping time 5 minutes. Calculate (i) Distance between the stations and (ii) the scheduled speed.
9. An EMU train weighing 1000T accelerate to a speed of 90kmph at uniform acceleration of 0.50m/sec2, runs at a constant speed of 90 kmph for 60 seconds, coasts upto speed of 72kmph. From here brakes are applied and train stops within 20 seconds. Draw the trapezoidal curve of the train run and the energy consumed during the run. Calculate the energy regenerated if the same is effective upto a speed of 15kmph. Assume average train resistance of 5T during acceleration and 10T during constant speed and coasting; negligible during braking.
10. A ... train travel down a gradient ... for