Type: DES

Q1. Define automotive driveline system. Differentiate the powertrain, drivetrain and driveline systems in automobiles. (3)

Q2. With a neat sketch, explain the features of a front north-south mounted engine and rear wheel drive automotive drive line system. (3)

Q3. How the automobiles are classified based on modes of operations they meant for? With examples, briefly discuss features of such vehicles. (4)

Q4. Determine the diameters for a hollow propeller shaft for an automobile drivetrain in which the engine is developing 30 kW at 1500 rpm. Low Gear Ratio= 3.2:1, ratio of diameters of shaft=1.8. shear stress for the shaft material = 560×10^5 N/m^2

(3)

Q5. With a neat sketch, explain the working principle of a Hook's joint. What are its merits and demerits? (3)

Q6. What are the functions of final drives? With a relevant diagram, illustrate the principle of working of a differential. (4)

Q7. Two shafts whose axes are inclined at 20^0 are connected by means of a Hook's joint. The driving shaft rotates uniformly at 5000 rpm. What are the max, min velocities of driven shaft? (3)

Q8. With a relevant sketch, illustrate a double reduction final drive system with both stages at the center of the axle (spur gears ahead of bevel gears type) for heavy duty vehicles. (3)

Q9. Discuss the working of a third differential operation in tandem axle drive systems with worm and wheel Final Drives. (4)

Q10. An engine develops 30 kW at 2000 rpm, when the torque developed is maximum. The bottom G R is 3:1 and Final Drive Ratio is 4.5:1. Diameter of road wheel is 700 mm. Coe of adhesion between tyres and road surface is 0.6. If the permissible stress in the material of the shaft is not allowed to exceed 2270×10^4 Pa, find the diameter of shaft.

(3)

Q11. Illustrate the principle of working of a mechanically operated differential lock system.
(3)

Q12. With a layout diagram, illustrate the features of a driveline system and basic modes of working of a four-wheel drive with transversely mounted engine. (4)

Q13. With a relevant sketch, explain the working of a six-speed dual clutch transmission system. (3)

Q14. Discuss the constructional of the belts used in continuously variable transmission systems. (3)

Q15. Differentiate the following:

(i) Full time four-wheel drive and part-time four-wheel drive systems

(ii) Clutch controlled PTO and Engine controlled PTO

(iii) Semi floating axle and full floating axle

(iv) Worm-wheel final drive and Bevel gear final drive (4)