VIT
Vellore Institute of Technology

Final Assessment Test – November 2019

Course: MEE2039 - Automotive Transmission Systems
Class NBR(s): 0761
Time: Three Hours
Slot: F1
Max. Marks: 100

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS EXAM MALPRACTICE

PART – A (10 X 5 = 50 Marks)
Answer ALL Questions

1. Explain the working of fluid coupling with the help of a performance curve.
2. Discuss the various factors which influence the rolling resistance of a vehicle.
3. A 1.5 ton weigh vehicle is traveling up a hill of slope 1 in 4 at a speed of 45 Km/hr. The road resistance is 11 N/ton and there is a tail wind of 12.8Km/hr. If the frontal area of car is 1.67 sq.m. and coefficient of air resistance 0.00375, calculate the power required to propel the car.
4. Why do we need synthetic transmission oils?
5. What is meant by 'double declutching' and 'synchronising' in a manual transmission?
6. A gear box with three speeds forward and one reverse is to provide the speed reduction as follows : top speed 5.5 : 1 , intermediate 8.8 : 1 , low 16.5 : 1 , reverse 19.8 : 1 with a constant reduction fires at the rear axle. Assuming that the smallest pinion has not less than 15 teeth and speed of lay shaft is half of the main driving shaft. Find the suitable number of teeth for different wheels.
7. Discuss the merits and demerits of ward Leonard electric drive system.
8. Differentiate between the hydrostatic and hydrodynamic transmission system.
9. Compare in terms of shift quality, performance, size and fuel consumption of CVT and manual transmission.
10. Write short notes on Tiptronic semi-automatic transmission system.

PART – B (5 X 10 = 50 Marks)
Answer any FIVE Questions

11. Describe the ways spoilers, air dams and diffusers reduces the drag forces with a simple sketches.
12. Determine the gear ratios of a four speed gearbox for vehicle of weight 1360 kg powered by an engine giving 21 kW at 1800 rpm. The vehicle has a frontal area of 2.23 m^2 and has a wheel diameter of 71 cm. The maximum gradient that the car has to negotiate is 1 in 4. The coefficient of rolling and air resistance is given by 0.022 and 0.00375. Assume transmission efficiency is 75% and that at top gear, the car is expected to go over a grade of 1 in 40.
13. Sketch and explain the performance characteristics of the three stage torque converters.
14. Explain with a simple sketch, how a gear change is made in a dual clutch semi-automatic transmission system?
15. Compare the transient performance of a series and parallel hybrid vehicle with suitable sketches.
16. Describe the working principle of Janney hydrostatic drive with a simple sketch.
17. Sketch a Wilson gear box and explain its working principle.