



## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

**Sixth Semester, B.E. - Automobile Engineering**

**Semester End Examination; June/July - 2015**

**Automotive Transmission**

Time: 3 hrs

Max. Marks: 100

**Note:** i) Answer any **FIVE** full questions, selecting at least **TWO** full questions from each part.  
ii) Sketches should be drawn using pencil only.

### PART - A

1. a. Discuss different types of resistances encountered by moving vehicle. How can these resistances be minimized? 10
- b. The coefficient of rolling resistance for a truck, weighing 62293.5 N is 0.018 and coefficient of air resistance is 0.0276 in the formula  $R = kW + k_a A.v^2$ , N. where A is m<sup>2</sup> of frontal area and V the speed in kmph. The transmission efficiency in top gear of 6.2:1 is 90% and that in second gear of 15:1 is 80%. The frontal area is 5.574 m<sup>2</sup>. If the truck has to have a maximum, speed of 88 kmph in top gear. Calculate; 10
  - (i) The engine BP required
  - (ii) The engine speed if the driving wheels have an effective diameter of 0.8125 m
  - (iii) The maximum drawbar pull available on level at the above engine speed in second gear.
- 2 a. Discuss the factors affecting the power transmission in case of a clutch. 4
- b. List out the requirements of good clutch facing. 4
- c. Sketch and explain the characteristics of semi-centrifugal clutch. 12
- 3 a. Sketch and explain the construction, working principle of fluid flywheel. 10
- b. A motor car engine develops 5.9 kW at 2100 rpm. Find the suitable size of clutch plate having friction linings riveted on both sides to transmit the power, under following conditions. 10
  - (i) Intensity of pressure on the surface not to exceed  $6.87 \times 10^4$  Pa.
  - (ii) Slip torque and losses due to wear etc is 35% of engine torque.
  - (iii) Coefficient of friction on contact surface is 0.3.
  - (iv) Inside diameter of friction plate is 0.55 times the outside diameter.
- 4 a. How a torque converter is different from fluid fly wheel? 5
- b. Discuss the performance characteristics of torque converter. 5
- c. Sketch and explain the working of torque converter. 10

**PART - B**

- 5 a. Discuss the types of transmission. 3
- b. Sketch and explain the working of synchromesh gear box. 12
- c. In a gear box, the clutch shaft, pinion has 14 teeth and low gear main shaft pinion 32 teeth. The corresponding lay shaft pinions have 36 and 18 teeth. The rear axle ratio is 3.7:1 and the effective radius of the rear tyre is 0.355 m. Calculate the car speed in the above arrangement at an engine speed of 2500 rpm. 5
6. a How do you obtain the gear reduction and direct drive in planetary transmission? Explain with neat sketches. 10
- b. Sketch and explain the working of overdrive. 10
- 7 a. With the help of line diagram, explain the working of Automatic transmission. 10
- b. Explain the layout of an electric transmission system with their limitations. 10
8. Write short notes on any four of the following :
- (i) Draw bar Horse Power
  - (ii) Dry clutches and wet clutches
  - (iii) Gear selector mechanism
  - (iv) One way clutch
  - (v) Principles of torque multiplication in torque converters.
- 20

\* \* \* \* \*