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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Sixth Semester, B.E., - Automobile Engineering
Semester End Examination; June - 2017
Automotive Transmission

Time: 3 hrs *Max. Marks: 100*

Note: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.
ii) Missing data may suitably be assumed.

UNIT - I

1 a. Explain with neat sketch, the working principle of a single plate clutch. | 10

   b. A multi plate clutch is to be designed for a motor cycle which engine develops maximum torque of 13 Nm at 3500 rpm. The external diameter of the clutch facing is limited to 100 mm and the inner diameter may be assumed to be 0.2 times the external diameter. The maximum intensity of pressure may be taken as 80 kPa and $\mu = 0.3$. Calculate the number of plates. | 10

2 a. Explain with a neat sketch, the principle of operation of Electromagnetic clutch. | 8

   b. Discuss briefly the procedure of adjustment of clutch. | 6

   c. Explain with a neat sketch, the principle of operation of Vacuum operated clutch. | 6

UNIT - II

3 a. Describe with neat sketch, the principle of operation of a fluid Fly wheel. | 10

   b. What are the characteristics of fluid Fly wheel? Mention the advantages and disadvantages of the same. | 10

4 a. With neat sketch, explain the principle of operation of a Single stage torque converter. | 12

   b. Differentiate between fluid coupling and torque converter. | 4

   c. Explain the principle of torque multiplication in a torque converter. | 4

UNIT - III

5 a. Explain the various resistances to motion of the automobile. | 8

   b. The coefficient of rolling resistance for a truck weighing 62293.5 N is 0.018 and the coefficient of air resistance is 0.0276 in the formula $R = k_W + k_a AV^2$. Where 'A' is frontal area in m^2, and 'V' is the speed in kmph. The transmission efficiency in top gear of 6.2:1 is 90% and that in the second gear of 15:1 is 80%. The frontal area is 5.574 m^2. If the truck has to have a maximum speed of 88 kmph in top gear. Calculate; | 12

i) The engine BP required.

ii) The engine speed if the driving wheels have an effective diameter of 0.8125 m

iii) The maximum grade the truck can negotiate at the above engine speed in the second gear

iv) The maximum draw bar pull in 2nd gear.

6 a.	Explain with neat sketch the principle of operation of a Synchro mesh gear box.		10
b.	What is the principle of CVT? What are the advantages and disadvantages of CVT?		10

UNIT - IV

7 a.	Explain with neat sketch the epicyclic gear train for Wilson gear box.		10
b.	Sketch and explain the construction and working of Ford T-Model gear box.		10
8 a.	What is overdrive? Explain with neat sketch the electric circuit for the control of the overdrive.		10
b.	Explain the principle of operation of a vacuum, pneumatic and hydraulic control of planetary gear system.		10

UNIT - V

9 a.	What is Automatic transmission? What is the principle of Automatic transmission?		8
b.	With neat sketch explain the principle and working of Borg-Warner Automatic transmission.		12
10 a.	Explain with neat sketch the working principle of longitudinally mounted four speed Automatic transmission.		10
b.	Explain with neat sketch the gear system of Hydromatic Transmission.		10

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