CBCS SCHEME

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Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
Automotive Transmission

Time: 3 hrs. Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a. Discuss in detail the requirements of a clutch. **(06 Marks)**
    b. An Automobile clutch has a clutch plate of 160mm inside and 240mm outside diameters. Six springs in the clutch provide a total force of 4.8kN, when the clutch is new and each spring is compressed 5mm. The maximum torque developed by the automobile engine is 250Nm. Determine:
       i) factor of safety for the new clutch
       ii) the amount of wear of the clutch facing that will take place before the clutch starts slipping.
       Assume $\mu = 0.3$. **(10 Marks)**

OR

2   a. With a neat sketch, explain the construction and working of single plate clutch. **(08 Marks)**
    b. Determine the size of the clutch plate suitable for an ford car employing a single plate type of friction clutch and developing 37.5kW at 4200 rpm. The inside diameter of the clutch plate is 0.6times its outside diameter and it is to be ensured that even after a loss of 30% of the engine torque due to wear of the clutch facing. The clutch does not slip. The intensity of pressure on the facing is not to exceed 70KPa. Assume $\mu = 0.3$. **(08 Marks)**

Module-2

3   a. Discus in detail fluid coupling characteristics. **(08 Marks)**
    b. With suitable figure, explain one way clutch. **(08 Marks)**

OR

4   a. With suitable figure, explain the construction and working of torque converter. **(10 Marks)**
    b. With a suitable graph, explain the performance of a torque converter. **(06 Marks)**

Module-3

5   a. With a suitable graph, explain Acceleration Gradability and Draw bar pull. **(08 Marks)**
    b. For typical motor car, the road resistance is given by 23N per 1000N, the air resistance by the expression $0.0827V^2$, transmission efficiency 88% in top speed, car weighs 19934N when fully loaded. Calculate:
       i) The brake power required for a top speed of 144km/hr
       ii) The acceleration in m/s^2 at 48km/hr, assuming the torque at 48km/hr in the top gear 25% more than at 144 km/hr
       iii) The brake power required to drive the car up a gradient of 1 in 5 at 48km/hr, transmission efficiency 80% in bottom gear. The resistance being in N and V the speed in km/hr and $g = 9.81$ m/s^2. **(08 Marks)**

OR

6 a. With a neat sketch, explain the construction and working of constant mesh gear box.
   (08 Marks)
   b. With suitable graph, explain the performance characteristics in different gears. (08 Marks)

Module-4

7 a. With a neat sketch, explain the working of overdrive. (08 Marks)
   b. With a neat sketch, explain the working of Wilson Planetary Transmission. (08 Marks)

OR

8 In an epicyclic gear train Pinion A has 15 teeth and is rigidly fixed to the motor shaft. The wheel B has 20 teeth and gears with A and also with the annular fixed wheel D. Pinion C has 15 teeth and is integral with B-C (compound gear wheel). Gear C meshes with annular wheel E, which is keyed to the machine shaft. The arm rotates about the same shaft on which A is fixed and carries the compound wheel B-C. If the motor runs at 1000rpm, find the speed of the machine shaft. Find the torque exerted on the machine shaft, if the rotor develops a torque 98.1Nm. (16 Marks)

Module-5

9 a. With a neat sketch, explain the working of variable displacement pumps and constant displacement motor. (08 Marks)
   b. With a neat sketch, explain the working of plunger type pump and plunger type motor.
   (08 Marks)

OR

10 a. With a neat sketch, explain the working of Borge – Warner gear box. (08 Marks)
    b. List out the advantages, limitations and applications of Automatic Transmission. (08 Marks)

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