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**B. E. (Seventh Semester) Examination,
April-May 2020**

(New Scheme)

(Mech. Engg. Branch)

AUTOMOBILE ENGINEERING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Solve all five questions. Part (a) of each question is compulsory and attempt any two from parts (b), (c) and (d). Explain your answers with the help of neat and labelled diagram.

Unit-I

1. (a) Why is the frame is narrowed at the front? 2
- (b) Describe the chassis layout and write the functions of its main components. 7

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- (c) What are the functions of a suspension system? Give the description of a telescopic damper, with neat sketches. 7
- (d) Describe the MacPherson strut assembly of a independent suspension system. What are the specific advantages of MacPherson System? 7

Unit-II

2. (a) Why is clutch placed between the flywheel and transmission? 2
- (b) How are the clutches classified? Describe briefly the construction and working of a single plate clutch. 7
- (c) Describe briefly the parts of a clutch plate. Write any 4 requirements of a good clutch facing. 7
- (d) Describe the construction and working of a fluid flywheel. 7

Unit-III

3. (a) What purpose are served by a gear box in an automobile? 2

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- (b) How are the constant mesh transmission arranged for obtaining torque changes? Discuss the advantages of a constant mesh gear box over a sliding mesh type. 7
- (c) Explain the principle and working of a torque convertor. Discuss its advantages and disadvantages. 7
- (d) The engine of a jeep is known to be able to provide 40.5 kW for propulsion purpose. In a certain application, the jeep weighing 12459 N is required to pull a trailer of gross weight 10673 N at a speed of 57.75 km/h in top gear on level. The resistance to motion is given by the equation $R = aW + bV^2$, where $a = 0.016$ and $b = 0.055$, W is in N and V in km/h. Find out if the jeep is adequate for the job, if the transmission efficiency is 90%. What is the pull in the coupling at this speed? If the available power is just utilised in top gear by suitably loading the trailer, what is the pull in the coupling at 57.75 km/h? 7

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Unit-IV

4. (a) What is the function of slip joint and universal joint in propeller shaft? 2
- (b) Explain the necessity of a differential in an automobile. Discuss in detail the construction and operation of differential. 7
- (c) Explain construction, working and advantages of Hutchkiss Drive. 7
- (d) Draw a simple diagram to show the layout of a hydraulically operated brake system and explain its working. Explain in brief the working of master cylinder. 7

Unit-V

5. (a) What is known as shimmy in a steering system? 2
- (b) State the requirements of a good steering system. Draw the layout of a steering system and label the various parts. Also explain its working. 7
- (c) Write short notes on the following : 7

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- (i) Camber
- (ii) King pin inclination
- (iii) Toe in and toe out
- (d) Draw a neat sketch of electrical system of a modern car and explain the salient features of it. 7