Sub Code: RME702

Paper Id: 140730 Roll No: | | | | | | | | | | | | | |

B. TECH.
(SEM VII) THEORY EXAMINATION 2019-20
AUTOMOBILE ENGINEERING

Time: 3 Hours *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a. Enumerate the main components of an automobile.

b. An engine develops 10 kg-m torque at 2500 rpm. If gear ratio in gear box is 2.1:1 and speed ratio at differential is 5:1, find the torque at driving wheels and speed of propeller shaft.

c. Enlist various types of gear boxes used in automobiles.

d. Give a broad classification of brakes.

e. Briefly mention the functions of a carburettor.

f. What are the main components of steering system of an automobile?

g. How is CNG better fuel than diesel from the view point of pollution?

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a. Explain the construction of fluid flywheel with the help of a neat sketch.

b. A single plate friction clutch has outer diameter of the clutch plate 1.2 times the internal diameter. Make calculations for the dimensions of the clutch plate and axial force provided by the springs. Assume uniform wear, friction coefficient as 0.35 and maximum allowable pressure intensity not to exceed 70 kPa.

c. How are constant mesh transmissions arranged for obtaining torque changes? Discuss the advantages of constant mesh gear box over the sliding mesh type.

d. What is perfect steering? Derive expression for the basic condition for a perfect steering mechanism.

e. What are the advantages of an alternator over the d.c. generator?

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Describe 'semi floating', 'full floating' and 'three quarter floating' types of rear axle mounting methods.

(b) The angle between the axes of two shafts connected by Hooke's joint is 18°. Determine the angle turned through, by the driving shaft when the velocity ratio is maximum and when unity.

4. Attempt any *one* part of the following: **7 x 1 = 7**

(a) What is sprung mass and unsprung mass? Why is the sprung mass kept as low as possible? https://www.aktuonline.com

(b) How does the independent suspension system differ from the rigid axle suspension system?

5. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Compare the constructional and operational aspects of disc and drum brakes in automobiles.

(b) Draw a layout of hydraulic braking system of an automobile and explain its working.

6. Attempt any *one* part of the following: **7 x 1 = 7**

(a) How many types of steering gears do you know? Explain working of rack and pinion type of steering gear.

(b) Explain emission standard for pollution control. Describe Euro-II norms for passenger cars.

7. Attempt any *one* part of the following: **7 x 1 = 7**

(a) State the necessity of alternate fuels for automobile engines and describe characteristics of such fuels.

(b) What are catalytic converters? How are they helpful in reducing HC, CO and NO_x emissions?