B.E./B.TECH. Degree Examination, December 2020

Fourth Semester

AE16401 -AUTOMOTIVE CHASSIS

(Regulation 2016)

Time: Three hours Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. Which is not correct about rack and pinion steering gear

   a) simple, light and responsive

   b) used in passenger cars

   c) has more linkages attached

   a) needs no maintenance

2. Multi-axle vehicles are the one which

   a) carry heavy goods or more passengers

   b) have a large flat platform

   c) have dummy axles

   d) all of the above

3. If the inside diameter, outside diameter of a hollow propeller shaft remains the same and the length of the propeller shaft is halved then the critical speed of the shaft is

   a) decreased by two times

   b) decreased by four times

   c) increased by two times

   d) increased by four times

4. A front stabilizer bar is used to

   a) increase vehicle load-carrying capacity

   b) provide a softer ride

   c) control suspension movement and body roll

   d) all of the above

5. Discuss the importance of ‘roll axis’ in a suspension.

6. Classify the cross sections of vehicle frame based on the mechanical strength.
7. Compare the design aspects of different types of rear axle.
8. A vehicle travelling at a speed of 80 kmph is stopped in a distance of 72 m after application of brakes. Assuming uniform deceleration for the vehicle find out the efficiency of brakes.

PART B - (4 x 16 = 64 marks)

9. (a) A vehicle has to travel through rough unconstructed roads and to climb hilly terrain. Discuss a suitable layout with a neat sketch for the above case along with its merits and demerits. **(16)**

(OR)

(b) Design a suitable steering system for a heavy vehicle with the following requirements: Less turning effort of the driver, easier to park, more laden weight, moderate jerking of the steering wheel during sudden front blow out of the front tyre. **(16)**

10. (a) Sketch and explain the types of real axle drive for a heavy vehicle which will withstand driving thrust, torque reaction, side thrust. **(16)**

(OR)

(b) Draw and explain a suitable mechanism which will adjust the speed of the driving wheels while taking a turn and at the same time prevent the slipping of the wheels when one of the wheels is on an icy/mud surface. **(16)**

11. (a) Indicate with valid reasons under what circumstances the shock absorber is required in the suspension system of a vehicle. Draw and explain the working of a shock absorber. **(16)**

(OR)

(b) Sketch and explain a suitable suspension system for a passenger car with a live front axle in such a way the tilting of one wheel does not affect other. Give valid reasons for the selection. **(16)**

12. (a) Draw the layout of a braking system suitable for passenger car application and explain in detail the various components with a neat sketch along with merits. **(16)**

(OR)

(b) Design a suitable system which will prevent the brakes from locking and the tyres from skidding on slippery pavement during a panic stop and provides better maneuverability. **(16)**