

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII • EXAMINATION – SUMMER 2013

Subject Code: 171902**Date: 24-05-2013****Subject Name: Automobile Engineering****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Suspension system of a scooter is fitted with a helical coiled spring of free length 155mm. Due to a road jerk of 500 N, it compresses to length of 105 mm. If coil diameter has to be 8 times wire diameter of spring, design the spring. The maximum shear stress should not exceed 65 N/mm^2 . Take $G=85 \text{ MPa}$ calculate the spring stiffness and strain energy absorbed by it. **07**
- (b)** Daewoo Cielo GEL car has kerb weight of 970 Kg and wheelbase 2520mm. Its C. G. is 1250mm in front of the rear axle and 655mm above level of road. The coefficient of road wheels adhesion is 0.6, if the car is moving upward on road inclined at an angle of 25° with horizontal, calculate the load distribution on front and rear axles, the acceleration or retardation and stopping distance when, moving at 60kmph. **07**
- i. The front brakes are applied.
 - ii. Rear brake are applied
 - iii. All four brake are applied
- The seating capacity of vehicle is for 5 persons including the driver. Take weight of each person is 600 N.
- Q.2 (a)** Explain the following: **07**
- i. Resistance to the motion of the vehicle and power required for propulsion of the vehicle,
 - ii. Power required for acceleration and effect of different drives like front wheel/rear wheel/for wheel drive
- (b)** Compare the following **07**
- i. Conventional frame with semi integral frame and unit frame.
 - ii. Bias ply tyre and radial tyre.
- OR**
- (b)** Explain the effect of various factors on the performance of a tyre. In respect, justify the importance of tyre rotation. **07**
- Q.3 (a)** With neat sketch explain construction and working of Master cylinder. **07**
- (b)** Draw neat sketches of following: **07**
- i. Worm and nut type steering gear,
 - ii. Ball joint,
 - iii. Different types of stub axles,
 - iv. Layout of compressed air brake system
- OR**
- Q.3 (a)** Explain following terms: pitching and rolling, bouncing and yawing, sprung and unsprung weight, soft and hard suspension. **07**
- (b)** Explain the mechanism of working of cooling water temperature gauge and **07**

lubricating oil pressure gauge.

- Q.4** (a) Compare the following **07**
i. Cone clutch and Single plate clutch
ii. Synchromesh and Constant mesh gear box
(b) Explain following terms relating to wheel geometry: castor, toe in –toe-out, scrub radius, camber. **07**

OR

- Q.4** (a) With neat sketch explain construction and working of shock absorber. **07**
(b) Sketch typical wiring diagram of modern car and explain function of each component briefly. **07**

- Q.5** (a) With neat sketch explain construction and working of lead acid battery. **07**
(b) Explain following terms and their salient features: servo brakes, booster brakes, anti lock brakes, anti skid brakes. **07**

OR

- Q.5** (a) Explain briefly the troubles and repair of engine part relating to cylinder head /cylinder block, crankshaft assembly **07**
(b) Write brief notes **07**
i. Electric vehicle
ii. Motor vehicle act

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