No. of Printed Pages : 2

BIME-012

01121

B.Tech. MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

December, 2013

BIME-012 : AUTOMOBILE ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions. All questions carry equal marks. Use of scientific calculator is **permitted**.*

1. (a) What are the desirable properties of good I.C. engines fuel ? Explain 'Octane Number' and 'Cetane Number'. 7+7

(b) A four-cylinder four stroke SI engine has a compression ratio of 8 and bore of 100 mm, with stroke equal to the bore. The volumetric efficiency of each cylinder is equal to 75%. The engine operates at a speed of 4800 rpm with an air fuel ratio 15.
Given that the calorific value of fuel = 42 MJ/kg, air density = 1.12 kg/m^3, mean effective pressure in the cylinder = 10 bar, and mechanical efficiency of the engine = 80%, determine indicated thermal efficiency and the brake power.

2. (a) State the differences in the knocking phenomena of SI and CI engines. Enlist various methods of controlling diesel knock. 7+7

(b) Draw a simplified wiring circuit for the lighting system of a car and discuss the same.

3. (a) What is a suspension system ? What are the functions of a suspension system ? List the requirement of a suspension system. 7+7

(b) "Battery is the heart of electrical system in an automobile"-Explain.

4. (a) Describe briefly the various types of friction materials linings used in clutches. What are the properties of a good clutch lining ? 7+7

(b) Discuss the classification of brakes for vehicles. Describe shoe and drum type mechanical brakes with the help of simple sketches.

5. (a) What is propeller shaft ? What are the functions of a propeller shaft in the transmission system of a vehicle ? 7+7

(b) What do you understand by the "ignition timing" ? Enumerate the various factors which affect ignition timings.

6. (a) What is the purpose of front axle ? Describe briefly "Electronic power steering" and MPFI system. 7+7

(b) What is engine 'tuning' ? Explain briefly the tuning procedure. Explain briefly 'trouble shooting of automobile'.

7. (a) List the points relating to preventive maintenance which should be kept in mind for smooth operation of an automobile vehicle. 7+7

(b) Explain briefly any two of the following :

(i) Conventional differential

(ii) Power-lock or Non-slip differential

(iii) Double reduction type differential

(iv) Eco-friendly vehicle

(v) Scope of liquid Nitrogen fuel vehicle in future