Department of Mechanical Engineering
Indian Institute of Technology Delhi

Minor Test-I (27/08/2016)
MCL-322 Power Train Design

M. Marks: 20

Time: 1 hour

Note: Attempt all the questions. Marks of each question are indicated in LHS. Any missing data may be suitably assumed.

Q.1 (a) Explain the components of vehicle's power train through schematic diagram with their functioning.

(b) Explain the functioning of the key components of IC engine. Why piston ring profile is important in saving the fuel and reducing the emissions?

(c) Provide break-up of energy in a typical IC Engine. Explain using π-chart.

(Marks: 3+3+2)

Q.2 (a) What are interference and under-cutting in gear-set. Explain with diagram.

(b) Derive the relation for minimum number of teeth on the gear for the given values of the gear ratio, pressure angle, and the addendum.

(c) Two 20^0 involute spur gears mesh externally for velocity ratio of 3. The module is 3 mm and the addendum is equal to 1.1 module. If the pinion rotates at 120 rpm, determine the (i) minimum number of teeth on each wheel to avoid interference; (ii) contact ratio.

(Marks: 2+5.5+4.5)