

**DIPLOMA IN MECHANICAL ENGINEERING/
ADVANCED LEVEL CERTIFICATE IN
MECHANICAL ENGINEERING
(DMEVI/ACMEVI)**

Term-End Examination

December, 2012

BME-033 : HEAT POWER TECHNOLOGY

Time : 2 hours

Maximum Marks : 70

Note : Answer question 1 and any four questions from Q. 2 to Q. 6. Use of scientific calculator is permitted.

1. Answer any seven questions from following objective (multiple choice) questions : **2x7=14**

(a) An engine cylinder has a dia. of 50 mm and stroke is 75 mm. If clearance volume is 21037.5 mm^3 the compression ratio is :

(i) 7.5 (ii) 8.0 (iii) 8.5 (iv) 9.0

(b) The speed of the crank of an engine varies between high of N_1 rpm and low of N_2 rpm. The mean crank shaft speed is N rpm. The coefficient of fluctuation of speed is defined as :

(i) $N_1 - N_2$ (ii) $\frac{N_1 - N_2}{2}$

(iii) $\frac{N_1 - N_2}{N}$ (iv) $\frac{N_1 - N_2}{2N}$

- (c) In a battery operated ignition system of petrol engine :
- (i) battery is directly connected to primary of coil.
 - (ii) battery is directly connected to rotary distributor
 - (iii) capacitor increases the current
 - (iv) rotary distributor increases the voltage.
- (d) The indicated power and power lost in friction of an engine cylinder are respectively 2.5 and 0.3 kW. The mechanical efficiency of the cylinder is :
- (i) 90% (ii) 88%
 - (iii) 85% (iv) 82%
- (e) Which test is used for determining the indicated power of a multi cylinder petrol engine ?
- (i) Heat balance (ii) Brake test
 - (iii) Morse test (iv) Motoring test
- (f) In which of the following power transmission devices friction plays no role ?
- (i) Chain drive (ii) V-belt drive
 - (iii) Rope drive (iv) Flat belt drive

- (g) Which of the following drives is compact and cheap ?
- (i) Gear drive
 - (ii) V-belt drive
 - (iii) Flat belt drive
 - (iv) Chain drive
- (h) For the same cylinder volume which engine has the largest stroke ?
- (i) Petrol engine
 - (ii) Gas engine
 - (iii) Light oil engine
 - (iv) Diesel engine
- (i) In a 2-stroke engine the charge enters the cylinder at a pressure which is :
- (i) greater than atmospheric
 - (ii) less than atmospheric
 - (iii) equal to atmospheric
 - (iv) either equal or less than atmospheric

2. At the shaft of a 4-cylinder, 4-stroke spark ignition engine a torque of 160 Nm is developed at 3000 rpm. The bore and stroke of the engine are equal and engine has a mechanical efficiency of 85%. The indicated mean effective pressure of all four cylinders is 960 kPa. Find bore and stroke. 14
3. (a) Sketch a 2-stroke engine and explain how it works ? 8
- (b) What advantages and/or disadvantages are associated with 2-stroke engine ? 6

4. (a) What is the process of carburetion ? Which fuels can undergo this process ? How is the reduced pressure obtained in passage of air fuel mixture ? 7
- (b) Name two ignition systems that are used to create spark in the spark plug. Which one does not use battery ? Sketch a spark plug. 7
5. (a) State the relation between tension on tight side and tension on slack side of a flat belt wrapping a pulley over an angle θ . Is the same relation applicable to V-belt and rope ? 6
- (b) A pulley of dia. 250 mm is run by a flat belt which can carry a maximum tension of 120N. The coefficient of friction between belt and pulley surface is 0.3 and angle of contact is 135° . Find torque on pulley. 8
6. (a) Name three governors. Sketch one of them. 7
- (b) A shaft to be fitted in hole is designated as $d = 120_{+0.144}^{+1.066}$ mm. The hole is designated as $D = 120_{+0.00}^{+0.035}$ mm. Find maximum and minimum diameters and interference.
-