

**DIPLOMA IN MECHANICAL ENGINEERING/  
ADVANCED LEVEL CERTIFICATE IN  
MECHANICAL ENGINEERING  
(DMEVI/ACMEVI) 01460**

**Term-End Examination  
June, 2012**

**BME-033 : HEAT POWER TECHNOLOGY**

*Time : 2 hours*

*Maximum Marks : 70*

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*Note : Answer five questions in all. Question no. 1 is compulsory. Answer four more questions from the remaining Use of scientific calculator is permitted.*

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1. Answer *any seven* objective (multiple choice) questions. **2x7=14**
- (a) Which engine works on dual combustion cycle ?
- (i) Light oil engine (ii) Heavy oil engine  
(iii) Petrol engine (iv) Gas engine
- (b) Theoretically the flywheel of a 2 - stroke engine in comparison with 4-stroke engine of same cylinder diameter, same stroke and same rpm will have :
- (i) Same mass at half the diameter  
(ii) Same mas at twice the diameter  
(iii) Same mass moment of inertia  
(iv) Half mass moment of inertia

- (c) In 2 - stroke engine at the end of expansion stroke :
- (i) exhaust port opens
  - (ii) inlet port opens
  - (iii) both exhaust and inlet ports open
  - (iv) inlet port closes
- (d) In a 4 - stroke engine the suction pressure is :
- (i) atmospheric
  - (ii) less than atmospheric
  - (iii) greater than atmospheric
  - (iv) either less or greater than atmospheric
- (e) In which case the quantity of fuel is varied but amount of air entering the cylinder remains unchanged ?
- (i) Qualitative governing
  - (ii) Quantitative governing
  - (iii) Both qualitative and quantitative governing
  - (iv) Hit and Miss governing
- (f) Choose the wrong statement. In comparison with 4 - stroke engine, a 2- stroke engine is characterized with :
- (i) less consumption of lubricant
  - (ii) smoother turning moment
  - (iii) elimination of friction work of suction and exhaust strokes
  - (iv) loss of unburnt fuel.

(g) The torque produced at the crank of the engine and angle turned by the crank are plotted on a graph. The constant mean torque at the crank is represented as a horizontal line. The area enclosed between the mean torque and varying torque is called :

- (i) indicated work
- (ii) brake work
- (iii) fluctuation of energy
- (iv) kinetic energy of flywheel

(h) Which is the correct combination to result in positive drive between driving and driven shafts ?

- (i) Flat and V - belts
- (ii) Chain and V - belt
- (iii) V - belt and gear
- (iv) Gear and chain

(i) Shaft of dia.  $9^{+0.010}_{+0.001}$  is to be fitted in a hole

of dia.  $9^{+0.015}_{+0.000}$ . The resulting assembly will have :

- (i) loose running fit
- (ii) close running fit
- (iii) transition fit
- (iv) interference fit

2. (a) Define indicated power and mean effective pressure of a cylinder of an I.C engine, How are these two quantities related ? 4

- (b) Define mechanical efficiency of an I.C. engine. 1
- (c) A cylinder of a petrol engine of 60 mm bore develops a mean effective pressure of  $0.654 \text{ N/mm}^2$ . 4 - stroke engine runs at 1000 r.p.m with piston stroke of 100 mm. Calculate the indicated power of the cylinder. 9
3. The power output of an I.C. engine is measured by a rope brake dynamometer. The diameter of brake pulley is 700mm and rope diameter is 25mm. The load on the tight side of the rope is 50kg mass and on the slack side spring balance reads 50N. Find brake power if engine is running at 900 rpm. What is indicated power if mechanical efficiency is 85% ? 14
4. (a) How is the fuel ignited in a diesel engine ? Describe the operation of a fuel injector. 7
- (b) Sketch the battery ignition system for a petrol engine and explain how a high voltage is obtained for creation of spark. 7
5. A pulley for flat belt having 1.0 m diameter is connected in a flat belt drive with another flat pulley of 0.5m diameter in (a) open and (b) crossed belt configuration. Find the length of belt in contact with pulleys and length out of pulleys in two cases. The centre distance is 1.5 m in both (a) and (b). 14

6. Why the engine is not able to produce a constant torque at the shaft. Define coefficient of fluctuation of speed and energy. Which device smoothens the torque to match almost constant load torque on engine ? 14
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