

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

**Term-End Examination** 00598

**December, 2013**

**BME-033 : HEAT POWER TECHNOLOGY**

*Time : 2 hours*

*Maximum Marks : 70*

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*Note : All questions are compulsory. Use of scientific calculator is permitted.*

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- 1 Choose the correct answer from the given *four* alternatives. **14x1=14**
- (a) The thermal efficiency of a diesel cycle having fixed compression ratio with increase of cut-off ratio will
- (i) increase
  - (ii) decrease
  - (iii) remain unaffected
  - (iv) None of the above
- (b) For maximum power generation, the order of air-fuel ratio for a petrol engine is :
- (i) 9 : 1
  - (ii) 12 : 1
  - (iii) 16 : 1
  - (iv) 18 : 1

- (c) The self ignition temperature of diesel compared to petrol.
- (i) is higher
  - (ii) is lower
  - (iii) is same
  - (iv) depends on quality of fuel.
- (d) For same compression ratio and heat input, the cycle which has maximum efficiency may be
- (i) Diesel cycle
  - (ii) Dual cycle
  - (iii) Otto cycle
  - (iv) None of the above
- (e) The rating of C.I engine fuel is given by
- (i) octane number
  - (ii) performance number
  - (iii) Cetane number
  - (iv) None of the above
- (f) In a typical medium speed four-stroke cycle diesel engine intake valve.
- (i) opens at TDC and closes at BDC
  - (ii) opens at  $20^\circ$  before TDC and closes at  $35^\circ$  after BDC
  - (iii) opens at  $10^\circ$  after TDC and closes at  $20^\circ$  before BDC.
  - (iv) None of the above.

- (g) ' Knock ' in the C.I. engine is characterised by
- (i) sudden auto - ignition of the mixture at the very beginning of the combustion process
  - (ii) sudden auto - ignition of the mixture near the end of the combustion period
  - (iii) knock does not occur in C.I. engines
  - (iv) None of the above.
- (h) The best possible location for the spark plug is
- (i) near the inlet valve
  - (ii) near the exhaust valve
  - (iii) at the centre of the cylinder head
  - (iv) any place of the combustion chamber
- (i) Supercharging of I.C. engines is essential for
- (i) marine engine
  - (ii) aircraft engine
  - (iii) stationary engine
  - (iv) none of the above
- (j) If the clearance volume of I.C. engines is increased, the compression ratio will
- (i) increase
  - (ii) decrease
  - (iii) remain constant
  - (iv) none of the above

- (k) Many vegetable oil can be used as a fuel in
- (i) petrol engines
  - (ii) diesel engines
  - (iii) both petrol engines and diesel engines
  - (iv) neither in petrol engines nor in diesel engines.
- (l) Which of the following is more viscous lubricating oil?
- (i) SAE 30
  - (ii) SAE 40
  - (iii) SAE 50
  - (iv) SAE 70
- (m) Which is the most effective alternative fuel in I.C. engine in rural area?
- (i) CNG
  - (ii) Bio gas
  - (iii) Alcohol
  - (iv) Hydrogen
- (n) In a four-stroke cycle engine, the four operations namely suction, compression, expansion and exhaust are completed in the number of revolutions of crankshaft equal to.
- (i) four
  - (ii) three
  - (iii) two
  - (iv) one

2. Answer **any two** of the following : **2x7=14**
- (a) Discuss the relative advantages and disadvantages of internal combustion and external combustion engines.
  - (b) Differentiate between a fly-wheel and a governor.
  - (c) Discuss the difference between theoretical and actual valve timing diagrams of a diesel engine.
3. Answer **any two** of the following: **2x7=14**
- (a) What do you mean by pre-ignition? How it can be detected?
  - (b) What is a carburettor? why is a choke used in a carburettor?
  - (c) Discuss in brief the chief qualities to be considered in selecting oil for lubrication.
4. Answer **any two** of the following : **2x7=14**
- (a) Why is cooling necessary for I.C. engines? Why overheating and over cooling of I.C. engines is harmful?
  - (b) What is the film co-efficient? On what factors the film co-efficient generally depends?
  - (c) What is 'Duel - fuel' operation ?

5. Answer any two of the following: **2x7=14**
- (a) What are the important types of the governors? Differentiate between centrifugal governor's and ' inertia governors'.
  - (b) What is a punching press ? Describe with a neat sketch the operation of the fly-wheel in a punching press.
  - (c) What are the relative advantages and disadvantages of chain and belt drives ?
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