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**ME 1818 PE 33**

23/6/22

Roll No. of candidate

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2022

**B.Tech. 8<sup>th</sup> Semester End-Term Examination**

**INTERNAL COMBUSTION ENGINE**

**(New Regulation 2017-18)**

**(New Syllabus 2018-19)**

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer Question No. 1 and any *four* from the rest.

1. Select the correct answer from the option given below: (10 × 1 = 10)
- (i) Which of the following is not true for internal combustion engine as compare to external combustion engine?
- (a) It has lower ratio of weight to output  
(b) They are self-starting  
(c) Higher overall efficiency  
(d) Mechanical simplicity
- (ii) Which of the following is not an internal Combustion (IC) engine?
- (a) Gas engine (b) Wankel engine  
(c) Jet engine (d) Stirling engine
- (iii) The energy of expanding gas is transferred by piston to connecting rod through
- (a) Crank pin (b) Gudgeon pin  
(c) Bearing (d) Crankcase

[Turn over



- (iv) Which of the following is not used in four stroke compression-ignition (CI) engines?
- (a) Fuel pump (b) Spark plug  
(c) Fuel injector (d) Inlet and outlet valves
- (v) In compression ignition (CI) engine, the compression ratio is
- (a) Cylinder volume / Clearance volume  
(b) Swept Volume / Cylinder Volume  
(c) Clearance volume / Cylinder volume  
(d) Cylinder volume / Swept volume
- (vi) If two stroke engine there is one power stroke in \_\_\_\_\_ of crankshaft rotation
- (a)  $90^\circ$  (b)  $180^\circ$   
(c)  $270^\circ$  (d)  $360^\circ$
- (vii) In two stroke engine, which of the following functions are performed at the same time?
- (a) Compression and exhaust (b) Intake and Expansion  
(c) Intake and exhaust (d) Intake and compression
- (viii) The compression ratio In a Compression Ignition (CI) engine is generally in between
- (a) 8 to 13 (b) 14 to 23  
(c) 20 to 28 (d) 25 to 32
- (ix) Which of the following is not true for two stroke engine as compared to four stroke engine?
- (a) Less cooling Is required  
(b) Greater lubrication is required  
(c) More uniform torque on crankshaft  
(d) Complete exhaust of products of combustion
- (x) The relation between Indicated power (ip), Friction power (fp) and Brake power (bp) is
- (a)  $ip=fp-bp$  (b)  $ip=fp+bp$   
(c)  $bp=ip+fp$  (d)  $bp=ip/fp$

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2. (a) Name the major exhaust emissions of SI and CI engines. Explain briefly how CO, NO<sub>x</sub> and HC form in SI engines. (2+8=10)
- (b) With a neat sketch briefly explain the phenomenon of Diesel knock. (5)
3. (a) Explain the assumptions and considerations of Air-standard cycles and Fuel-Air Cycles. (7)
- (b) What is super charging? Mention the various methods of supercharging. Explain how the p-v diagram of Otto cycle changes with supercharging. (1+2+5=8)
4. (a) Mention some of the functional requirements of an injection system. Discuss with a neat sketch the common Rail Injection System. (2+6=8)
- (b) Mention the factors that affect carburetion with a neat sketch explain the working principle of a simple carburetor. (1+6=7)
5. (a) With a neat sketch discuss the combustion phenomenon in LT engines. (7)
- (b) With neat sketches, briefly discuss the different stages of combustion in SI engines. (8)
6. (a) With a neat sketch explain the working of hydraulic dynamometer. (7)
- (b) A single-cylinder, four-stroke, engine has a bsfc of  $1.13 \times 10^{-5}$  kg/kW h and a fuel consumption rate of 0.4068 kg/h. The specific power output of the engine is 0.33 kW/cm<sup>2</sup>. If the engine runs at 3000 rpm find the displacement volume of the cylinder and if the piston speed is 15 m/s, find the bmep. (8)
7. (a) What is the main function of spark plug? Draw a neat sketch of a spark plug and explain its various parts. (7)
- (b) What are the advantages of dual fuel system? Write the difficulties of using dual or multi-fuel system. (8)

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