

C.U.SHAH UNIVERSITY
Winter Examination-2019

Subject Name: Internal Combustion Engines

Subject Code: 4TE05ICE1

Branch: B.Tech (Mechanical)

Semester : 5

Date : 19/11/2019

Time : 10:30 To 01:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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- Q-1** **Attempt the following questions: (14)**
- The reference fuels for knock rating of spark ignition engines would include (1)
- (a) A. iso-octane and alpha-methyl naphthalene
B. normal octane and aniline
C. iso-octane and normal hexane
D. normal heptane and iso-octane (1)
- (b) In hit and miss governing, the fuel supply is cut-off completely during one or more number of cycles. (1)
- A. Yes B. No
- The brake power of a diesel engine, keeping other parameters constant, can be increased by (1)
- (c) A. decreasing the density of intake air
B. increasing the temperature of intake air
C. increasing the pressure of intake air
D. decreasing the pressure of intake air (1)
- (d) In open combustion chamber in diesel engines, the shape and layout of the piston crown, the inlet port and the valve produce the turbulent effect of fuel mixture. (1)
- A. True B. False
- (e) The pressure inside the cylinder is _____ the atmospheric pressure during the exhaust stroke. (1)
- A. equal to B. below C. above D. not effect
- (f) The pre-ignition occurs before the spark is produced whereas detonation develops (1)



after the introduction of spark.

A. Agree B. Disagree

(g) The ratio of the heat equivalent to one kW hour to the heat in fuel per B.P. hour is termed as indicated thermal efficiency. (1)

A. Yes B. No

(h) The function of a distributor in a coil ignition system of I.C. engines is (1)

A. to distribute spark B. to distribute power
C. to distribute current D. to time the spark

(i) In order to mix air and petrol in the required proportion and to supply it to the engine during suction stroke, then _____ is employed. (1)

A. fuel pump B. injector C. carburettor D. none of these

(j) The ratio of the brake power to the indicated power is called (1)

A. mechanical efficiency
B. overall efficiency
C. indicated thermal efficiency
D. volumetric efficiency

(k) Morse test is used to determine the I.P. of a (1)

A. single cylinder petrol engine B. four stroke engine
C. single cylinder diesel engine D. multi-cylinder engine

(l) The inlet valve of a four stroke cycle internal combustion engine remains open for (1)

A. 130° B. 180° C. 230° D. 270°

(m) A supercharger receives air from the atmosphere surrounding the engine, compresses it to a higher pressure and then feeds it into the inlet valve of the engine. (1)

A. True B. False

(n) During idling, a petrol engine requires _____ mixture. (1)

A. lean B. rich C. chemically correct D. None

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions (14)

(a) Write a short note on valve timing diagram for 4 stroke cycle spark ignition engine with neat sketch. (07)

(b) Describe with neat sketch the working principal of Stirling engine. What are the advantages and disadvantages? (07)

Q-3 Attempt all questions (14)



- (a) Discuss the types of fuel injection system in CI engine. (07)
- (b) What is meant by air swirl? Explain any two methods of producing swirl in CI engines. (07)
- Q-4 Attempt all questions (14)**
- (a) Discuss the working of a simple carburettor with the help of a neat sketch. What modifications are required in simple carburettor to meet the requirement of cold starting and low load running of the engine? (07)
- (b) How detonation combustion can be recognized in SI engine? Explain in details. (07)
- Q-5 Attempt all questions (14)**
- (a) State the different methods of turbo charging and discuss any two of them. (07)
- (b) What is the function of cooling system? Explain Forced Circulation Cooling system with neat sketch. (07)
- Q-6 Attempt all questions (14)**
- (a) Enumerate the requirements of ignition system. With the help of a sketch, explain the working of battery ignition system. (07)
- (b) What is the function of lubrication system? Explain any one lubrication system with a neat sketch. (07)
- Q-7 Attempt all questions (14)**
- (a) What do you understand by emission norms? Explain the norms applicable in India. (07)
- (b) Write a brief explanatory note on heat balance sheet. (07)
- Q-8 Attempt all questions (14)**
- (a) What is friction power? Classify measurement methods. Explain any one method for measurement of friction power of an engine with neat sketch. (07)
- (b) A four cylinder petrol engine has bore of 5.7 cm and stroke 9 cm. Its rated speed is 2800 rpm and it is tested at this speed against a brake which has torque arm of 0.356 m. The net brake load is 155 N and fuel consumption is 6.74 liter/hr. The Specific gravity of petrol used is 0.735 and it has low calorific value of 4200 kJ/kg. A Morse test is carried out and cylinders are cut out in the order of 1, 2, 3, and 4 with corresponding brake loads of 111, 106.5, 104.2 and 111 N respectively. Calculate for this speed, engine torque, brake mean effective pressure, brake thermal efficiency, specific fuel consumption, indicated mean effective pressure and mechanical efficiency. (07)

