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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (2013 Onwards) (Sem.-3)

INTERNAL COMBUSTION ENGINES

Subject Code : BTAE-303/401

Paper ID : [A3270]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**I. Write briefly :**

- a) Define the Mechanical efficiency.
- b) Write any two merits of S.I engine.
- c) What is quality governing?
- d) Define mean effective pressure.
- e) What is function of air cleaner?
- f) What is the effect of rich mixture of air fuel ratio in C.I Engine?
- g) Draw with neat sketch Pressure-Time Diagram of combustion for four strokes S.I Engine.
- h) What is meant by octane number?
- i) What are causes of knock in C.I. engines?
- j) How auto-ignition is responsible for knocking in S.I. engines?

SECTION-B

2. Explain the phenomenon of knocking in C.I. engine. What are the different factors which influence the knocking?
3. Derive air standard cycle efficiency of the Diesel cycle, along with P-V & T-S plots.
4. State the relative advantages and disadvantages of battery and magneto-ignition systems.
5. What are the different methods used in C.I. engines to create turbulence in the mixture?
6. A turbo-charged six-cylinder diesel engine has the following performance details :
 - a) Work done during compression and expansion = 820 kW
 - b) Work done during intake and exhaust = 50 kW
 - c) Rubbing friction in the engine = 150 kW
 - d) Net work done by turbine = 40 kW, If the brake mean effective pressure is 0.6 MPa, determine the bore and stroke of the engine taking the ratio of bore to stroke as 1 and engine speed as 1000 r.p.m.

SECTION -C

7. The power output of an I.C. engine is measured by a rope brake dynamometer. The diameter of a brake pulley is 700 mm and the rope diameter is 25 mm. The load on the light side of rope is 50 kg mass and spring balance reads 50 N. The engine running at 900 r.p.m. consumes fuel of calorific value of 44000 kJ/kg, at a rate of 4 kg/h. Assume $g = 9.81 \text{ m/s}^2$. Calculate :
 - a) Brake specific fuel consumption
 - b) Brake thermal efficiency
8. Discuss the difference between theoretical and actual valve timing diagrams of a S.I. engine.
9. Describe the method commonly used in laboratory for measuring the air supplied to an I.C. engine.