

Code No: R22033

R10**SET - 1****II B. Tech II Semester Supplementary Examinations, November-2017****THERMAL ENGINEERING - I**

(Com. to ME, AME)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

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1. a) Discuss the effect of the following variables on pressure and temperature and salient features of Otto cycle on the basis of fuel-air cycle i) Compression ratio ii) fuel-air ratio  
b) What is the difference between air standard cycle approximation, fuel-air cycle approximation and real cycle performance?
2. a) What are the requirements of an ignition system for an IC engine? Explain the working of Battery ignition system  
b) Where is the dry sump lubrication system preferred and why? Explain it briefly with the neat sketch.
3. a) What are the factors affecting normal combustion in SI engines  
b) Explain the phenomenon of knocking in SI engines with a neat sketch
4. a) Give the comparison between open combustion chambers and divided combustion chambers  
b) Explain the basic methods of generating air swirl in CI engines combustion chambers
5. A test carried out on a single cylinder, two-stroke oil engine gave the following data:  
Cylinder bore=200mm, stroke 250mm, engine speed=300rpm, net brake torque 500Nm, indicated mean effective pressure= $4.9 \times 10^5$  N/m<sup>2</sup>, fuel consumption=5kg/min, temperature rise of cooling water=55K, specific heat capacity of water=4.1868KJ/kg K  
Calculate (a) mechanical efficiency (b) the specific fuel consumption (c) draw up an energy balance in KW
6. a) Explain the working of the double cylinder air compressor with intercooler with a neat sketch  
b) An air compressor takes in air at 1 bar and 20°C and compresses it according to law  $p v^{1.2} = \text{constant}$ . It is then delivered to a receiver at a constant pressure of 10 bar.  $R=0.287$  KJ/kg K. Determine (i) temperature at the end of compression (ii) work done and heat transferred during the compression per kg of air
7. a) Distinguish between the working principles of centrifugal and reciprocating air compressor  
b) Explain the working of a Roots Blower and derive the expression for work done.
8. a) What are the different losses in axial flow compressor stage  
b) Explain the principle of operation and mechanical construction of an axial flow compressor