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Roll No .....

AU-7002-CBGS

B.E. VII Semester

Examination, December 2020

Choice Based Grading System (CBGS)

Combustion and Heat Transfer

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) What do you mean by detonation or knock in internal combustion engines? Discuss the detonation or knock in the case of both S.I. and C.I. engine.
   b) Describe the requirements of a good combustion chamber for S.I. and C.I. engines.

2. If a thin and long fin, insulated at its tip is used, show that the heat transfer from the fin is given by

$$Q_{fin} = \sqrt{hpkA_c}\left(T_0 - T_\infty\right)\tanh mL$$

3. How volumetric type and gravimetric type fuel consumption measurement is done in vehicles?

4. a) One end of a very long aluminium rod is connected to wall at 140°C which 0 the end produces in to room whom air temperature is 15°C. The diameter of the rod is 3mm and thermal conductivity of rod material is 150 W/mK. If heat transfer coefficient between the rod surface and the environment is 300W/m^2k, Determine heat distribution in the fin.

b) Explain the term critical radius of insulation.

$T_C = \frac{g_0 L^2}{2k} T_s$, T_s = surface temperature on either side.

5. Explain concept of thermal conduction, mechanism of natural convention and radiation with their basic rules.

6. a) Define Irradiation and radiosity.
   b) Derive the expression for Log Mean Temperature Difference (LMTD) in case of parallel flow heat exchanger.

7. a) Discuss following Dimentionless numbers Nussel number, Prandle number, Reynold's number.
   b) Deduce an equation of heat transfer for a flat slab with Q' w/m^3 of heat generation.

8. Write short notes on the followings:
   i) Viscous air flow meter
   ii) Flame temperature measurement
   iii) Gravimetric type-fuel consumption measurement

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