

**III B.Tech I Semester Supplementary Examinations, April/May 2005**  
**THERMAL ENGINEERING AND HEAT TRANSFER**  
**(Mechatronics)**

**Time: 3 hours**

**Max Marks: 70**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) Define specific fuel consumption of an engine and explain its importance.  
(b) With neat sketches, explain the working of two stroke S.I Engine.
2. What are the different kinds of fuels used in an IC engine? Discuss them in detail.
3. (a) Explain the principle of carburetion.  
(b) With a neat sketch explain the working of principle of a simple carburettor.
4. (a) What do you understand by solid injection? What are its advantages over air-injection system?  
(b) Draw a schematic diagram of Bosch type fuel pump and explain its working.
5. (a) Compare the working process in reciprocating I.C. engines and gas turbines.  
(b) Describe with neat sketches the working of a simple constant pressure open cycle gas turbine. How does the actual cycle differ from the theoretical cycle?
6. (a) Explain Fourier heat conduction equation.  
(b) Derive the general conduction equation in cylindrical coordinates by considering the infinitesimal volume.
7. (a) Explain the difference between laminar and turbulent flow.  
(b) Derive an equation for the film heat transfer coefficient in forced convection using dimensional analysis. What are its limitations.
8. (a) When a body is said to be black? What is the range of wave lengths it absorbs?  
(b) Compute the radiant energy loss from 1 cm diameter opening in a thin walled furnace located in a large enclosure, if the temperature with in the furnace is  $900^{\circ}\text{C}$  and the surroundings are at  $20^{\circ}\text{C}$ .

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