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10ME53

**Fifth Semester B.E. Degree Examination, June/July 2015**  
**Energy Engineering**

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.**  
**2. Missing data, if any, may be suitably assumed.**

**PART – A**

- 1 a. List out the different types of fuels used for steam generation. Briefly explain them. (10 Marks)
- b. With a neat sketch, explain the working of travelling grate stoker. (06 Marks)
- c. With a neat sketch, explain the working of cyclone burner. (04 Marks)
- 2 a. With a neat sketch, explain the working of Schmidt – Hartmann boiler. (10 Marks)
- b. Explain with a neat sketch the working of hyperbolic cooling tower. (05 Marks)
- c. Determine the height of chimney to get a net draught of 12 mm if the total draught losses are 4 mm. The temperature of air is 25°C and the temperature of chimney gases is 300°C. The mass of air used per kg of fuel is 18 kg. One kg of air occupies a volume of 0.7734 m<sup>3</sup> at NTP. (05 Marks)
- 3 a. Draw the schematic diagram of DG power plant. Mention the function of each component of the plant. (10 Marks)
- b. Explain the different methods used for starting diesel engines. (06 Marks)
- c. Write a note on filters used in intake system of diesel engine. (04 Marks)
- 4 a. What is a surge tank? What are its functions? List out the types of surge tanks used in hydro-electric power plant. (06 Marks)
- b. What do you mean by water hammer? How it will be formed? (04 Marks)
- c. The run-off data of a river at a particular site is tabulated below :

Month	Mean discharge millions of m <sup>3</sup> /month	Month	Mean discharge millions of m <sup>3</sup> /month
Jan	40	July	70
Feb	25	Aug	100
Mar	20	Sep	105
April	10	Oct	60
May	0	Nov	50
June	50	Dec	40

- i) Draw the hydrograph and find the mean flow
- ii) Draw the flow duration curve
- iii) Find the power in MW available at mean flow if the head available is 100 m and overall efficiency of generation is 80%. (10 Marks)

**PART – B**

- 5 a. With a neat sketch, explain the working of Fast Breeder Reactor State its advantages and disadvantages. (10 Marks)
- b. Write a note on :
  - i) Radiation hazards
  - ii) Radioactive waste disposal. (10 Marks)

Important Note : 1. On completing your answers, carefully draw diagonal cross lines on the remaining blank spaces.  
 2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.



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- 6 a. What is the difference between a pyr heliometer and a pyranometer? Describe the principle of Angstrom Pyr heliometer. (06 Marks)
- b. What is the principle of photovoltaic power generation? With a neat sketch, explain the working of photovoltaic cell. (06 Marks)
- c. Determine extraterrestrial normal radiation and extraterrestrial radiation on a horizontal surface on February 15 at 2 pm solar time for  $40^{\circ}$  N latitude. Also determine the total solar radiation on the extraterrestrial horizontal surface for the day. (08 Marks)
- 7 a. Describe the tidal energy harnessing by "Two basin with liked basin" method. (06 Marks)
- b. List out the problems associated with OTEC power plant. (06 Marks)
- c. With a schematic diagram, explain the working of vapour dominated geothermal power plant. (08 Marks)
- 8 a. Clearly describe the production of oxygen from photosynthesis process. (06 Marks)
- b. With a neat sketch, explain the working of Indian type biogas plant. (08 Marks)
- c. With a neat sketch, explain the working of fluidized bed gasifier. (06 Marks)

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