

## ONE TIME EXIT SCHEME

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BANGALORE - 560 037

10ME53

Fifth Semester B.E. Degree Examination, April 2018

**Energy Engineering**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.**

**PART - A**

- 1
  - a. Write a note on various types of fuels used for steam generation. (04 Marks)
  - b. Explain spreader stoker with a neat sketch and write its advantages and disadvantages. (10 Marks)
  - c. Explain pneumatic ash handling system with a neat sketch. (06 Marks)
- 2
  - a. Define draught and explain forced draught system with a neat sketch. (06 Marks)
  - b. Explain Schmidt-Hartmann boiler with a neat sketch. (08 Marks)
  - c. A boiler is equipped with a 30m high chimney. The temperature of the flue gases passing through the chimney is 250°C and the temperature of the outside air is 25°C. The amount of air supplied is 18 kg per kg of fuel. Calculate (i) the theoretical draught in mm of water (ii) the velocity of the flue gases passing through the chimney if 60% of theoretical draught is lost in friction at the grate and passage. (06 Marks)
- 3
  - a. Draw the general layout of Diesel power plant. (05 Marks)
  - b. Explain thermostat cooling system with a neat sketch. (10 Marks)
  - c. Explain the purpose of lubrication and list the main engine parts which need lubrication. (05 Marks)
- 4
  - a. Classify hydro-electric power plants. (05 Marks)
  - b. What are the functions of a surge tank? Explain inclined surge tank with a neat sketch. (06 Marks)
  - c. The data for a weekly flow at a particular site is given below for 12 weeks.

Week	Weekly Flow in m <sup>3</sup> /s
1	6000
2	4000
3	5400
4	2000
5	1500
6	1000
7	1200
8	4500
9	8000
10	4000
11	3000
12	2000

- (i) Draw the hydrograph and find the average flow.
- (ii) Draw the mass curve and find the size of the reservoir and the possible rate of available flow after the reservoir had built in. (09 Marks)

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**PART – B**

- 5 a. Explain the following components of a nuclear reactor:  
(i) Moderator (ii) Control rod (iii) Coolants. (06 Marks)
- b. Explain sodium-Graphite nuclear reactor with a neat sketch and write its advantages and disadvantages. (08 Marks)
- c. Write a brief note on radio-active wastes and its safe disposal methods. (06 Marks)
- 6 a. Explain low temperature thermo-electric power generation using solar pond with a neat sketch. (08 Marks)
- b. Explain the principle of harnessing wind energy using vertical axis wind machine with a neat sketch. (07 Marks)
- c. Wind velocity at the rate of 10 m/s at 1 standard atm pressure and 30°C temperature flows into a turbine. Estimate the value of reasonably obtainable power density assuming maximum power coefficient as 40%. (05 Marks)
- 7 a. Explain the working of tidal power plant with a neat sketch. (08 Marks)
- b. Explain the principle of working of OTEC plant. (08 Marks)
- c. Write a note on Geothermal energy conversion. (04 Marks)
- 8 a. Explain the constructional details and working of KVIC digester with the help of a neat sketch. (08 Marks)
- b. Indicate briefly the reasons for considering bio-mass as  
(i) a renewable source of energy  
(ii) an useful derivative of solar energy (05 Marks)
- c. Explain updraft gasifiers with a neat sketch. Write its applications and advantages. (07 Marks)

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