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B.E. (FULL-TIME) DEGREE END SEMESTER EXAMINATIONS - MAY / JUNE 2013

ELECTRICAL AND ELECTRONICS ENGINEERING – II SEMESTER (R-2012)

ME 8253 – POWER PLANT ENGINEERING

Time : 3 Hours

Max. Marks : 100

PART – A (10 X 2 = 20 Marks)

1. List out the boiler mountings and accessories.
2. Draw the 'T-s' diagram of a diesel cycle.
3. State the function of a splitter and hydraulic brake in a pelton turbine.
4. Mention the functions of draft tube.
5. List out the properties of a moderator in a nuclear power plant.
6. Define 'mass defect' and 'binding energy' with respect to nuclear power plant.
7. What are the methods of improving the thermal efficiency of simple open cycle gas turbine?
8. Mention the merits of diesel engine power plant.
9. List out Non-conventional energies.
10. What do you mean by 'SOLAR' and 'MHD' power generator.

PART – B (15 X 16 = 80 Marks)

11. i) List out the four circuits of a modern steam power plant and explain with a layout of any one of them. (6)
ii) Explain with a neat diagram of forced draught system and induced draught system. (5)
iii) Mention the functions of a condenser and an economizer. (5)
12. a) i) Draw a neat layout of Hydro-Electric power plant and indicate the various parts with a direction of flow. (5)
ii) Compare impulse turbine and reaction turbine with respect to water turbine. (5)
iii) Draw a neat diagram of a surge tank, indicate the parts in the diagram and state the (6) functions of surge tank.
(OR)
b) i) Explain pelton turbine with a neat diagram. (7)
ii) State the factors to be considered for the selection of water turbine. (5)
iii) Mention the advantages of Hydro-Electric power plant. (4)
13. a) i) State the 'Radio-activity Law of disintegration' and derive an equation for the same. Also prove that half life period is inversely proportional to decay constant and mean Life period is the reciprocal of decay constant. (12)
ii) Compare nuclear fission and nuclear fusion. (4)

(OR)

- b) i) Draw a neat diagram of a nuclear reactor and indicate the various parts and state the function of each component. (8)
- ii) Explain the boiling water reactor power plant with a neat diagram. (8)

14. a) i) Explain with a neat diagram of a 'Simple open cycle gas turbine' and also draw 'p-v' diagram 'h-s' diagram and 'T-s' diagram. (14)
- ii) Mention the applications of Gas turbine. (2)

(OR)

- b) i) A gas turbine unit has a pressure ratio of 6 and maximum cycle temperature of 610°C . The isentropic efficiency of the turbine and compressor are 82% and 80% respectively. Calculate the power output in KW of an electric generator, geared to the turbine and thermal efficiency of the gas turbine plant, when air enters the compressor at 15°C at a rate of 16 kg/s.
Take $C_p = 1.005 \text{ kJ/kg.k}$ and $\gamma = 1.4$ for both compression and expansion process. (14)
- ii) Define 'Isentropic turbine efficiency' of a gas turbine power plant. (2)

15. a) i) Explain with a neat diagram of a 'phosphoric acid fuel cell'. (6)
- ii) Draw a neat diagram of geothermal energy and explain the same. (6)
- iii) Mention the advantages of tidal power plants. (4)

(OR)

- b) i) Draw a neat diagram of ocean thermal energy conversion and explain the same. (8)
- ii) Explain thermo electric power generation with a diagram. (8)
