

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, November 2017

B. Tech. in Mechanical Engineering, Semester VII

Roll No.....

ME 703: Power Plant Engineering

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A	Objective type multiple choice questions (10 questions @ 1 mark)	10
i.	In fuel cell, the following energy is converted into electrical energy: (a) Mechanical (b) Chemical (c) Heat (d) Sound	
ii.	Rankine cycle efficiency of a good steam power plant may be in the range of: (a) 15 - 20 percent (b) 35 - 45 percent (c) 70 - 80 percent (d) 90 - 95 percent	
iii.	Steam jet draught is used in (a) Locomotive boiler (b) Lancashire boiler (c) Benson boiler (d) Cornish boiler	
iv.	Solar thermal power generation can be achieved by: (a) using focusing collector or heliostats (b) using flat plate collectors (c) using a solar pond (d) any of the above system	
v.	The main source of production of bio gas is: (a) human waste (b) wet cow dung (c) wet livestock waste (d) All of the above	
vi.	Mechanical efficiency of a gas turbine as compared to internal combustion reciprocating engine is : (a) Same (b) lower (c) Higher (d) None of the these	
vii.	The function of control rods in nuclear plants is to: (a) Control temperature (b) Control radioactive pollution (c) Control absorption of neutron (d) Control fuel consumption	
viii.	The use of regenerator in a gas turbine cycle increases : (a) output but has no effect on efficiency; (b) output but decreases efficiency; (c) both efficiency and output ; (d) efficiency but decreases output	
ix.	More efficient plants are generally used as: (a) base load plant (b) peak load plant (c) no such restriction (d) None of the above	
x.	If the load factor on the power station is higher: (a) Cost/unit power is less (b) Cost/unit power is more (c) Has no bearing on cost (d) None of the above	
Q.2	Short answer type questions (2 questions @ 5 marks)	10
i.	What is the function of a cooling tower in a steam power plant?	
ii.	Explain in brief the spray type condenser.	
Q.3	Explain the factors to be considered while selecting the site for a hydroelectric power plant.	10

Q.4	Explain the operation of a travelling grate stoker with the help of neat sketch.	10
Q.5	Explain the working principle of an Ocean Thermal Energy Conversion (OTEC) plant.	10
Q.6A	Explain the principle of working of FBC boiler.	05
Q.6B	What do you mean by pulverized coal firing system?	05
Q.7	Explain the working of Pressurized Water Reactor with a neat sketch.	10
OR		
Q.7	A gas turbine power plant operating on an ideal Brayton cycle has a pressure ratio of 7. The gas temperature is 293K at the compressor inlet and 1350K at the turbine inlet. Utilizing the air standard assumptions, determine (a) the gas temperature at the exits of the compressor and the turbine (b) the back work ratio.	10
Q.8	A turbine is to be operated under a head of 30 m at 200 rpm. The discharge is 15 m ³ /s. If the efficiency is 90 percent determine, (i) specific speed of the turbine (ii) power generated by the turbine.	10
Q.9	Write a short note on economics of various power plant operations.	10
Q.10	The catchment area of a hydroelectric power plant is 2800 km ² and the annual average rainfall is 180 cm. The head drop available at a power house site is 140m. Assuming the turbine efficiency to be 79 percent and the generation efficiency to be 89 percent, find the kilo-watt that can be developed from the hydroelectric plant. Take evaporation losses as 25 percent.	10
OR		
Q.10	Explain any three types of tariffs for electrical energy.	10

-----ALL THE BEST-----