Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (OLD) - EXAMINATION - SUMMER 2017 Subject Code: 151906 Date: 15/05/2017 Subject Name: Conventional Power Engineering (Institute Elective - II) Time: 02:30 PM to 05:00 PM **Total Marks: 70 Instructions:** 1. Attempt all questions. Make suitable assumptions wherever necessary. 2. 3. Figures to the right indicate full marks. Explain the process in simple Rankine Cycle on p-v and T-S diagrams and 0.1 (a) 07 derive an expression for thermal efficiency. A steam power plant operates on simple Rankine cycle develops 200 MW 07 **(b)** power. The boiler and condenser are 60 bar and 0.1 bar respectively. The temperature of steam at inlet of turbine is 400C.Determine (1)The quality of steam at the turbine exit.(2) mass flow rate of steam(3)The thermal efficiency of cycle. Give detailed classification of steam turbine. Differentiate between impulse and 0.2 07 **(a)** reaction turbine. State the various methods of improving the efficiency and work output of a gas 07 **(b)** turbine plant. With schematic and T-S diagram explain the regeneration process. OR Draw and discuss the plant layout of hydro plant. 07 **(b)** Write advantages and disadvantages of Hydraulic power plant Also write the **Q.3** (a) 07 classification for hydraulic turbines. The following data refers to a gas turbine plant: 07 **(b)** (1)Power developed=5.5KW (2)Inlet pressure and temperature of air to compressor=1bar and 27C (3) pressure ratio of the cycle=5 (4)Isentropic efficiency of the compressor=80% (5)Isentropic efficiency of low and high pressure turbine=85% (6)Maximum temperature of low and high pressure turbine=577C (7)Take for air Cp+1.0KJ/KgK assume isentropic index If reheater is used between two turbine at a pressure of 2.24bar Calculate (1) Mass flow rate of air (2)Overall efficiency Neglect the mass of fuel OR What is axial flow turbine? Explain construction and working of Kaplan turbine 0.3 07 (a) and compare with the Francis Turbine. (b) Draw the schematic diagram of a diesel electric power plant and write its 07 advantages and disadvantages. Explain the following systems for diesel power plant with a neat sketch : 0.4 **(a)** 07 (i) Air intake system and (ii) Engine exhaust system. Write a note on nuclear waste and its disposal. **(b)** 07 OR Explain fast breeder reactor and List various nuclear power plants in India **Q.4** 07 **(a)**

(b) What is fuel injector? Explain common rail fuel injection system. 07

Q.5	(a)	Define the following (1)Load factor(2)utility factor(3)plant operating factor(4)capacity factor(5)Demand factor (6)Base load (7)peak load	07
	(b)	What is the future for nuclear power? Discuss with neat sketch PWR	07
		OR	
Q.5	(a)	Differentiate between Nuclear fission and fusion process. Explain Nuclear	07
		fission and chain reaction.	
	(b)	A power plant of 210 MW installed capacity has the following particulars:	07
		(1)capital cost :Rs.18000/KW installed capacity	
		(2)interest and depreciations:12%	
		(3)Annual load factor :60%	
		(4)Annual capacity factor:54%	
		(5)Annual running charges:200x10 ⁶	
		(6) energy consumed by power plant auxiliaries: 6%	
		Calculate: (1) cost of power generation for KWh	
		(2)Reserve capacity	
