Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

Programme Name: B.Tech- PSE + Electrical **Semester : V**
Course Name : Nuclear & Hydro Power Plant **Time : 03 hrs**
Course Code : EPEG 3007 **Max. Marks: 100**
Nos. of page(s) : 2
Instructions: All questions are compulsory

SECTION A

S. No.		Marks	CO
Q1	With the help of appropriate diagram, explain 'Run-of the river' type hydroelectric Power Plant along with their application.	**4**	**CO2**
Q2	Enumerate the methods adopted for the safe disposal of Solid & Gaseous wastes from a Nuclear Power Plant.	**4**	**CO1**
Q3	Describe the following with the help of appropriate diagram: a) Arch Dam b) Buttress Dam	**4**	**CO2**
Q4	Describe the following (along with examples) with reference to Nuclear Power Plant: a) Control Rods b) Moderator	**4**	**CO2**
Q5	Describe the function of the following w.r.t Hydro-electric Power Plant: a) Penstock c) Spillways b) Surge Tank d) Draft Tube	**4**	**CO3**

SECTION B

Q6	a) Compare & contrast between the size of the generator for a Nuclear Power Plant with generator rotor speed of 3000 rpm and a Hydroelectric Power Plant with generator rotor speed of 250 rpm. b) Suggest the generator rotor alignment for the above-mentioned Power Plants along with your justification.	**10**	**CO4**
Q7	For a Hydroelectric power station, the total quantity of water available under a head of 1.6 m is 250 m3 /sec. The speed of the turbine is 50 rpm & plant efficiency is 82%. Determine the number of turbine units required. Consider Specific Speed as 740.	**10**	**CO2**
Q8	a) Explain the phenomenon of 'Water Hammer' in the 'Penstock' of a Hydroelectric Power Plant under varying load condition. b) Using appropriate diagram, describe the method and the design feature adopted in the penstock to overcome water hammer.	**10**	**CO3**

Q9	Draw & explain the construction and principle of working of a Boiling Water Reactor (BWR). OR Draw & explain the construction and principle of working of a Pressurized Water Reactor (PWR).	**10**	**CO2**
SECTION-C			
Q10	a) For a Hydroelectric Power Plant, water is available at the rate of Q = 175 M3/sec at a pressure head of H = 18 m. The actual speed of the turbine (Kaplan type) is N = 150 rpm with an overall efficiency of 82% and the Specific Speed of the turbine is Ns = 460. Determine the total number of turbines required in the hydro-electric power plant using Kaplan Turbines as per the data given below: b) For the above mentioned turbine scheme, calculate the synchronous speed of the generator.	**15+5**	**CO4**
Q 11	A PWR operates for a Nuclear based TPP of capacity 3000 MW. Feed water enters at 280 ^{0}C at a rate of 62000 TPH. The system pressure is 156 Bar. Determine the temperature at which the coolant leaves the reactor.	**20**	**CO3**