Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Sustainable Habitat **Semester : II**
Program: M Tech Energy Systems and Sustainability **Time : 03 hrs.**
Course Code: EPEC-7037 **Max. Marks : 100**
Instructions: Attempt all questions. Internal choice is given in question number 11.

SECTION A
(5Qx4M=20Marks)

S. No.	Statement of question	Marks	CO
Q 1	Differentiate between green building and energy efficient building.	4	CO1
Q2	List some devastating impacts of using VOC materials in buildings.	4	CO2
Q3	Identify the key measures in building water pumping systems which can improve the energy performance index (EPI) of the building.	4	CO3
Q4	Differentiate between building code and building rating system for the buildings.	4	CO4
Q5	Which refrigeration cycle used in building HVAC system, is more efficient and why.	4	CO3

SECTION B
(4Qx10M= 40 Marks)

Q6	Explain in detail how green buildings are sustainable solution, justify your answer with relevant case study.	10	CO1
Q7	With the help of case study explain which building materials are best suited for the commercial complex and list their advantages and disadvantages.	10	CO2
Q8	Discuss in detail various measures that can reduce the energy consumption of the buildings by providing optimized thermal comfort to the occupants.	10	CO3
Q9	Explain how building rating systems can reduce the energy intensity from building sector by taking some case study.	10	CO4

SECTION-C
(2Qx20M=40 Marks)

Q10 — Compare the performance of centrifugal chiller with vapor absorption chiller using the data given below: — **20** — **CO3**

Sl. No	Parameter	Centrifugal Chiller	VAM
1	Chilled water flow (m^3/h)	192	183
2	Condenser water flow (m^3/h)	245	360
3	Chiller inlet water temperature (^0C)	13	14.5
4	Condenser water inlet temperature (^0C)	28	32
5	Chiller outlet water temperature (^0C)	7.8	9.2

	6	Condenser water outlet temperature (^{0}C)	36.2	40.7		
	7	Chilled water pump consumption (kW)	32	31		
	8	Condenser water pump consumption (kW)	38	52		
	9	Cooling tower fan consumption (kW)	9	22		
	If the compressor of centrifugal chiller consumes 205 kW, the steam consumption for VAM is 1620 kg/Hr. Calculate the following: i) Refrigeration load delivered (TR) for both systems? ii) Condenser Heat load (TR) for both systems? iii) Compare auxiliary power consumption for both systems, give reason? iv) If electricity cost is Rs.4.0/kWh and steam cost is Rs.0.45/kg compare the operating cost for both systems.					
Q11	Discuss in details how IGBC rating system can be implemented in industrial buildings. Discuss the ratings criterion and mandatory clauses given in IGBC rating system.				**20**	**CO4**
	OR					
Q11	Discuss in detail various measures given in ECBC code to reduce the building energy consumption. Explain which measures you want to adopt in all the classrooms of UPES Bidholi campus as per ECBC code so that the energy consumption can be optimized.				**20**	**CO4**