Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
EndSemester Examination, July 2020

Course: Mechanical Engineering (Mech 2028) **Semester: IV**
Programme: B.Tech Civil Engineering **Time: As per instruction.**
Max. Marks: 100
Instructions:

1. Read the instruction carefully before attempting.
2. This question paper has two section, Section A and Section B.
3. There are total of six questions in this question paper. **One** in **Section A** and **five** in **Section B**
4. **Section A** consist of multiple choice based questions and has the total weightage of 25%.
5. **Section A** will be conducted online on BB Collaborate platform
6. **Section B** consist of long answer based questions and has the total weightage of 75%. The questions for section B shall also appear in BB Collaborate
7. The maximum time allocated to **Section A** is one Hrs.
8. **Section B** to be submitted within 24 hrs from the scheduled time (*exceptional provision due extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas*).
9. No submission of **Section B** shall be entertained after 24 Hrs.
10. **Section B** should be attempted after **Section A**
11. **The section B** should be attempted in blank white sheets (hand written) with all the details like programme, semester, course name, course code, name of the student, Sapid at the top (as in the format) and signature at the bottom (right hand side bottom corner)

SECTION A

S. No.		**Marks**	**CO**
Q 1	MCQ (25x1) done online		
	Section B		
Q:2	a) Explain first law of thermodynamics by taking any two practically applicable examples. b) Apply the first law of thermodynamics to different type of process to find out the heat interaction in process considering close system	**7+8**	**CO1**
Q-3	a) Explain any of the statements in the second law of thermodynamics and show that how that statement is telling the direction of flow of energy. b) Describe the principle of increase of entropy for universe and show any one example with suitable numerical values to show the applicability of this principle.	**7+8**	**CO1**

Q-4	In the temperature range between 0°C and 100+ last two digits of you roll number°C a particular system maintained at constant volume has a heat capacity. **Cv = A + 2BT** With A = 0.014 J/K and B = 4.2 × 10-4 J/K^2 A heat reservoir at 0°C and a reversible work source are available. What is the maximum amount of work that can be transferred to the reversible work source as the system is cooled from 100°C to the temperature of the reservoir?	**15**	**CO2**
Q-5	Prove that the COP of a reversible refrigerator operating between two given temperatures is the maximum.	**15**	**CO2**
Q-6	Make a poster presentation showing following things about any one thermodynamic power cycle. Use one A3 size paper or 2 A-4 size blank sheet. You can draw also to show the concept. I) Basics process on P-V, T-S, H-S plot also show their block diagram showing energy interactions. II) Efficiency of cycles. How one can vary them (improvement) III) Comparison of cycle with any one other power cycle. (Guidelines: 30% marks will be given on creativity also. Copying content within students will leads to strict marks penalty on all students found providing same content.)	**15**	**CO3**