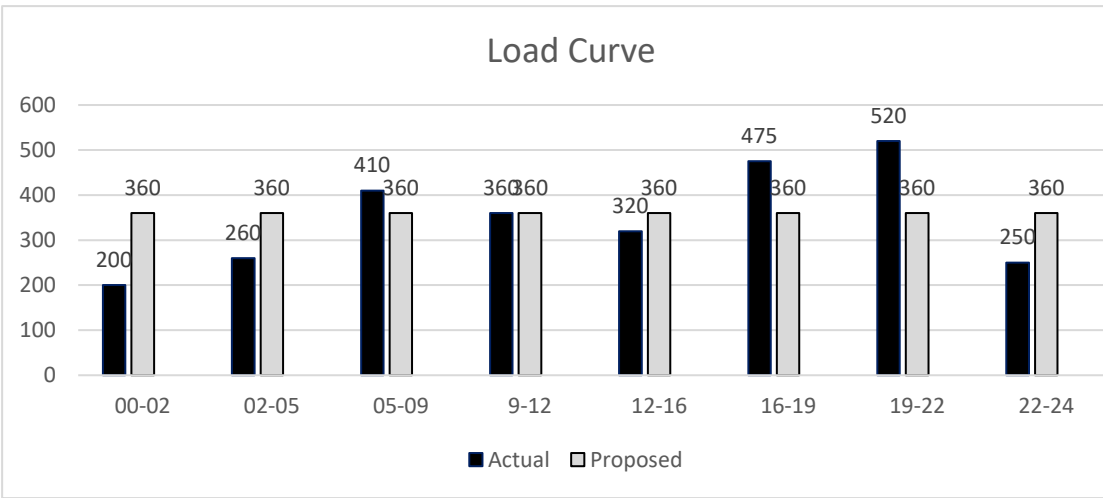| Name:	
Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination July 2020

Programme Name: M.Tech Energy System &   **Semester : II**
                     M.Tech Renewable Energy Engineering
Course Name   : Smart & Micro Grid   **Duration: 3 Hrs**
Course Code   : EPEC8005   **Max. Marks : 100**
Instructions:

1. **Attempt all the questions (Theory, Numerical, Case study etc.) on A4 size blank sheets.**
2. **Attempt all questions serially as per question paper.**
3. **Answer should be neat and clean. Draw a free hand sketch for circuits/tables/schematics wherever required.**
4. **Scan the whole answer script and check the resolution carefully before upload on the blackboard. Note that answer scripts will be considered for evaluation only through Blackboard. No other mode of submission is acceptable.**

You are expected to be honest about each attempt which you make to progress in life

S. No.		Marks	CO
	Section A		
Q.1	The load curve of a typical Distribution System is as following (Thick Black Bars) The DISCOM has to meet the peak demand and hence the company has to install a 520 MW power plant. But installing a 520 MW will be requiring a very huge investment (Appro. 2200 crores). Instead DISCOM propose to set up Smart Grid and average out load to 360 MW (Light gray colored bars) and install a Generating station of 360 MW (appro. 1700 Crore).	20	CO2

NOTE : The submission time of the Question Paper Answer Sheet is 24 Hrs from the scheduled time (*exceptional provision due to extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas*).
No Submission will be entertained after 24 Hrs

	As a Smart Grid Specialist, propose a hypothetical plan. The plan should give the complete layout, breakup of costs for various Investments and tariff rates (in terms of premium & discounts) so that customers are encouraged to use power during nonpeak loads. (It is also expected that DISCOM should not be in loss). The DISCOM expect average price of Rs. 5.50 Per unit. The power is supplied to approximately 10000 consumers covering 20 square km area. Costs for various infrastructure product like Smart Meters, Distribution lines from internet.		
Q.2	A) With neat block diagram, explain 66kV/11kV sub station automation system with the major equipment.	10	CO4
	B) Explain the various issues associated with present distribution system. Explain the use of recent trend in technology in addressing the issues?	10	CO1
Section B			
Q.3	Explain the importance of IT infra in smart grid.	5	CO3
Q.4	With neat Diagram, explain the use of Rogowaski coil for Current Sensing.	5	CO1
Q.5	Explain time based tariff mechanism and its need.	5	CO5
Q.6	With neat diagram explain the communication network in Smart Grid System.	5	CO4
Q.7	A) Explain the need and importance of Bay Controller B) Based on 2003 Electricity Act, explain the vitality of Smart grid, in strengthening of economic status of Distribution System.	5 5	CO2 CO1
Q.8	A) With neat diagram explain the load curve B) Explain the challenges associated with 'Peak Demand' and ways to mitigate with the challenges.	3 7	CO5
Q.9	1) With a neat Block diagram explain the grid interactive Solar Power System. 2) With neat Diagram explain HAN, NAN, LAN, WAN with respect to Smart Grid and their role in deployment of AMI 3) Role and Importance of Cyber Security in IT Infra for Smart Grid 4) Block Diagram of Numeric relay with its importance in Smart Grid.	5 5 5 5	CO1 CO2 CO3 CO4