DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

S8 EEE

2021 BATCH

ALL SUBJECT QUESTION BANK

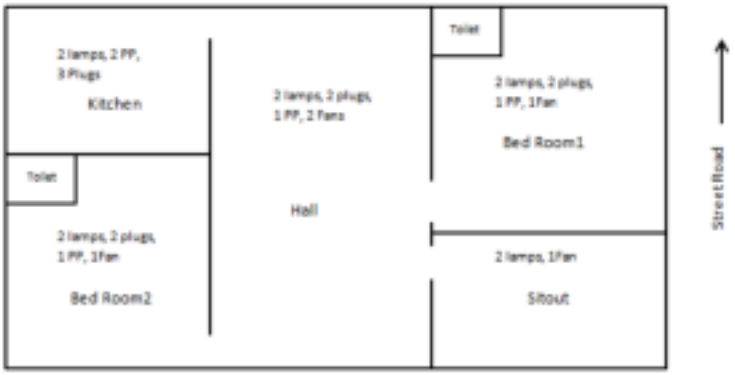
QUESTION BANK

Subject: EET402 Electrical System Design & Estimation

S8 EEE

MODULE 1			
Sl.No	**Question**	**Marks**	**Year**
1	Mention the Scope of Indian electricity act 2003 in brief	5	KTU DEC 2018
2	What are the steps to be followed for safety precautions against electric shock?	4	KTU DEC 2018
3	Describe electric service in buildings.	6	KTU DEC 2018
4	Explain the scope of the following IS codes: IS 732, IS 3043 OR What are the importance of IS 3043, IS 732?	5	KTU DEC 2020
5	Explain the salient features of electricity act 2003 OR Discuss the aims of Indian Electricity Act 2003.	5	KTU DEC 2020
6	Explain the significance of IS codes in electrical system design? How can we design a proper earthing system using IS codes for various electrical systems?	5	KTU DEC 2021
7	Explain the significance of NEC 2011 in Indian power sector. OR What is NEC? Explain its relevance in electrical installations OR. Mention the objectives of National Electric Code (NEC) 2011.	5	KTU OCT 2023
8	Write the classification of voltages according to the applications	5	KTU DEC 2021
MODULE 2			
Sl.No	**Question**	**Marks**	**Year**
1	A certain incandescent lamp, hangs from the ceiling of a room. The illuminance received on a small horizontal screen lying on a bench 2m vertically below the lamp is 63.5 lux. Calculate illuminance at a point when the screen is moved horizontally a distance of 1.5m along the bench.	5	KTU DEC 2018
2	Mention the various types of luminaries used for proper lighting scheme.	5	KTU DEC 2018

3	An office 30m X 15m is illuminated by twin 40w fluorescent luminaries of lumen output 5600 lumens. The lamps being mounted at a height of 3m from the work plane, the average illumination required is 240lux. Calculate the number of lamps required to be fitted in the office, assuming the CU 0.6 and maintenance factor to be 0.8. Assume the height of ceiling as 4.5m	5	KTU DEC 2018
4	Explain the various design parameters taken into consideration while designing street lighting and flood lighting.	5	KTU DEC 2018
5	What are the factors to be considered while selecting the type of wiring? Which are the energy conservation techniques in lighting	10	KTU DEC 2020
6	What is the purpose of A lamp giving out 1200 lm in all directions is suspended 8 m above the working plane. Calculate the illumination at a point on the working plane 6 m away from the foot of the lamp	5	KTU DEC 2020
7	A single storied residential building with two bedrooms with attached toilets, one dining room, one living room, kitchen, and sit out. Decide the required number of light points, fan points, 5A socket outlet, 15A socket outlet. Decide the number of sub circuits required. Determine the connected load, type of supply required, sub circuits required, maximum demand	10	KTU DEC 2020
8	What are the laws of illumination? Explain with a neat diagram OR Explain the laws of illumination with a neat diagram.	10	KTU DEC 2020
9	Mention the features of good lighting scheme for buildings? Explain the factors to be considered for an efficient lighting system design. OR What are the requirements of efficient street lighting?	10	KTU DEC 2019
10	Explain Coefficient of utilisation and LLF in illumination systems. Explain in detail the factors affecting LLF?	6	KTU DEC 2021
11	State the importance of LLF and CU in lighting design. An illumination of 300 lux is to be produced on the floor of a room 12m x 9m. 10W LED lamps of 1000lumens are used for the installation. Considering CU and LLF as 0.7, calculate the number of lamps required for the installation.	6	KTU DEC 2021
12	In a residential building, having 45 nos of light points , 10 fan points, 20 nos of 5 ampere plug socket, 6 nos of 15 ampere power plug socket and 1.5 HP single phase motor pump set (assume DOL starting). Calculate the total connected load, the no. of sub-circuits required, and select the conductors used for each sub-circuits.	10	KTU DEC 2019

MODULE 3			
Sl.No	**Question**	**Marks**	**Year**
1	Specify a circuit breaker having both short circuit and overload protection. Explain its difference between MCB and ELCB. OR Specify a circuit breaker having earth leakage, short circuit and overload protection. Explain its difference between MCB and ELCB. OR What are different protective devices used in domestic installation? Mention their application.	5	KTU OCT 2023
2	Design an electrical schematic for the residential building with following details. Locate the positions of meter board, Main Switch board, DB, switch boards. 	5	KTU DEC 2018
3	Which are the main factors to be taken into account for the selection of cables? Explain.	5	KTU DEC 2020
4	What are the safety aspects that have to be considered while doing electrical dwelling in LV and MV installations?	5	KTU DEC 2019
5	Explain design requirements of high-rise buildings.	5	KTU DEC 2019
6	Describe the selection procedure for ELCB for domestic and industrial dwelling	6	KTU DEC 2018
7	What are functions of RCCB? How does RCCB protect the electrical installation under fault conditions?	3	KTU DEC 2021
8	Explain grading of Fuses with an example.	4	KTU OCT 2023
9	Explain the Pre-commissioning tests to be carried out for domestic installation of electrical wiring with the help of schematic diagram.	10	KTU OCT 2023
MODULE 4			

Sl.No	Question	Marks	Year
1	Explain different methods of cooling of a transformer.	10	KTU DEC 2018
2	Draw the single line diagram of a transformer substation of 400 kVA, 11 kV/ 415 V, dry type transformer. Specify the rating of each unit at the primary and secondary side of the transformer with proper justification	10	KTU DEC 2018
3	Define the function of AMF panel in electrical supply system	5	KTU DEC 2018
4	How do you design an earth mat in substation? Explain its importance.	5	KTU DEC 2018
5	Explain rising mains and rising buses in high rise buildings.	5	KTU DEC 2018
6	Explain with suitable line diagram, how standby generators can include in existing electrical supply system. Assume HT consumer connection.	8	KTU DEC 2018
7	An outdoor pole mounted 11kV/433 V substation has to be installed for supply to a residential area having a load of 63 kVA. With the help of a neat diagram, make a list of materials required.	10	KTU DEC 2020
8	Explain the substation earthing system OR Write short note on the substation earthing system.	5	KTU DEC 2021
9	A substation has to be installed in a residential complex having a load of 50kVA, taking supply from a nearby 11kV line. Which type of substation must be chosen for this application? List out the materials required for the installation of this substation.	10	KTU DEC 2021
10	The following motors have to be installed in a plastic manufacturing industry i. 5.5hp, three phase motor (M1) ii. 3hp, three phase motor (M2) iii. 1.5hp, single phase motor (M3) iv. ¼ hp, single phase motor (M4) The positions of the machines are given below. Select the suitable components for the motor wiring system and draw the wiring circuit diagram with required components. Any missing data may be assumed	10	KTU DEC 2021
11	What are the factors to be considered while selecting a standby generator?	5	KTU DEC 2019

12	What are the advantages and disadvantages of an outdoor type substation over an indoor type substation? OR What are the classifications of the substations according to its functions?	10	KTU DEC 2019
13	Draw the single line diagram of pole mounted outdoor substation of 11kV/415V, 250kVA transformer showing all necessary parts based on loading. OR Draw the single line diagram of an indoor substation showing all accessories of the system. OR Draw the single line diagram of a 500kVA, 11kV/415V indoor substation and justify the component ratings	7	KTU DEC 2019

MODULE 5

Sl.No	Question	Marks	Year
1	What are the factors which decide the power distribution architecture in an electrical installation of an industry	5	KTU DEC 2018
2	What are the various energy conservation techniques imposed in buildings?	5	KTU DEC 2018
3	What is automatic transfer switch? Explain.	5	KTU DEC 2020
4	Explain with the help of schematic, the necessary protections to be provided for a 100 kVA standby diesel generator installed in an electrical installation.	8	KTU DEC 2020
5	What are the design considerations of solar PV system for domestic applications?	10	KTU DEC 2020
6	Draw the block diagram representation of an off-grid and on grid solar PVsystem.	7	KTU OCT 2023
7	What are different types of PV system designs used in electrical systems for renewable energy integration?	5	KTU DEC 2021
8	What are the Installation requirements of standby generators in high rise buildings?	6	KTU OCT 2023
9	Draw and explain the rising main panel of a five storeyed building located in a densely populated area.	6	KTU OCT 2023
10	Briefly explain need of a solar PV system for domestic application.	5	KTU DEC 2019

QUESTION BANK

EET436: POWER QUALITY

(S8 EEE)

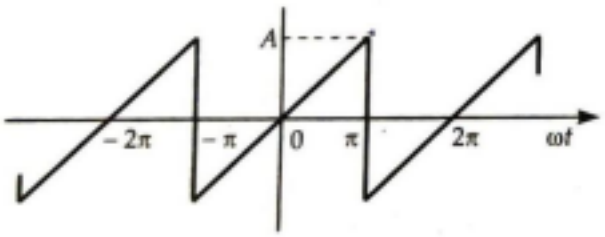
Module 1

Sl No:	Questions	Marks	Year
Module - 1			
1.	'Power Quality is voltage quality'. Comment.	3	Model Question Paper
	Define power quality. List the sources of power quality problems in the power system.	3	October 2023 (2019 Scheme)
	Discuss the need for growing concern in power quality.	4	October 2023 (2019 Scheme)
2.	Differentiate between impulsive and oscillatory transients.	3	Model Question Paper
		3	October 2023 (2019 Scheme)
3.	Explain the sources of voltage sag in a power network.	6	Model Question Paper
	Define voltage sag and explain the mitigation method for voltage sag.	3	June 2023 (2019 Scheme)
4.	Explain voltage unbalance and voltage flicker	6	June 2023 (2019 Scheme)
	Explain the various kinds of voltage variations with neat figures.	10	October 2023 (2019 Scheme)

	With neat diagrams, explain short duration and long duration voltage variation.	10	June 2023 (2019 Scheme)
5.	Explain the following power quality issues (a) DC offset (b) Harmonics (c) Interharmonics	8	June 2023 (2019 Scheme)
	Explain the following power quality issues with neat diagrams (i) Voltage imbalance (ii) Voltage fluctuations (iii) Waveform distortion (iv) Power frequency variation	10	October 2023 (2019 Scheme)
	Explain the source and mitigation methods of voltage transients	4	June 2023 (2019 Scheme)

6.	Discuss any four effects of power quality problems.	8	Model Question Paper
	List any four sources of power quality problems in power system.	4	October 2023 (2019 Scheme)
7.	What is meant by waveform distortions? Using neat diagrams, explain the five primary types of waveform distortion.	14	Model Question Paper
8.	Illustrate about notching in power quality	5	June 2023 (2019 Scheme)
Module - 2			
1.	What do you mean by triplen harmonics and what are its effects in the power system?	3	Model Question Paper
	Define triplen harmonics and explain its effects in power system?	3	June 2023 (2019 Scheme)
2.	Explain in detail about the harmonic sources from industrial loads.	14	June 2023 (2019 Scheme)
	Explain any two harmonic sources in power system.	4	October 2023 (2019 Scheme)
3.	With relevant circuits and waveforms explain the mechanism of harmonic generation in power systems.	14	October 2023 (2019 Scheme)
	Explain the generation of harmonics in the presence of non-linear loads.	3	Model Question

			Paper
4.	For a quasi-square wave of (120° pulse width) of current with an amplitude I of 100A (shown in Fig), calculate (a) crest factor (CF), (b) distortion factor (DF), and (c) total harmonic distortion.	14	Model Question Paper
5.	Explain the effects of power system harmonics on different components of power systems.	14	Model Question Paper
	Explain the effects of harmonics on telecommunication systems	3	June 2023 (2019 Scheme)

6.	Discuss how Fourier series helps in harmonic analysis.	3	October 2023 (2019 Scheme)
	Obtain the Fourier series expression for the waveform shown below. 	14	June 2023 (2019 Scheme)
	Let f(x) be a function of period 2π such that f(x) = 1, -π < x < 0 = 0, 0< x < π Sketch an f(x) graph in the interval - 2π < x < 2π. Find the Fourier series of f(x).	10	October 2023 (2019 Scheme)
Module - 3			
1.	Write short notes on IEEE 519 standards.	3	Model Question Paper

			October 2023 (2019 Scheme)
2.	Explain the objectives of power quality monitoring	5	October 2023 (2019 Scheme)
	What is the need for power quality monitoring?	3	June 2023 (2019 Scheme)
	What are the power quality monitoring consideration	8	June 2023 (2019 Scheme)
3.	Define total harmonic distortion, distortion factor, total demand distortion and telephone influence factor.	8	Model Question Paper
	Derive the expression for Distortion Index (DIN) in terms of Total Harmonic Distortion (THD)	3	October 2023 (2019 Scheme)
	Explain harmonic indices (a)TDD (b)TIF	3	June 2023 (2019 Scheme)
	Explain harmonic indices a) CF b) THD c) DIN	6	June 2023 (2019 Scheme)
	Explain in detail how the following indices can be used to measure harmonicdistortion in power system. (i) Total Harmonic Distortion (ii) Distortion index (iii) C-message weights.	9	October 2023 (2019 Scheme)

4.	Derive the relationship between total power factor, distortion factor and displacement factor.	6	Model Question Paper
	Explain displacement and total power factor	6	June 2023 (2019 Scheme)
	Derive the relationship between total power factor, displacement power factor and distortion power factor.	6	October 2023 (2019 Scheme)
5.	How is RMS value computed by a power quality monitoring instrument?	7	Model Question Paper
6.	Describe the functionalities offered by a power quality analyzer.	7	Model Question Paper

	With neat block diagram explain power quality analyzer	8	June 2023 (2019 Scheme)
	List the functionalities offered by power quality analyzer.	3	October 2023 (2019 Scheme)
	Enumerate the features of power quality analyzers and harmonic analyzers usedfor power quality monitoring.	8	October 2023 (2019 Scheme)
7.	With the help of block diagram, explain in detail about the flicker meter.	7	December 2018 (2015 Scheme)
		6	May 2019 (2015 Scheme)
Module - 4			
1.	List the merits and demerits of passive filters to reduce harmonic distortion.	3	Model Question Paper
	What are the demerits of passive filters in harmonic elimination?	3	June 2023 (2019 Scheme)
	Explain passive filters and its classification	8	June 2023 (2019 Scheme)
	Explain hybrid active filters in harmonic elimination	6	June 2023 (2019 Scheme)
	List the disadvantages of passive filters used for harmonic mitigation.	3	October 2023 (2019 Scheme)
	With a neat circuit diagram, explain the operation of a shunt active power filterfor harmonic mitigation.	8	October 2023 (2019 Scheme)

	Discuss the steps involved in single tuned passive filter design.	6	October 2023 (2019 Scheme)
	Differentiate between active and passive filters used for harmonic elimination.	6	October 2023 (2019 Scheme)
2.	Define Telephone Interference Factor.	3	Model Question Paper

3.	Explain the working principle of DVR for sag and swell correction.	6	Model Question Paper
	Distinguish between DVR and D-STATCOM.	3	June 2023 (2019 Scheme)
	Explain the modes of operation of DVR.	3	October 2023 (2019 Scheme)
4.	A single-phase fully controlled bridge converter is fed from a supply of 230V at 50 at a thyristor firing angle of 60°. Consider continuous load current of 200 A. Design a shunt passive filter with third, fifth, seventh and a ninth passive tuned filters.	8	Model Question Paper
5.	Draw the configuration of a unified power quality conditioner and show that it offers a single solution for mitigating multiple power quality problems.	14	Model Question Paper
			June 2023 (2019 Scheme)
	Explain the working of a unified power quality conditioner with neat diagram.	8	October 2023 (2019 Scheme)
Module - 5			
1.	Explain the operation of a PWM power factor correction circuit. Using a block diagram, explain the control logic of the same.	14	Model Question Paper
	Explain with neat circuit single phase active power factor converter	14	June 2023 (2019 Scheme)
	Explain the control block diagram of a single-phase active power factor converter.	3	October 2023 (2019 Scheme)
2.	Discuss the important solutions to wiring and grounding problems.	14	Model Question Paper
			June 2023 (2019 Scheme)
	Mention the reasons for grounding.	3	June 2023 (2019 Scheme)

	Discuss the different grounding and wiring problems.	7	October 2023 (2019 Scheme)
3.	What is meant by islanding? List the problems caused by it.	3	Model Question Paper
			October 2023 (2019 Scheme)
4.	Explain various power quality conditioners for smart grid.	10	December 2018 (2015 Scheme)
5.	Explain the power quality issues of grid-connected renewable energy sources.	14	October 2023 (2019 Scheme)
	Explain briefly any two operating conflicts in grid connected system which leads to PQ issues	7	October 2023 (2019 Scheme)
6.	Describe the term Ground Loops. List solutions for mitigating this problem.	3	Model Question Paper
			June 2023 (2019 Scheme)

QUESTION BANK

EET 468 INDUSTRIAL INSTRUMENTATION AND AUTOMATION

(S8 EEE)

Module 1			
Sl No.	**Questions**	**Marks**	**KU/KTU (Month/Year)**
1	Define transducer. List the different criteria for classification of it.	5	
2	Define the following 1.Resolution 2. Precision 3. Accuracy 4. Threshold 5. Hysteresis 6. Linearity 7. Repeatability		
3	What do you understand about the dynamic characteristics of a transducer? Define speed of response, Fidelity, lag, Dynamic Error.	7	
4	What do you understand about the static characteristics? List the different types of static characteristics. Define the terms; Instrument, accuracy, precision, Resolution, sensitivity and errors.		
5	Draw and explain second order sensor time response	4	KTU May, October 2019
6	Draw the block diagram representation of a process control system and explain the functions of each block.	5	KTU May, October 2019
7	Explain the factors influencing the choice of a transducer of an industrial instrumentation system	6	KTU May, October 2019
8	Explain the factors that govern the output of characteristics of a transducer	5	KTU May 2019
9	List any five factors affecting the choice of a transducer	4	KTU Sep 2020
10	Explain the working of a variable reluctance tachometer	4	KTU Sep 2020
11	With the help of diagram explain the working of an eddy current sensor	6	KTU May 2019

12	Explain the concept of nano instrumentation	5	KTU May 2019

Module 2			
Sl No.	**Questions**	**Marks**	**KU/KTU (Month/Year)**
1	Explain the importance of signal conditioning in industrial instrumentation systems.	5	KTU May, October 2019
2	What is instrumentation amplifier and discuss its role in instrumentation.	5	KTU October 2019
3	Explain the working of instrumentation amplifier with basic circuit diagram	4	KTU Sept 2019
4	Write a short note on precision rectifier and isolation amplifier	10	
5	How can the noise problem in the instrumentation can be minimized?	4	KTU May, October 2019
6	List any five important features of instrumentation amplifiers.	5	KTU May, October 2019
7	Explain different switched capacitor circuits	7	
8	Explain the principle of operation of phase sensitive detectors		KTU May 2019
9	The circuit diagram of the charge amplifier shows how it enables measurement of electrical charge.	4	KTU May 2020
10	Derive expression for the output voltage of a logarithmic amplifier and show that it is proportional to logarithm of input voltage	5	KTU May 2020

Module 3			
Sl No.	**Questions**	**Marks**	**KU/KTU (Month/Year)**

1	What are the advantages and disadvantages of MEMS?	5	KTU May, October 2019
2	Explain the steps involved in surface micromachining with relevant figures. Compare surface micromachining with bulk micromachining.	10	
3	With the help of diagram explain the principles of MEMS accelerometer.	5	KTU May,Oct 2019
4	What is MEMS? List its advantages and applications.	7	
5	With the help of block diagram explain the architecture of virtual instruments.	5	KTU October 2019
6	List the advantages of virtual instruments over traditional instruments.	5	
7	Differentiate between bulk and surface micromachining	7	KTU May2019
8	Explain the concept of graphical programming in virtual instrumentation.	5	KTU May 2019
9	Explain the need of virtual instruments with an example and concepts of graphical programming	10	
10	With the help of diagram explain the working of an automated system.	5	KTU October 2019
11	Explain the working of a solenoid actuator with the help of a diagram.	5	KTU May2019
12	Explain the selection criterion for control valves.	5	KTU May2019

Module 4			
Sl No.	**Questions**	**Marks**	**KU/KTU (Month/Year)**
1	Give the significance of timers and counters in PLC	5	KTU May2019
2	With some suitable examples explain four major components of the DCS system.	8	

3	Draw the PLC ladder diagrams to realize two input AND. OR, XOR gates	5	KTU May2019
4	What is PLC? What are the advantages of a PLC system? What are the different data files available in PLC?	7	
5	What is the function of I/O module in a PLC? Describe the basic functional blocks of a PLC with suitable diagrams.	4	KTU May, October 2019
6	Compare PLC with PC.	5	KTU May, October 2019
7	Explain the following 1. NANAD gate relay and PLC equivalents. 2. NOT gate and relays and PLC equivalents.	6	KTU May, October 2019

Module 5			
Sl No.	**Questions**	**Marks**	**KU/KTU (Month/Year)**
1	What are hardware elements of DCS?	5	KTU Octo 2019
2	Write the key features of DCS ?	8	
3	Draw the PLC ladder diagrams to realize two input AND. OR, XOR gates	5	KTU May2019
4	Explain RTU in SCADA communication	3	KTU Oct 2023
5	Explain the role of Supervisory station in SCADA communication	3	KTU Oct 2023
6	Explain the architecture of SCADA	8	KTU Oct 2023
7	Explain the control modes in DCS.	6	KTU Oct 2023
8	Explain the advantages, limitations and applications of SCADA	8	KTU Oct 2023
9	Explain the significance and features of the IEC 60870-5- 101 protocols used in SCADA systems.	6	KTU Oct 2023

EET424 ENERGY MANAGEMENT

Module 1

Sl No.	Question	KU/ KTU Year	Marks
1	What is energy audit? Discuss types of energy audit briefly.duties of energy manager.	KTU JUN 2019,2021	10
2	Define energy management	KTU JUN 2021, KTU JUN 2019,2021	5
3	Principles of energy management	KTU DEC 2017,june2023	4
4	Steps involved in energy management planning.	KTU JUN 2016	10
5	Short note on building management system	KTU DEC 2017,2022	7
6	Short note on ECBC code	KTU DEC 2018	5
7	Short note on detailed energy audit	KTU DEC 2016	10
8	Discuss the different instruments used for energy audit.	KTU DEC 2019,2022	7
9	With the help of case studies, explain any four energy management principles.	KTU DEC 2017	7
10	Explain what do you mean by energy audit report.	KTU JUN 2016,june 2023	8

11	Explain the different phases of energy management planning.	KTU DEC 2016	10
12	Explain what do you mean by POWER QUALITY audit .	KTU DEC 2019,2022	10
Module 2			
Sl No.	**Question**	**KU/ KTU Year**	**Marks**
1	Compare the efficacy of different light sources.	KTU DEC 2016,2020	10
2	Write notes on design measures for increasing efficiency in transformers.	KTU DEC 2021,june 2023	5
4	With the help of case studies, explain any four methods to reduce energy consumption in lighting	KTU DEC 2020,2022	10
5	Explain how energy efficient motors help in reducing energy consumption	KTU DEC 2016,2021	7
6	With the help of case studies, explain any four methods to reduce energy	KTU JUNE 2020,2022	5
7	Define cascade efficiency of an electrical system. How it can be calculated?	KTU DEC 2017,2019,june 2023	10
8	With the help of case studies, explain any four methods to reduce energy consumption in lighting.	KTU DEC 2017,2020	10
9	Explain the different methods used for peak demand control.	KTU DEC 2018	5
Module 3			

1	Discuss the benefits of demand side management.	KTU DEC 2017,2019	6
2	Explain the benefits of power factor improvement.	KTU DEC 2017,2020	5
3	Explain the different techniques of demand side management	KTU DEC 2018,june 2023	10
4	The load on an installation is 800 kW, 0·8 lagging p.f. which works for 3000hours per annum. The tariff is Rs 100 per kVA plus 20 paise per kWh. If the power factor is improved to 0·9 lagging by means of loss-free capacitors costing Rs 60 per kVAR, calculate the annual saving effected. Allow 10% per annum for interest and depreciation on capacitors.	KTU DEC 2016,2020,june 2023	5
5	Discuss the importance of peak demand control. Explain the different methods used for that.	KTU DEC 2021	5
6	Explain the different types of ancillary services.	KTU DEC 2020,2022	10
7	Discuss the different energy conservation opportunities in boilers.	KTU DEC 2016,2021	5
8	Explain in detail, the reasons for low furnace efficiency.	KTU JUNE 2020,2022	10
9	What is meant by a steam trap? Explain the operation of the thermostatic steam trap.	KTU DEC 2016,june 2023	7
10	Explain any four energy conservation opportunities in furnaces.	KTU DEC 2019,2022	5

Module 4			
1	Discuss any two opportunities for energy savings in steam distribution.	KTU JUN 2019,2021	10

2	Explain the working of a waste heat recovery system.	KTU JUN 2021, KTU JUN 2019,2021	10
3	Explain any four energy conservation opportunities in furnaces	KTU DEC 2017	5
4	Explain the working of different types of cogeneration systems.	KTU JUN 2016,june 2023	12
5	Discuss the different energy conservation opportunities in boiler	KTU DEC 2017,2022	12
6	Explain any five energy saving opportunities in heating, ventilating and air conditioning systems.	KTU DEC 2018	10
7	How is cooling capacity of a cooling tower calculated?	KTU DEC 2016	6
8	Which type of cooling is better for DG set - ‘Air Cooling’ or ‘Water Cooling’? Why?	KTU DEC 2019,2022	5
9	Is it possible to assess the combustion efficiency of a boiler by flue gas analysis?Explain	KTU DEC 2017	3
10	Explain the working of a waste heat recovery system	KTU JUN 2016,june 2023	5
11	Write notes on computer aided energy management.	KTU DEC 2016	5
12	Explain any five energy saving opportunities in heating, ventilating and air conditioning systems.	KTU DEC 2019,2022	7
Module 5			
1	What are the advantages and disadvantages of the payback period method?	KTU DEC 2017	5

2	Write notes on computer aided energy management systems.	KTU JUN 2016	5
3	a. Calculate the energy saving and payback period which can be achieved by replacing a 11 kW, existing motor with an EEM. The capital investment required for EEM is Rs. 40,000/-. Cost of energy/kWh is Rs. 5. The loading is 70% of the rated value for both motors. Efficiency of the existing motor is 81% and that of EEM is 84.7%	KTU DEC 2016,june 2023	5
4	Compare internal rate of return method with present value method for the selection of energy projects.	KTU DEC 2019,2022	5
5	Explain how the life cycle costing approach can be used for the selection of energy projects.	KTU DEC 2016,2020	5
	Define Internal Rate of Return. How it can befoundout?	KTU DEC 2018	5
	A new cogeneration plant installation is expected to reduce the company's annual electricity bill by Rs.4,86,000/-. The capital cost of the new installation is 22,20,000/- and the annual maintenance and operating cost are Rs.42,000/-. Find out the simple paybackperiod.	KTU DEC 2017,june 2023	5
	Discuss the electrical ECO's in a commercial building	KTU JUN 2016	10
	Briefly explain Life Cycle Costing , What do you mean by time value of money?	KTU DEC 2017,2022	10

<table>
<tr>
<td>6</td>
<td>The cash flow of an energy saving project with a capital investment cost of Rs. 20,000/- is given in the table below. Find the NPV of the project at a discount rate of 10%. Also find the Internal Rate of Return of the project.
<table>
<tr><th>Year</th><th>Cash Flow in Lakhs</th></tr>
<tr><td>1</td><td>7000</td></tr>
<tr><td>2</td><td>7000</td></tr>
<tr><td>3</td><td>7000</td></tr>
<tr><td>4</td><td>7000</td></tr>
<tr><td>5</td><td>7000</td></tr>
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<td>KTU DEC 2016,2020</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>Prepare an energy audit report conducted in a domestic system. The buildingis installed with rooftop PV system and the owner is having a four wheeleralso.</td>
<td>KTU DEC 2018,june 2023</td>
<td>10</td>
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12	<table><tr><th>Year</th><th>Cash Flow in Lakhs</th></tr><tr><td>1</td><td>3.2</td></tr><tr><td>2</td><td>3.5</td></tr><tr><td>3</td><td>4.3</td></tr><tr><td>4</td><td>3.8</td></tr><tr><td>5</td><td>4.5</td></tr><tr><td>6</td><td>5</td></tr></table> Calculate the NPV of the investment, if the interest rate is 12% and capital investment is Rs. 25 Lakhs and comment on the feasibility of the project. The return from the project is asfollows:	KTU DEC 2016,2020	10