VIDYA ACADEMY OF SCIENCE & TECHNOLOGY

TECHNICAL CAMPUS

Kilimanoor, Thiruvananthapuram

"A Unit of Vidya International Charitable Trust"

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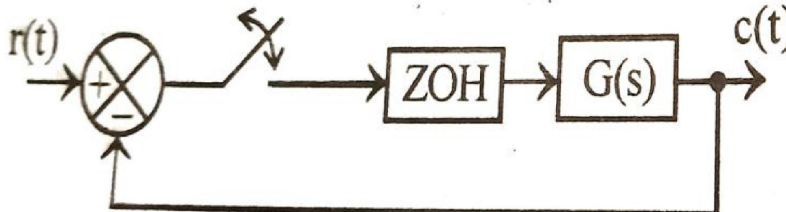
S7 EEE

ALL SUBJECT QUESTION BANK

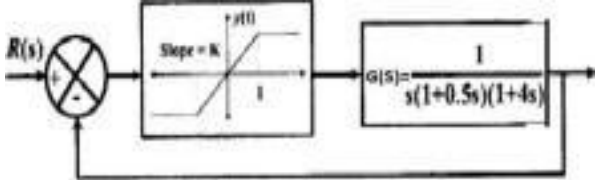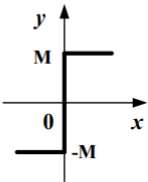# DEPARTMENT OF ELECTRICAL & ELECTRONICS

ENGINEERING
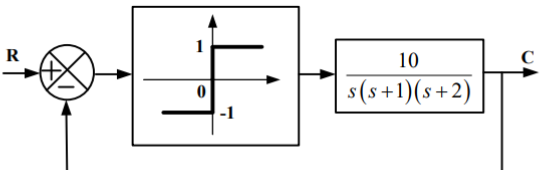
Subject: EET 401 Advanced Control Theory

S7 EEE

Sl.no	Question	Marks	Year
	MODULE 1		
1	Selecting $i_1(t) = x_1(t)$ and $i_2(t) = x_2(t)$ as sate variables obtain state equation and output equation of the network shown in Fig.1	5	KTU APRIL 2018
2	Transform the system in to controllable canonical form $\dot{x} = [0\ 1-2-3\ ]x + [2\ 1\ ]u$ and $y = [1\ 2\ ]x$	5	KTU APRIL 2018
3	Find the complete response of the system $\dot{x} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}x + \begin{bmatrix} 2 & 1 \\ 0 & 1 \end{bmatrix}U(t), x(0) = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ and $y(t) = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}x$ to the following input, $U(t) = \begin{bmatrix} u(t) \\ e^{2t}u(t) \end{bmatrix}$ where $u(t)$ is the unit step input.	10	KTU APRIL 2018
4	Explain the terms (i) state (ii) state variables (iii) state vector (iv) state space.	5	KTU MAY 2019, DEC2022(R & S)
5	Derive the state model of the following transfer function in, (i) Controllable canonical form (ii) Diagonal canonical form $\frac{y(s)}{u(s)} = \frac{5(s+2)}{s(s+1)(s+2)}$	10	KTU DEC 2019

7	(A). Obtain the state model of the system whose transfer function is given by Y(s)/U(s)= 10/[s³+4s²+2s+1]	5	KTU SEPT 2020
	(B). Obtain the state model of a field controlled DC motor.	5	
8	The state space representation and transfer function are given below. Find m? $$\begin{bmatrix}\dot{x}_1\\\dot{x}_2\end{bmatrix}=\begin{bmatrix}0&1\\-4&-m\end{bmatrix}\begin{bmatrix}x_1\\x_2\end{bmatrix}+\begin{bmatrix}0\\1\end{bmatrix}u \qquad [y]=[2\quad2]\begin{bmatrix}x_1\\x_2\end{bmatrix}$$ $$\frac{Y(s)}{U(s)}=\frac{2s+2}{(s+1)(s+4)}$$	3	KTU DEC 2022

MODULE 2

1	Determine the pulse transfer function of the discrete time control system shown in figure for a sampling time of T=1 sec. Also find the response to unit step input. The transfer function of the system is G(s) = 1/(s+1).	10	KTU MAY 2019
2	Derive a relation between state equation and transfer function for LTI system.	5	KTU DEC 2019
3	What is pulse transfer function?	1	KTU SEPT 2020
4	A discrete time system is described by the difference equation y(k+2)+5y(k+1)+6y(k)=u(k) y(0)=y(1)=0; T=1 sec. (a) Determine state model in a canonical form (b) Find the state transition matrix	10	KTU SEPT 2020, DEC 2022
5	a) A system is described. Find the solution of state equation $$\begin{bmatrix}\dot{x}_1\\\dot{x}_2\end{bmatrix}=\begin{bmatrix}0&1\\-6&-5\end{bmatrix}\begin{bmatrix}x_1\\x_2\end{bmatrix}\quad X(0)=\begin{bmatrix}1\\0\end{bmatrix}$$ b) A discrete system is given. Determine the state model in phase variable form $$\frac{Y(z)}{U(z)}=\frac{4z^3-12z^2+13z-7}{(z-1)^2(z-2)}$$	7 / 7	KTU MAY 2023

6	a) Find the state transition matrix using Cayley Hamilton Theorem $$A=\begin{bmatrix} 0 & 1 \\ 0 & -2 \end{bmatrix}$$	8	KTU MAY 2023
	b) Write the transfer function of the system $$\dot{x} = \begin{bmatrix} -3 & 1 \\ -2 & 0 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u \ , \quad y = \begin{bmatrix} 1 & 0 \end{bmatrix} x$$	6	
MODULE 3			
1	Define controllability and observability of a system and check whether the system $Y(s)/U(s) = 1/(s+1)(s+2)$ is controllable or not.	6	KTU MAY 2019
2	Consider a linear system described by the transfer function Y(s)/U(s) =10/[S(S+1)(S+2)]. Design a feedback controller with a state feedback so that the closed loop poles are placed at -2, -1±j1.	7	KTU MAY 2019
3	Define controllability. Explain with a suitable example, how can we check the controllability of a system.	5	KTU Dec 2019
4	a) Using PBH test, check the controllability of the system given below. $$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u \quad [y] = \begin{bmatrix} 2 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$	8	KTU DEC 2022
	b) Design a feed back controller with state feed back so that the closed loop poles are at -2, -1±j1. The state equation of the original systems is given below. $$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 10 \end{bmatrix} u$$	6	
5	a) Check whether the given system is observable using Gilbert's test. $$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 \\ -2 & -3 & 0 \\ 0 & 2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix} u$$ $$y=\begin{bmatrix} 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$	10	KTU MAY 2023
	b) What you mean by full order and reduced order observer? Explain.	4	
MODULE 4			
1	Consider a unity feedback system shown in figure having a saturating amplifier with a gain K. Determine the	10	KTU May

	maximum value of K for the system to be stable. What would be the frequency and nature of limit cycle for a gain of K=2.5? 		2019
2	Derive the Describing function of saturation with Dead-zone nonlinearity.	10	KTU May 2019
3	Write the concept of describing function method	5	KU May 2012
4	Define Describing function. Explain how describing function can be used for stability analysis of nonlinear systems.	5	KTU May 2019, MAY 2023
5	Explain different non linearities with diagram.	5	KTU April 2018
6	Explain saturation and dead zone nonlinearities associated with non linear system	6	KU May 2012, MAY 2023
7	a) Derive the describing function of ideal relay non-linearity given below. b) Determine the frequency and nature of the limit cycle for the unity feed back system given below. 	8 6	KTU DEC 2022
	MODULE 5		
1	Explain Liapunov second method of stability for nonlinear systems.	5	KTU May 2019
2	What is phase plane analysis? How is it used for analysis non linear systems	5	KU May 2012

3	Determine whether the following function is positive definite or not $Q=X1^2+2X2^2+3X3^2+2X1X2^2+20X1X3$	5	KU May 2011
4	Define Singular point. Explain the nature of Eigen values of system matrix for any five types of singular points.	5	KTU May 2019
5	Determine given quadratic form is positive definite or not $$V(x) = 10x_1^2 + 4x_2^2 + x_3^2 + 2x_1 x_2 - 2x_2 x_3 - 4x_1 x_3$$	5	KTU April 2018
6	What is limit cycle? How will you determine stable and unstable limit cycle using phase portrait?	5	KTU April 2018
7	a) What do you mean phase trajectory? Explain how to draw the phase trajectory using isocline method. a) Compute the Lyapunov function V(x) for which the system is asymptotically stable. $$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & -2 \\ 1 & -4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$	7 7	KTU DEC 2022
8	a) Determine the stability $$\dot{x} = Ax, \text{ where } A = \begin{bmatrix} -1 & -2 \\ 1 & -4 \end{bmatrix}$$ Solve for matrix P in the equation, assuming the matrix Q $$A^TP+PA = -Q,$$ to be identity matrix a) Define: (i) Stability (ii) Asymptotic stability	10 4	KTU MAY 2023

Subject: EET463-ILLUMINATION TECHNOLOGY

Module 1

Sl. No	Questions	Marks	KU/KTU (Month/Year)
1	Explain the quality of a good lighting	5	KTUDec2017,KTU Dec 2020
2	Select the factors affecting the quality of artificial lighting	5	KTUApril2016,KTU Dec 2023
3	a)What are the different schemes of artificial lighting? b) Explain with neat diagram the different types of artificial lighting system used	5	KTUDec2017,KTU Dec 2020
4	What is the impact of stroboscopic effect on visual comfort in an artificial lighting scheme? How the effect can be reduced	7	KTU Dec 2018,KTU Dec 2022
5	Explain Colour rendering and stroboscopic effect	10	KTU Dec 202
6	What is a glare? How it is classified	5	KTU Dec 2021
7	a)Mention the various types of luminaries used for proper lighting scheme b)What are the different lighting schemes employed in interior lighting? Clearly state the percentage of light flux in different directions.	10	KTU April2016,KTU Dec 2019

Module 2

1	Define MHCP, MSCP	5	KTUDec2017 KTUDec2020
2	Define Maintenance Factor Define (i) Luminous Flux (ii) Luminous Intensity (iii) Illumination (iv) Brightness	5	KTU April2016,KTU Dec 2023

3	a)Explain how photometric bench is used for measuring candle power of a test lamp b)Explain the term luminous efficacy? How the luminous efficacy of artificial light sources affect the operational cost of a lighting system?	7	KTUDec2017 ,KTU Dec 2020
4	Explain how illumination can be calculated for Line source and Surface source	7	KTU Dec 2018,KTU Dec 2022
5	Four lamps 15m apart are arranged to illuminate a corridor. Each lamp is mounted at a height of 8m above the floor level. Each lamp gives 450 Cd in all directions below the horizontal. Find the illumination at the midway between 2nd and 3rd lamp	10	KTU Dec 202
6	a)Illustrate with a neat diagram the concept of polar curve in illumination technology b)With the help of appropriate sketches, explain polar luminance distribution curve	10	KTU Dec 2021
7	a)State the Laws of Illumination b)Explain with neat figures a.) Inverse square law b.) Lambert's Cosine law c)Derive the expression for illumination in the case of a round source. Rousseans construction	10	KTU April2016,KT U Dec 2019
8	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	10	KTU Dec 2018,KTU Dec 2022

Module 3			
1	Specify the need of DLOR and ULOR in artificial architectural lighting. List out three factors on which DLOR and ULOR depends	5	KTUDec2017 ,KTU Dec 2020
2	a)Illustrate at least five fixtures used for interior lighting? b)What are the special features that must be taken care of while illuminating staircase.	5	KTU April2016,KT U Dec 2023

3	a)Define 1. Coefficient of utilisation 2. Depreciation factor b)Define Space to Mounting height ratio c)What are the desirable features of a luminaires?	5	KTUDec2017 ,KTU Dec 2020
4	A drawing hall in an engineering college is to be illuminated with a lighting installation. The hall is 30m × 20m × 8m (high). The mounting height is 5m and the required level of illumination is 144 lm/m2. Using metal filament lamps, estimate the size and number of single lamp luminaries and draw their spacing layout. Assume: Utilization factor = 0.6, MF = 0.75; Space/Height = 1. Lumens/ Watt for 300-W lamp = 13, Lumens/Watt for 500-W lamp = 16	8	KTU Dec 2018,KTU Dec 2022
5	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	10	KTU Dec 2022
6	The Kinfra apparel park provides space area of 40 m long, 20 m wide and 8 m in height to a textile company. The luminaires are suspended 1.5 m below ceiling level. The sewing machines are placed 1 m high from the floor level. Calculate the minimum number of luminaires which must be installed to conform a recommend SHR (Space height ratio) of 1.5 : 1. Clearly show the layout of the luminaires.	10	KTU Dec 2021
7	What are the different features of corridor lighting?	7	KTUApril2016 KTUDec2019
8	a)Calculate the room index for a hall of dimensions 10m X 8m X 3m. Luminaries are suspended at height of 0.8m from the ceiling and work plane height is 0.85 from floor b)A room 8m x12m is lighted by 15 lamps to a fairly uniform illumination of 100 lm/m2. Calculate the utilisation factor of the room, given that the output of each lamp is 1600 lumens.	10	KTU Dec 2018,KTU Dec 2022

Module 4			
1	a)How are the projectors in flood lighting classified according to the beam? b)LED lit luminaires are encouraged by the supply provider for various good reasons. What are the design modifications needed when LED luminaires are used for outdoor flood lighting purpose?	5	KTUDec2017, KTU Dec 2020

2	a)Describe the area of application of each type of flood light. b)How are the projectors in flood lighting classified according to the beam? c)What are different methods available for aiming the lamp in flood lighting?	7	KTU April2016,KTU Dec 2023
3	a)Illustrate at least five fixtures used for outdoor lighting? b) What you do mean by flood lighting? List out the requirements of a good flood lighting scheme used for a football stadium	7	KTUDec2017, KTU Dec 2020
4	a)Explain the various types of lamps used in street lighting. b)What are the main factors to be considered while designing street/ road lighting? c)Define up cast angle, outreach, pole set back and mounting height in street lighting. Give a clear picture showing all these.	7	KTU Dec 2018,KTU Dec 2022
5	a)Select the main factors for designing street/road lighting? b)What are the advantages and disadvantages of using LED light as street light?	8	KTU Dec 202
6	With a neat diagram give the application of Track Fixtures	5	KTU Dec 2021
7	Calculate the average illuminance on a road having 30 m width and having street light span of 30 m. The luminary used is a sodium vapour lamp luminaire and is arranged in single side layout. The total light output of the luminaire is 5000 lumens. The utilisation factor is 0.8 and the multiplication factor is 0.75	8	KTU April2016,KTU Dec 2019
8	a)A road of 300m long is required to be illuminated by providing 40 W fluorescent tube. The width of the road is 4m. Design a street lighting scheme as per BIS standard. Average illumination required is 0.6 lux b)A building frontage 50m x 25m is to be illuminated by flood lighting projectors situated 25m away. If the illumination is 50 lux, coefficient of utilisation is 0.5, depreciation factor 1.5, waste light factor 1.2. Estimate the number and size of projectors. Sketch the projectors recommended indicating the adjustments provided	7	KTU Dec 2018,KTU Dec 2022

9	A parking area measuring 135m in length and 90 m in width is to be provided with area lighting. The specifications given are
	
	  Illumination required = 10 lux
	  Mounting height restriction = 10 m
	  Lamps per pole = 2
	  The available lamp details are
	Determine the layout of the lighting scheme with the wattage of lamps required
		10	KTU April2016,KTU Dec 2023

Details	HPSV	LPSV
CU	0.60	0.55
LLF	0.75	0.9

Module 5-Power Distribution Systems

1	Explain at least Five features of monument lighting	5	KTUDec2017, KTU Dec 2020
2	What are the different factors to be considered while designing aesthetic illumination of bridges and statues?	5	KTU April2016,KTU Dec 2023
3	Selection of luminaries for different areas in hospitals? What are different types of emergency lighting used in a hospital?	5	KTUDec2017, KTU Dec 2020
4	List out the requirements of a good Sport lighting. List out and explain at least five features of auditorium lighting	5	KTU Dec 2018,KTU Dec 2022
5	What are different factors to be considered while designing aesthetic illumination of bridges and statues?	10	KTU Dec 202
6	What is the importance of modelling and shadows in the case of sports field lighting?	10	KTU Dec 2021
7	Describe any five characteristics of statue lighting	7	KTUApril2016 ,KTUDec 2019

8	During the Onam week celebration organised by the Dept. of Tourism, it is a customary to illuminate the Kerala Secretariat Building and the arterial road in the capital city in different colours. As an illumination engineer what are the different factors which must be considered for i) Illuminating the Secretariat building ii) ii) The roads way aesthetic lighting iii) iii) A Statue in front of Secretariat building	10	KTU Dec 2018,KTU Dec 2022
9	The boundary of a football stadium is 100m x 50m. The recommended illumination level is 500 lux. Luminaries of 1000W with light output of 92000 lumens are used for installation. Calculate the number of luminaries required to get the recommended level of illumination. Assume utilisation factor = 0.8, maintenance factor = 0.8, light loss factor = 1.2. Sketch the configuration of light fittings.	10	KTU April2016,KTU Dec 2023

QUESTION BANK

MET445 - RENEWABLE ENERGY ENGINEERING

MODULE 1

Sl No:	Questions	Marks	Year
1.	Define a) Solar constant b) Air mass c) Irradiance	3	KTU Dec 2022
2.	List greenhouse gases. Explain the science of greenhouse effect	3	KTU Dec 2022
3.	Explain briefly the impact of conventional sources of energy on environment	6	KTU Dec 2022
4.	Calculate the angle made by beam radiation with normal to a flat plate collection November 30, at 9.00 AM solar time for a location at27%0' N. The collector is tilted at an angle of latitude plus 120, with the horizontal and is pointing due south.	8	KTU Dec 2022
5.	How is nuclear fission different from nuclear fission? Discuss the method of energy generation in both the cases	6	KTU Dec 2022
6.	Calculate the average value of global solar radiation on a horizontal surface for March 2I, at the latitude 6f 120 N. The ratio of average length of solar day and length of the longest solar day is 0.68. The constants a = 0.28 and b : 0.5'	6	KTU Dec 2022
7.	Discuss in brief advantages of renewable energy	3	KTU Model QP
8.	Explain the following terms related to solar geometry (i) Hour Angle ((ii) Zenith Angle (iii) Surface azimuth angle	5	KTU Model QP
9.	Elucidate the necessity of energy storage in the context of renewable sources of energy	14	KTU Model QP
10.	Calculate the number of daylight hours in Srinagar for 22nd June .The latitude of Srinagar as 34º05'N	4	KTU Model QP
11.	Compare the construction and working of Pyranometer and Pyrheliometer.	10	KTU Dec 2022
12.	Identify six potential renewable energy sources that could replace the ways that energy is now used.	3	KTU May 2023
13.	What is Air Mass? How it can be used as the measure of solar Irradiance?	3	KTU May 2023
14.	For New Delhi (28 0 35' N, 770 12' E), calculate the zenith angle of the sun at 2:30 PM on February 2015. The standard IST	6	KTU May 2023

	latitude for India is 810 44' E.		
15.	Substantiate your answer for promoting electric vehicles in Kerala, which is a densely populated state. Is there any disadvantages in future?	8	KTU May 2023

MODULE 2

Sl No:	Questions	Marks	Year
1.	What is the difference between active and passive solar applications? Give examples of active and passive solar applications.	3	KTU Dec 2022
2.	Describe about solar pond with a sketch?	3	KTU Dec 2022
3.	Give the comparison between flat plate collectors and concentrating collector	8	KTU Dec 2022
4.	With a neat sketch, explain the working of a medium temperature solar power generation cycle	8	KTU Dec 2022
5.	What are the components of solar liquid flat plate collectors? Draw a solar liquid flat plate collector and discuss the critical requirements of cover plate and absorber plate for the efficient working of the collector?	8	KTU Dec 2022
6.	With a neat diagram, explain the working of a solar absorption refrigeration system	6	KTU Dec 2022
7.	List different types of solar collectors	3	KTU Model QP
8.	Discuss about solar pond	4	KTU Model QP
9.	How solar thermal power plants classified. List the methods for converting solar energy into electric power	6	KTU Model QP
10.	Briefly explain the applications of a solar PV system.	4	KTU Model QP
11.	Explain te thermal methods of energy storage	4	KTU Model QP
12.	Differentiate between sensible and latent heat storage.	3	KTU May 2023
13.	List the essential parts needed to generate low-temperature thermoelectric power.	3	KTU May 2023
14.	Explain the production process of a solar photovoltaic cells	8	KTU May 2023

MODULE 3

Sl No:	Questions	Marks	Year
1.	Explain the terms a) solidity b) Cut-in speed c) cut-out speed	3	KTU Dec 2022
2.	Explain the environmental impacts of wind turbines	3	KTU Dec 2022
3.	Define power coefficient of wind turbines. Derive an expression for power coefficient. Explain Betz Criterion and its significance?	3	KTU Dec 2022
4.	Discuss briefly the effect of tip speed ratio (TSR) on torque and solidity	8	KTU Dec 2022
5.	With neat sketches, explain the different types of wind turbines used to extract wind energy	6	KTU Dec 2022
6.	What are the advantages and disadvantages of wind energy conversion systems	5	KTU Dec 2022
7.	What is a Windrose Diagram? Explain with a model diagram	3	KTU May 2023
8.	Explain Betz limit theory?	3	KTU May 2023
9.	What are the different configurations of Wind Turbines? Explain with simple sketches	7	KTU May 2023
10.	Describe the swept area, capacity factor, and survival wind speed in relation to wind turbines	7	KTU May 2023
11.	Derive an expression for the actual power generation for a wind turbine. Differentiate VWT and HWT	7	KTU May 2023
12.	What are the basic components of a wind turbine?	7	KTU May 2023
13.	List the different methods used to estimate wind speed at a location.	3	KTU Model QP

MODULE 4

Sl No:	Questions	Marks	Year
1.	Discuss the advantages and disadvantages of tidal power plant	3	KTU Dec 2022
2.	Define and discuss geothermal gradients	3	KTU Dec 2022
3.	Explain about binary cycle geothermal power generation	6	KTU Dec 2022

4.	With the help of a neat sketch, explain the working of a closed cycle OTEC system and mention its advantages and limitations	8	KTU Dec 2022
5.	Explain with the help of a neat schematic diagram, the working of a Dry-steam open system used for geothermal power generation. State it's environmental aspects	6	KTU Dec 2022
6.	Explain about tidal power plant with a neat sketch? Kerala state has a long coastal area, discuss the environmental impact of installing a tidal power project	8	KTU Dec 2022
7.	Explain any two methods to harness wave energy from ocean with neat sketch	8	KTU May 2023
8.	Explain with a neat sketch the working of liquid dominated Flashed steam Hydrothermal system & geothermal system	6	KTU May 2023
9.	List the geothermal resources.	3	KTU Model QP
10.	Explain binary cycle Geothermal system	14	KTU Model QP

MODULE 5

1.	Explain the various factors affecting the performance of a biomass digestor	3	KTU Dec 2022
2.	State the advantages of a continuous type biogas plant	3	KTU Dec 2022
3.	With neat sketch, explain the construction and working of floating drum type biogas plant (KVIC).	7	KTU Dec 2022
4.	What is biomass? List the different resources used to extract biomass energy.	4	KTU Dec 2022
5.	Why hydrogen is called secondary energy source. Explain various methods of hydrogel production.	8	KTU Dec 2022
6.	Discuss process of production of ethanol from biomass.	6	KTU Dec 2022
7.	Name the different processes used for hydrogen production	3	KTU May 2023
8.	What are the major drawbacks of using bio-ethanol as an alternate fuel?	3	KTU May 2023
9.	What are the different gasifiers used in the conversion of biomass to energy?	8	KTU May 2023
10.	Define Payback time, Return on investment and Life cycle cost	6	KTU May 2023
11.	A solar PV system consisting with two lamps, a battery and other associated components cost Rs. 55000. The cost of conventional energy saved due to its installation is Rs. 4000 in the first year and this cost inflates at the rate of 5 % per year. Assume discounting rate is 9%. Calculate the payback period of the system with and without discounting	8	KTU Model QP

QUESTION BANK

MCN401- INDUSTRIAL SAFETY ENGINEERING

Sl No:	Questions	Marks	Year
Module - 1			
1.	Differentiate Unsafe act and Unsafe conditions with suitable examples	3	Model Question Paper
	Explain any three unsafe acts which are responsible for accidents in industries.	3	December 2022 (2019 scheme)
2.	Discuss the significance of a safety committee in improving the safety performance of an industry	3	Model Question Paper
	List any important six responsibilities of worker/workmen towards the safety measures in an organization.	3	December 2022 (2019 scheme)
	With the help of a neat sketch explain safety organization structure. Also write the importance of safety organization structure.	14	May 2023 (2019 Scheme)
	With suitable schematics, describe the different types of safety organization.	6	December 2022 (2019 scheme)
	Explain the responsibilities of safety officer in the implementation of safety in industries.	8	December 2022 (2019 scheme)
	Write the importance of safety in organizations	3	May 2023 (2019 Scheme)
3.	List the various accident causation theories and explain any one in details.	14	Model Question Paper
	List the various accident causation theories and explain any two in detail with relevant schematics.	14	December 2022 (2019 scheme)
	Explain the various theories of accident causation	7	May 2023 (2019 Scheme)
	What are the causes of industrial accidents	7	May 2023 (2019 Scheme)
4.	Discuss the significance of safety policy in reducing the accidents.	4	Model Question Paper
	How can you describe safety policy	3	May 2023 (2019 Scheme)
5.	Safety and productivity are the two sides of a coin'. Are you agreeing with this statement? Explain with your arguments.	10	Model Question Paper

Module - 2			
1.	Which are the different types of permit? Highlight its suitability.	3	Model Question Paper
	What are the major objectives of a work permit system in a hazardous work site?	5	December 2022 (2019 scheme)
	Discuss any five potential hazards associated with hot works. Hence, mention any eight safety measures referred to hot work permits.	9	December 2022 (2019 scheme)
	Write the significance of work permit system	3	May 2023 (2019 Scheme)
2.	Which are five 'S' used in housekeeping?	3	Model Question Paper
	Explain the benefits of good housekeeping? Also, explain the five 'S' (5 S) concept in housekeeping.	9	December 2022 (2019 scheme)
	Explain the role of management & employees in housekeeping?	7	May 2023 (2019 Scheme)
3.	Classify the personal protective equipment. List the suitability of at least fifteen types of PPEs.	10	Model Question Paper
	What is respiratory protective equipment (RPE)? Explain the features of any one type of RPE.	3	December 2022 (2019 scheme)
	With suitable sketches explain the important functions of any two PPE used for eye protection.	5	December 2022 (2019 scheme)
	Classify personal protective equipment used in industries. List the suitability of at least seven types of PPEs	14	May 2023 (2019 Scheme)
4.	How will you calculate the frequency rate? Explain with an example.	4	Model Question Paper
	How does frequency rate and incidence rate support safety analysis?	3	December 2022 (2019 scheme)
5.	How will you compare the safety performance of two industries? Explain with suitable example.	10	Model Question Paper
	How do you monitor the safety performance in industries	3	May 2023 (2019 Scheme)
6.	Which are the steps to be followed in confined space entry to protect the life a worker.	4	Model Question Paper
	What procedures should be taken during confined space access to protect a worker's life?	7	May 2023 (2019 Scheme)

		Module - 3		
1.	List the various safety features of ladders	3	Model Question Paper
	List any important six safety practices used with ladders in construction sites.	3	December 2022 (2019 scheme)
2.	How safety of the workers can be ensured during a demolition operations.	3	Model Question Paper
	You are appointed as a safety manager for a demolition work of a 10-storey building in a congested residential area. What are the safety measures that you need to ensure for the completion of the work?	8	December 2022 (2019 scheme)
3.	Discuss the safety and fire protection facilities required for a high rise building as per National building code.	14	Model Question Paper
	Discuss some important aspects of construction safety provisions in National Building Code.	5	December 2022 (2019 scheme)
4.	Identify the various hazards during the different stages of building construction.	7	Model Question Paper
	Discuss the major ergonomic hazards associated with construction industries.	6	December 2022 (2019 scheme)
	Identify various hazards that may arise during the various stages of building construction.	7	May 2023 (2019 Scheme)
5.	Discuss the important types of ergonomic hazards associated with industries.	7	Model Question Paper
	Discuss the important types of ergonomic hazards associated with industries. How can we reduce its impact?	14	May 2023 (2019 Scheme)
6.	Explain any important four safety practices in excavation works.	3	December 2022 (2019 scheme)
7.	What are the safety precautions to be taken before entering a confined space?	9	December 2022 (2019 scheme)
8.	How can workers' safety be ensured during underpinning work?	3	May 2023 (2019 Scheme)
9.	List the various hazards of underwater works	3	May 2023 (2019 Scheme)
10.	Mention the safety precautions that will be implemented to avoid scaffolding related incidents.	7	May 2023 (2019 Scheme)

		Module - 4		
1.		Which are the hazards associated with manual material handling?	3	Model Question Paper
		Discuss about the handling capacity assessment for lifting process associated with manual material handling.	6	December 2022 (2019 scheme)
		Explain the safety precautions to be followed while doing various material handling assessments and techniques in industries	14	May 2023 (2019 Scheme)
2.		Discuss the safety issues of Gas welding operations.	3	Model Question Paper
		Discuss the safety issues associated with gas welding operations.	8	December 2022 (2019 scheme)
3.		Which are the various types of machine guarding devices used industries. Discuss the suitability of each machine guarding devices.	14	Model Question Paper
		With suitable sketches explain the operation of any two types of safety guards suitable for industrial applications.	8	December 2022 (2019 scheme)
4.		With suitable sketches briefly explain seven defects of wire ropes.	14	Model Question Paper
		Mention any four potential hazards associated with wire rope used for material handling.	3	December 2022 (2019 scheme)
5.		Discuss the key elements of a hearing conservation program.	3	December 2022 (2019 scheme)
6.		Explain the potential hazards associated with grinding operations.	6	December 2022 (2019 scheme)
		List the safety precautions to be followed during grinding operation	3	May 2023 (2019 Scheme)
7.		Briefly explain the maintenance of chains slings	7	May 2023 (2019 Scheme)
		What are the various objectives of Maintenance	3	May 2023 (2019 Scheme)
		Briefly explain the maintenance of clamps	7	May 2023 (2019 Scheme)
		Module - 5		
1.		Differentiate Hazard and Risk.	3	Model Question Paper
		What do you meant by Hazard and Risk	3	May 2023 (2019 Scheme)

2.	Explain the need for a Preliminary Hazard Analysis in a hazardous industry.	6	December 2022 (2019 scheme)
3.	Why MSDS is mandatory for chemical products.	3	Model Question Paper
	What is meant by MSDS	3	May 2023 (2019 Scheme)
	Why material safety data sheet is mandatory for chemical products?	3	December 2022 (2019 scheme)
4.	What is Hazard and Operability Analysis? How do you conduct a HAZOP analysis?	14	Model Question Paper
	What is meant by HAZOP? How do you conduct a HAZOP analysis?	7	May 2023 (2019 Scheme)
	What is the significance of Hazard and Operability Analysis? How do you conduct a HAZOP analysis?	8	December 2022 (2019 scheme)
5.	Discuss about different types of chemical hazards.	14	Model Question Paper
	Discuss about different types of chemical hazards with suitable examples.	6	December 2022 (2019 scheme)
	Explain the hierarchy of control of chemical hazards.	3	December 2022 (2019 scheme)
6.	Briefly explain Criticality Analysis	7	May 2023 (2019 Scheme)
7.	How do you classify fires and explain various types of fire extinguishers used in industries?	14	May 2023 (2019 Scheme)
	Explain the important features and functions of any four different types of fire extinguishers	8	December 2022 (2019 scheme)