2021 BATCH QUESTION BANK

SEMESTER 7, 2024-2025

Staff Advisors:- Mr. Chandu C.B. and Ms. Sreejitha S.G.

QUESTIONS COMPILED BY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VIDYA ACADEMY OF SCIENCE & TECHNOLOGY TECHNICAL CAMPUS, KILIMANOOR

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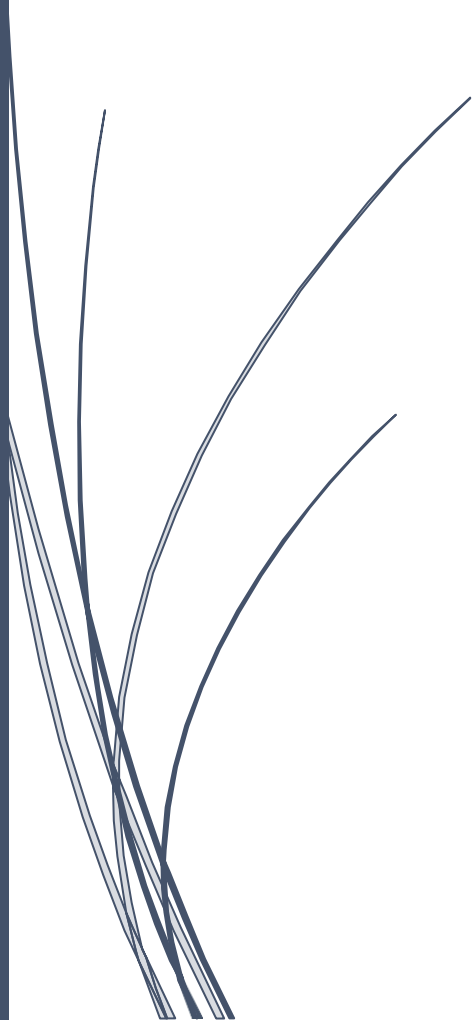
2021 Batch S7
(2024 –2025)

ECT401
MICROWAVE AND ANTENNA

Faculty–Ms. ANJANA N.



ECT 401

MICROWAVE AND ANTENNAS

MODULE 1

Sl No	Questions	Marks	Month & Year
1	Differentiate between Gain and Directivity of an antenna.	3	Dec 2022
2	a. Derive expression for effective aperture of an antenna. b. Derive expressions for the Radiation Resistance and Directivity of a short dipole antenna.	3	Dec 2022
3	With the help of a neat figure explain about the antenna field zones	6	Dec 2022
4	State and prove Reciprocity theorem.	7	Dec 2022
5	Derive Helmholtz Equation in terms of Vector Magnetic Potential.	7	Dec 2022
6	Define the term Beam Area of an antenna. Calculate the beam area of a field pattern given by $E(\theta)=\cos^2\theta$ for $0° \leq \theta \leq 90°$	3	May 2024
7	Find HPBW and FNBW of an antenna which has a field given by, $E(\theta) = cos^2(\theta)\ for\ 0 \leq \theta \leq 90°$	3	May 2024
8	Define the term Effective aperture. Derive the expression for the Effective aperture of antenna. Calculate the effective aperture of an antenna which is operating at a frequency of 2GHz.	9	Dec 2023
9	Differentiate between Antenna efficiency and Beam efficiency	5	Dec 2023
10	Explain different types of Radiation patterns	8	Dec 2023

MODULE 2

1	Explain the principle of operation of a a. Horn Antenna b. Inverted F Antenna c. Log Periodic Antenna d. Helical Antenna	3	Dec 2022
2	With the help of diagrams, compare different feeding method of parabolic dish antenna.	3	May 2024
3	List major advantages and drawbacks of the Microstrip patch antennas	3	May 2024
4	What is the principle of pattern multiplication?	3	May 2024
5	Outline the principles of a mobile phone antenna with neat diagram	3	Dec 2023
6	a. With suitable figures, explain any two feeding methods of Micro strip patch antenna. b. Design a rectangular microstrip patch antenna using a substrate with dielectric constant of 2.2, h =0.1588 cm so as to resonate at 10GHz	3	Dec 2023
7	Design a rectangular patch antenna using a substrate with a dielectric constant of 10.5, h = 0.126 cm so as to resonate at 1.65 Ghz.	8	Dec 2022

8	Why log periodic antenna is called frequency independent antenna? Explain the working of log periodic dipole array.	8	May 2024
9	Differentiate between the Normal mode and Axial mode of a Helical antenna. Write the expressions for HPBW, BWFN and Directivity in axial mode	7	Dec 2023
10	Explain the principle of a Cassegrain antenna with a neat figure.	4	Dec 2023

MODULE 3

1	Explain the principle of Pattern Multiplication	3	Dec 2022
2	Explain the concept of phased arrays	3	Dec 2022
3	Find the FNBW of linear array of 4 isotropic point sources with n=4, d=λ/2 and δ= -π ?	3	May 2024
4	Derive expression for the total field radiated by two isotropic point sources fed with current of same amplitude and phase. Also find the directions of maxima and minima.	7	Dec 2022
5	Derive expressions for the array factor of a linear array of n-isotropic point sources of equal amplitude and spacing. Derive the conditions for using this array as an end fire array.	7	Dec 2022
6	Explain the difference between broadside array and end fire array	4	Dec 2022
7	Design a 7 element Dolph-Chebyshev array with a spacing of d = λ/2. The pattern is to be optimum with a side lobe of 22 db down the main lobe maximum	10	Dec 2022
8	Show that for an array of two isotropic point sources with identical amplitude and phase, have a broadside radiation pattern	7	May 2024
9	Design a broadside Dolph-Tschebyscheff array of 10 elements with spacing d between elements. The side lobes are 26 dB below the maximum of the major lobe. Find the excitation coefficients and form the array factor	14	May 2024
10	Derive the expression for the total field radiated by linear array of N isotropic point sources and write the expression for Array factor.	7	Dec 2023

MODULE 4

1	Derive expressions for the resonant frequency of a rectangular cavity resonator.	3	Dec 2022
2	Explain the working of a cavity resonator. Give a practical use of cavity resonator.	3	Dec 2022
3	Find the FNBW of linear array of 4 isotropic point sources with n=4, d=λ/2 and δ= -π ?	3	Dec 2023
4	Derive the equation for Cyclotron angular frequency of cylindrical magnetron	6	Dec 2023

5	Derive the equation for resonant frequency of Rectangular cavity resonator. Compute the resonant frequency of the dominant mode for an air-filled cavity of dimensions a = 5 cm, b = 2 cm, and d =15 cm	8	Dec 2023
6	Derive expressions for the Hull cut off Magnetic Field and Voltage of a magnetron	11	Dec 2022
7	With the help of a neat diagram explain the working of a Reflex Klystron	7	Dec 2022
8	With the help of neat diagrams explain the working of a magnetron	7	May 2024
9	With diagram explain the amplification process in a travelling wave tube	7	Dec 2022
10	A reflex klystron operates under the following conditions: Cathode voltage , Vo=600V Rsh = l5Kohm Oscillating frequency , fr= 9 GHz , Distance between Rentrant cavity and Repeller , L =1 mm Given J(1.832) = 0.582 The tube is oscillating at fr at the peak of the n = 2 mode or 1 3/4 mode Assume that the transit time through the gap and beam loading can be neglected (i) Find the value of the repeller voltage Vr . (ii) Find the direct current necessary to give a microwave gap voltage of 200 V. (iii) What is the electronic efficiency under this condition?	14	May 2024

MODULE 5

1	List the important properties of Scattering parameters	3	Dec 2022
2	Explain the important properties of Magic Tee. Derive its Scattering parameters	3	Dec 2022
3	Explain the different modes of operation of Gunn Diode	7	Dec 2022
4	Explain the working of two hole directional coupler. Derive its Scattering parameters.	7	Dec 2022
5	Explain Gunn effect with the help of Ridley–Watkins–Hilsum theory	7	Ma 2024
6	Explain the working principle of a a. 2 hole directional coupler and derive its S matrix b. Ferrite Oscillator c. Circulator d. Hybrid Ring T	7	May 2024 & Dec 2023
7	Explain Scattering parameters for an N port network	3	May 2024
8	Discuss the constructional features of E plane tee and derive its S Matrix	7	Dec 2023
9	With a schematic diagram describe the operation of a four-port circulator. Obtain the S matrix of a perfectly matched, lossless four port circulator	10	Dec 2023
10	With neat figure, describe the two valley model theory of semiconductors	6	Dec 2023

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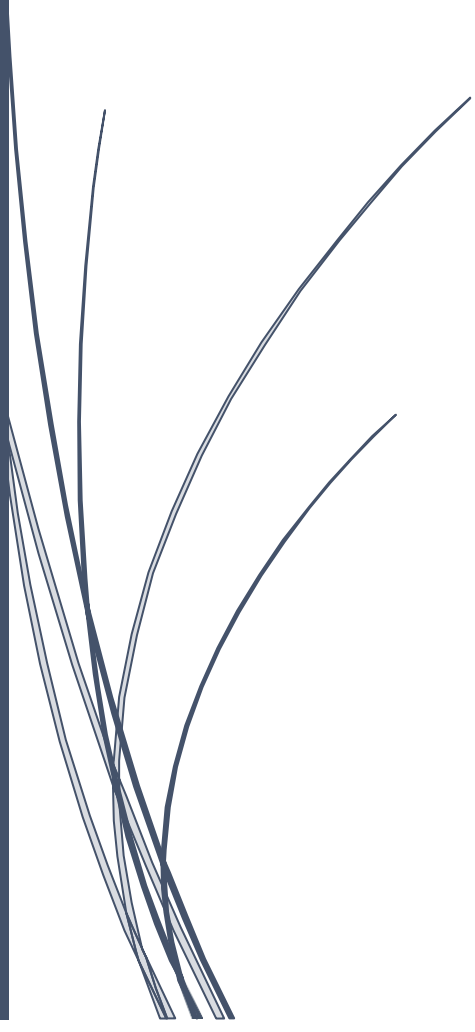
ECT413

OPTICAL FIBER COMMUNICATION

Faculty–Ms. ASWINI DUTT



ECT 413 OPTICAL FIBER COMMUNICATION

MODULE 1

Qn.No.	Questions	Marks	CO	BL
1	a)A graded index fiber has a core with a parabolic refractive index profile which has a diameter of 50 μm. The fiber has a numerical aperture of 0.2. Estimate the total number of guided modes propagating in the fiber when it is operating at a wavelength of 1 μm. b) A graded index fiber having parabolic profile of refractive index has NA=0.3 in air and a core diameter of 60μm and supports 742 guided modes. Calculate the wavelength of light propagating in the fiber	5 4	1 1	3 3
2	Explain the structure and principle of photonic crystal fibres also explain the different types of photonic crystal fibres	10	1	2
3	Explain the following (i)Acceptance angle (ii)Numerical aperture If for a given optical fiber the refractive index of cladding and core are 1.45 and 1.47 respectively,calculate the numerical aperture and angle of acceptance in air.	8	1	2
4	Explain the significance of phase velocity and group velocity for the light propagating through the optical fiber cables.?	8	1	2
5	Write short notes on transmission wavelengths available for optical communications Also Explain the necessity of cladding for an optical fiber.	5	1	2
6	a)Calculate the V-number and the number of modes supported by the step index fiber having n1=1.53, n2=1.5 and with a core radius of 50μm operating at 1500nm. b)Discuss the importance of cut off wavelength in the optical fibre and explain how can it can be related to the Vnumber of the optical fibre? Determine the cut off wavelength for a step index fibre to exhibit single mode operation when the core refractive index and radius are 1.45 and 4 μm respectively, with the relative index difference being 0.20%.	3 8	1 1	3 3
7	Classify the optical fibre based on number of modes and index profile and explain various types with neat sketch?	8	1	2
8	With block diagram explain a general light wave system. What are the advantages of optical communication?	7	1	2
9	Explain the different modes in planar waveguide.	7	1	2
10	Illustrate the differences between loose buffered cable and tight buffered cable	4	1	1

MODULE 2

(35 Marks)

Qn.No.	Questions	Marks	CO	BL
1	Explain how attenuation affect the transmission of signal through the fibers. Also Explain the main causes of attenuation.	10	2	2
2	a)What is meant by dispersion? Explain the different types of dispersion in fibers, b)Discuss material dispersion in optical fiber and derive the expression for pulse spread due to it.	10 10	2 2	2 2
3	Discuss various nonlinear scattering process such as stimulated Raman scattering and stimulated Brillouin scattering in the optical fibre communication?	7	2	3
4	i) Explain macro bending and micro bending losses with a neat diagram ii) The mean optical power launched into an 8 km length of fiber is l20 μm and the mean optical power at the output of the fiber is 3 μm .Find overall the signal attenuation in dB through the fiber and the attenuation per km for the fiber.	8 4	2 2	2 2
5	Explain briefly about various types of linear scattering losses in the optical fibre cable?	8	2	2
6	Explain Group velocity dispersion.Also Discuss chromatic dispersion in an optical fiber cable	7	2	2
7	Discuss the importance of intramodal dispersion and material dispersion effect in the optical fibre communication?	10	2	1
8	Give short notes on fusion splicing.Also Explain Elastic tube splice technique in the optical cable joint with a neat figure ?	9	2	2
9	Calculate the macrobend loss of a GI fiber with index profile $\alpha=2$, core diameter of 50μm,and wavelength 850nm, bent curve radius R=2 cm. The core refractive index is 1.45, NA=0.21,$\Delta=0.02$	4	2	2
10	Explain various mechanical misalignment losses in fibre joints with neat figure?	6	2	2

MODULE 3

(35 Marks)

Qn.No.	Questions	Marks	CO	BL
1	a)What are the main LED structures? Explain the operation of double heterojunction LED. b) Explain the operation of semiconductor Injection laser with neat sketches.	10 7	3 3	2 2
2	Briefly discuss the Fabry Perot type and Distributed feedback type laser diode structure with neat sketches?	14	3	1
3	Discuss the structure and working principle of Avalanche photodiode with neat diagrams? Also Discuss the advantages and disadvantages	8	3	1
4	a) Draw the structure and electric field distribution of RAPD. How is multiplication achieved in RAPD? b) The quantum efficiency of silicon RAPD is 85% which is used for the detection of wavelength 0.9μm. When the incident optical power is 0.5 μW, the output current from the device is after multiplication is 12μA. Determine responsivity, primary photocurrent and multiplication factor of the RAPD.	8 6	3 3	1 2
5	Write a short note on four types of noises in the photo-detector ?	8	3	1
6	a)Elaborate on direct band gap and indirect band gap materials. b)Draw the basic block diagram of an optical receiver and explain.	9 7	3 3	2 2
7	Explain the structure and working principle of PIN photodiode as an optical detector with neat figure ?	5	3	2
8	Write a short note on semiconductor laser amplifier and doped fiber amplifiers in an optical communication system?	6	3	1
9	What is a heterojunction? Explain the working of heterojunction LED with a neat sketch?	6	3	2
10	Explain the importance of amplified spontaneous emission noise in the laser diode which is used as an optical source in the optical fibre communication?	3	3	2

MODULE 4

(35 Marks)

Qn.No.	Questions	Marks	CO	BL
1	Explain briefly the working principle of Raman amplifier as an optical amplifier with a neat sketch? Draw its gain spectrum? Also give the advantages of Raman Amplifier	9	4	2
2	a)Explain the working and operation of EDFA also give the different architectures (10) b)Consider an EDFA being pumped at 980 nm with a 30-mW pump power. If the gain at 1550 nm is 20 dB, what are the maximum input and output powers?	10 4	4 4	2 2
3	Briefly explain the general applications of three types of optical amplifier?	6	4	2
4	Explain the operation and working of semiconductor optical amplifier (SOA) and what are the different types of SOAs.	10	4	2
5	Explain the working principle of TDFA	5	4	2
6	a) Explain the different ways to accomplish gain flattening in EDFA b) Derive the expression for the power conversion efficiency and gain of the EDFA? c) Discuss the advantages of EDFA	4 6 5	4 4 4	2 2 1
7	Write short notes on rare earth doped Fiber amplifiers.	7	4	1
8	Compare EDFA and TDFA.	3	4	1
9	What are salient features of semiconductor optical amplifiers?	7	4	1
10	Explain the amplification mechanism with energy level diagram in an EDFA.	8	4	2

MODULE 5

(35 Marks)

Qn.No.	Questions	Marks	CO	BL
1	What is free space optics? Write the advantages and challenges of free space communication	9	5	2
2	Explain briefly VLC and LiFi technology.	6	5	2
3	What is WDM? Differentiate between CWDM and DWDM . Also explain different WDM Standards	8	5	1
4	With neat sketches, explain the operation of optical time domain reflectometer for fault detection and refractive index measurement	14	5	2
5	Explain the operation of a typical WDM system also give the advantages of WDM.	10	5	2
6	Explain the role of tunable filters in WDM.	5	5	2
7	Explain the operation of Add/drop Mux	4	5	2
8	Explain the operating principle of wavelength division multiplexing (WDM) with neat diagrams?	10	5	2
9	Explain features of various star couplers with suitable diagrams?	6	5	2
10	Briefly explain the importance of diffraction grating in the optical communication system with neat sketches?	8	5	2

2021 Batch S7
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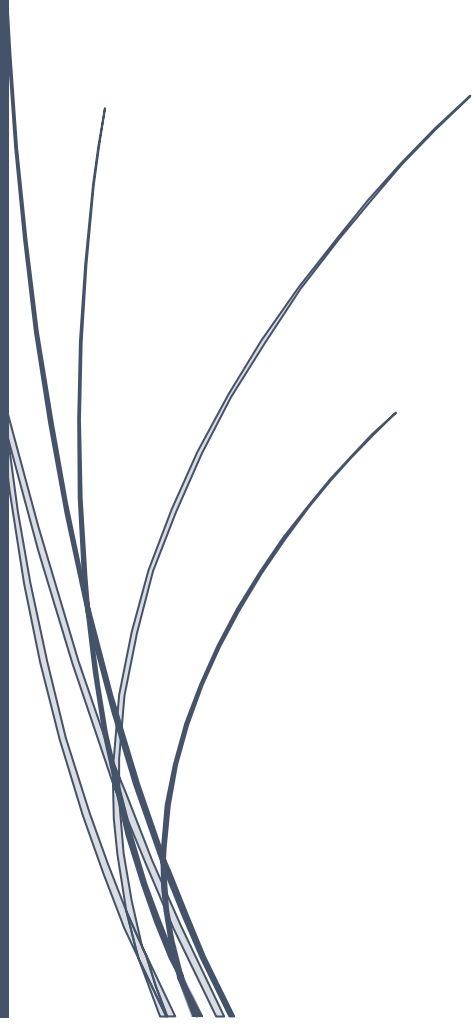
EET435
RENEWABLE ENGERY SYSTEMS

Faculty–Ms. DHANYA S.



EET435 RENEWABLE ENERGY SYSTEMS

MODULE 1

Sr No	Questions		Marks
1	Differentiate between Conventional and Non-conventional sources of energy	KTU DEC 2023	3
2	Explain 3 applications of stand-alone solar PV systems	KTU DEC 2023	3
3	Differentiate between Open Cycle and Closed Cycle OTEC systems	KTU DEC 2023	3
4	Draw a fully labelled sketch and explain the working of a Solar Thermal Electric Power generation system using Central Tower solar-collector.	KTU DEC 2023	10
5	Draw a fully labelled I-V Curve of a solar cell indicating all relevant voltages and currents. Also indicate the voltage and current corresponding to the maximum power point and show how the Fill Factor can be computed from this curve	KTU DEC 2023	4
6	With a neat labelled diagram explain the construction and working of a Flat plate solar collector	KTU DEC 2023	10
7	Compare the features (4 points) of non-concentrating and non-concentrating type solar collectors.	KTU DEC 2023	4
8	Explain about the role of non-conventional energy sources on the basis of current energy demands of the world	KTU DEC 2022	3
9	Explain the principle of solar energy conversion into heat energy , write any three types of solar cells based on construction materials	KTU DEC 2022	8
10	What are solar collectors? Give their classification and compare them based on construction and area of applications	KTU DEC 2022	10

MODULE 2

1	Explain the environmental impacts of Tidal Energy conversion systems	KTU DEC 2023	3
2	List 3 important criteria for the selection of site for a WECS	KTU DEC 2023	3
3	A wind turbine rotor has a blade diameter of 20m. At a wind speed of 16m/s the turbine produces a power output of 270kW. Given that the density of air is 1.2 kg/m^3 determine the maximum power coefficient of the turbine	KTU DEC 2023	3
4	With a neat diagram explain the working of a Hybrid Cycle OTEC system	KTU DEC 2023	10
5	Explain the advantages of OTEC systems	KTU DEC 2023	4

6	Draw a schematic diagram and explain the working of a double-basin Tidal power Plant	KTU DEC 2023	10
7	What are the environmental impacts of Tidal Power plants?	KTU DEC 2023	4
8	List out any four environmental impacts of OTEC systems	KTU Dec 2022	3
9	What are the limitations of the tidal power production	KTU Dec 2022	4
10	What are the different classifications of tidal power plants. Explain the components and detailed working operation of double basin tidal power plant with neat sketch	KTU Dec 2022	10

MODULE 3

1	What is the product obtained from Biomass gasification? Name the stages involved in the gasification process	KTU DEC 2023	3
2	Explain in detail the different types of classifications of Wind energy Conversion systems	KTU DEC 2023	10
3	Explain how wind speed is measured using an anemometer	KTU DEC 2023	4
4	Determine the theoretical maximum power that can be extracted from wind using a wind turbine. Also show that this condition is achieved when the down stream velocity is one-third of the upstream velocity	KTU DEC 2023	10
5	Explain the factors to be considered for selection of site for WECS	KTU DEC 2023	4
6	What are the advantages and disadvantages of a vertical axis wind turbine system?	KTU DEC 2023	6
7	Discuss the advantages and disadvantages of horizontal and vertical axis wind mills	KTU Dec 2022	3
8	What is mean by betz limit? Derive the expression for the power extracted by a wind turbine	KTU Dec 2022	8
9	What are the different types of generators used with wind turbines	KTU Dec 2022	6
10	Describe the construction of a three-bladed horizontal shaft wind turbine generator unit.	KTU Dec 2022	6

MODULE 4

1	Name the process used to produce biogas from wet biomass? Explain the stages involved in this process	KTU DEC 2023	3
2	What are the factors affecting the biogas generation?	KTU DEC 2023	3
3	How can Urban waste be converted to useful energy? Draw a neat diagram and explain the step-by-step process	KTU DEC 2023	10

4	Explain the process of converting Biomass to Ethanol	KTU DEC 2023	4
5	What is KVIC model of Biogas generation? With a neat schematic diagram explain its working	KTU DEC 2023	10
6	Explain any four significant factors which affect the performance of a Biogas plant	KTU DEC 2023	4
7	Describe the construction and working of a biogas plant, its material aspects, and utilization of plant products with a neat diagram	KTU DEC 2022	10
8	Explain the advantages and uses of biogas	KTU DEC 2022	4
9	What are the factors affecting the selection of a particular model of a biogas plant	KTU DEC 2022	4
10	Explain the ethanol production process from biomass.	KTU May 2024	4

MODULE 5

1	List three methods for storing hydrogen	KTU DEC 2023	3
2	What are the benefits of using hydrogen as a fuel?	KTU DEC 2023	3
3	Draw a neat schematic of a Hydrogen-Oxygen fuel cell, write down the chemical reactions involved and explain the working	KTU DEC 2023	10
4	Explain any 2 methods used for storage of Hydrogen	KTU DEC 2023	4
5	What are the different types of turbines used in Small Hydro power plants? With neat sketch explain any two such turbines	KTU DEC 2023	10
6	Explain how Hydrogen is produced by Electrolysis	KTU DEC 2023	4
7	What are the risks for the hydrogen energy storage	KTU DEC 2022	3
8	What are fuel cells? List out applications of fuel cells	KTU DEC 2022	3
9	Explain the working of a H_2O_2 fuel cell and also write the advantages and disadvantages of a fuel cell	KTU DEC 2022	8
10	What are the advantages and applications of hydrogen energy?	KTU DEC 2022	6

2021 Batch S7
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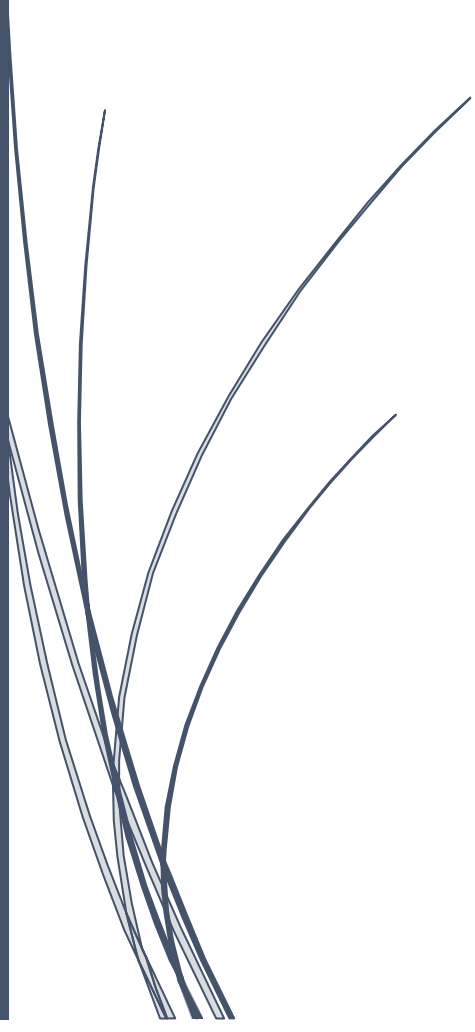
MCN401
INDUSTRIAL SAFETY ENGINEERING

Faculty–Ms. SREEJITHA S.G.



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 December 2023
	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 6	Model QuestionPaper December 2023 May 2024 (2019 Scheme)
	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 December 2023 (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 December 2022 May 2023 May 2024 (2019 scheme)
	What are the causes of industrial accidents	7	May 2023 May 2024 (2019 Scheme)

	Explain Heinrich's domino theory for accident causation. Also mention any two modifications made on this basic concept.	7	December 2023 (2019 scheme)
4.	Discuss the significance of safety policy in reducing 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 Write note on cold work permit	3	May 2023 December 2023 May 2024 (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 December 2023 May 2024 (2019 scheme)
	Explain the role of management & employees in housekeeping?	7	May 2023 (2019 Scheme)
	Explain any ten important responsibilities of housekeeping head of an organization	8	December 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 December 2023 (2019 scheme)

	With suitable sketches explain the important functions of any two PPE used for eye protection.	5	December 2022 December 2023 (2019 scheme)
	Classify personal protective equipment used in industries. List the suitability of at least seven types of PPEs	14	May 2023 May 2024 (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 May 2024 (2019 scheme)
	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 demolition operations.	3	Model Question Paper December 2023 (2019 scheme)
	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

			May 2024 (2019 scheme)
	Discuss some important aspects of construction safety provisions in National Building Code.	5	December 2022 (2019 scheme)
	Explain the classification of residential buildings based on the National Building Code of India	5	December 2023 (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 December 2023 (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.How can we reduce its impact?	14	Model Question Paper May 2023 (2019 scheme)
	Write short note on cumulative trauma disorders due to ergonomic issues in worksites	14	December 2023 (2019 Scheme)
6.	Explain any important four safety practices in excavation works.	3	December 2022 December 2023 (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 December 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 December 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 December 2023 (2019 Scheme)
	Differentiate between manual and mechanized material handling with suitable examples	6	December 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)
	Describe about safety practices to be followed during arc welding process	8	December 2023 (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 May 2024 (2019 scheme)
	With suitable sketches explain the operation of any two types of safety guards suitable for industrial applications.	8	December 2022 December 2023 (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 December 2023 (2019 scheme)
	What do you meant by hearing conservation program in production industries? Explain the key elements of a hearing conservation program	14	May 2024 (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)
	Explain the different causes of electric hazards	3	December 2023 (2019 scheme)
2.	Explain the need for a Preliminary Hazard Analysis in a hazardous industry.	6	December 2022 May 2024 (2019 scheme)
3.	Why MSDS is mandatory for chemical products.	3	Model Question Paper
	What is meant by MSDS	3	May 2023 May 2024 (2019 Scheme)
	Why material safety data sheet is mandatory for chemical products?	3	December 2022 (2019 scheme)
	Explain how does MSDS differ from a product label referred to material safety	5	December 2023 (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 December 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 December 2023 (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 December 2023 May 2024 (2019 scheme)
	Explain the important features and functions of any four different types of fire extinguishers	8	December 2022 (2019 scheme)