

R20

III B.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

OCT./NOV. - 2023

**(R20) III B.TECH II SEMESTER SUPPLEMENTARY END EXAMINATIONS OCT/NOV-2023**

**TIME TABLE**

TIME: 02.00 PM TO 05.00 PM

Date	Civil Engg. (01-CE)	Electrical & Electronics Engg. (02-EEE)	Mechanical Engg. (03-ME)	Electronics & Communication Engg. (04-ECE)	Computer Science & Engg. (05-CSE)	IT (12-IT)	AI (43-AI)
30.10.2023	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (R20CC32MC1)	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (R20CC32MC1)	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (R20ME32MC1)	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (R20EC32MC1)	PROFESSIONAL ETHICS AND HUMAN VALUES (R20CC32MC2)	PROFESSIONAL ETHICS AND HUMAN VALUES (R20CC32MC2)	PROFESSIONAL ETHICS AND HUMAN VALUES (R20CC32MC2)
01.11.2023	DESIGN AND DRAWING OF STEEL STRUCTURES (R20CE3201)	MICROPROCESSOR AND MICROCONTROLLERS (R20EE3201)	DESIGN OF MACHINE ELEMENTS-II (R20ME3201)	MICRO WAVE AND OPTICAL COMMUNICATIONS (R20EC3201)	CRYPTOGRAPHY AND NETWORK SECURITY (R20CC3201)	CRYPTOGRAPHY AND NETWORK SECURITY (R20CC3201)	CRYPTOGRAPHY AND NETWORK SECURITY (R20CC3201)
03.11.2023	ENVIRONMENTAL ENGINEERING (R20CE3202)	POWER SYSTEM ANALYSIS (R20EE3202)	HEAT TRANSFER (R20ME3202)	VLSI DESIGN (R20EC3202)	MACHINE LEARNING (R20CC3204)	MACHINE LEARNING (R20CC3204)	DEEP LEARNING (R20AI3204)
06.11.2023	HYDROLOGY AND IRRIGATION ENGINEERING (R20CE3203)	MEASUREMENTS AND INSTRUMENTATION (R20EE3203)	DYNAMICS OF MACHINERY (R20ME3203)	MICROPROCESSORS AND MICROCONTROLLERS (R20EC3203)	ADVANCED JAVA AND WEB TECHNOLOGIES (R20CC3205)	AGILE METHODOLOGIES (R20IT3202)	ADVANCED JAVA AND WEB TECHNOLOGIES (R20CC3205)
08.11.2023	FOUNDATION ENGINEERING (R20CE3204)	ELECTRIC DRIVES (R20EE3205)	ROBOTICS AND APPLICATIONS (R20ME3207)	DIGITAL IMAGE PROCESSING (R20EC3207)	BIG DATA ANALYTICS (R20CC3206)	BIG DATA ANALYTICS (R20CC3206)	NATURAL LANGUAGE PROCESSING (R20AI3206)
10.11.2023	REMOTE SENSING AND GIS (R20CC20E01)	INDUSTRIAL ROBOTICS (R20CC20E06)	DIGITAL MARKETING (R20CC20E13)	OOPS THROUGH JAVA (R20CC20E10)	CLOUD COMPUTING (R20CC20E16)	CLOUD COMPUTING (R20CC20E16)	INDUSTRIAL ROBOTICS (R20CC20E06)

**NOTE:**

- I. ANY OMISSION OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS, IMMEDIATELY.
- II. EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- III. THE HOD'S ARE REQUESTED TO INFORM THE EXAMINATION SECTION (AUTONOMOUS) ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

*M. S. S.*

**CHIEF CONTROLLER OF EXAMINATIONS**

## III B.Tech II Semester Supple Examinations, October/November-2023 Month/Year

**Sub Code: R20CC32MC1 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

Time: 3 hours

(CE,EEE,ME,ECE)

Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M
<b>Unit-I</b>				
1	a Elucidate the position of women in Ancient, Medieval and Modern Women.	K2	1	14M
	OR			
	b Describe Characteristics & Significance of Indian Culture.	K2	1	14M
<b>Unit-II</b>				
2	a Briefly explain Epic of Ramayana.	K3	2	14M
	OR			
	b Write about the short history of the Sanskrit literature.	K3	2	14M
<b>Unit-III</b>				
3	a Explain the role of Modern theatre and Indian Cinema	K2	3	14M
	OR			
	b Write about the main elements of Hindu temples in Indian.	K2	3	14M
<b>Unit-IV</b>				
4	a How can you assess Indian Culture in South, East and Central Asia and Western World through ages?	K3	4	14M
	OR			
	b Explain briefly Causes, Significance and Modes of Indian culture Exchanges.	K3	4	14M
<b>Unit-V</b>				
5	a Elaborate the Aim of Indian education in Ancient, Medieval and Modern era.	K2	5	14M
	OR			
	b Describe Science and Scientist in Ancient and Modern India.	K2	5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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# NARASARAOPETA ENGINEERING COLLEGE

(AUTONOMOUS)

**III B.Tech II Semester Supple Examinations, October/November-2023 Month/Year**

**Sub Code: R20CC32MC2 PROFESSIONAL ETHICS AND HUMAN VALUES**

Time: 3 hours

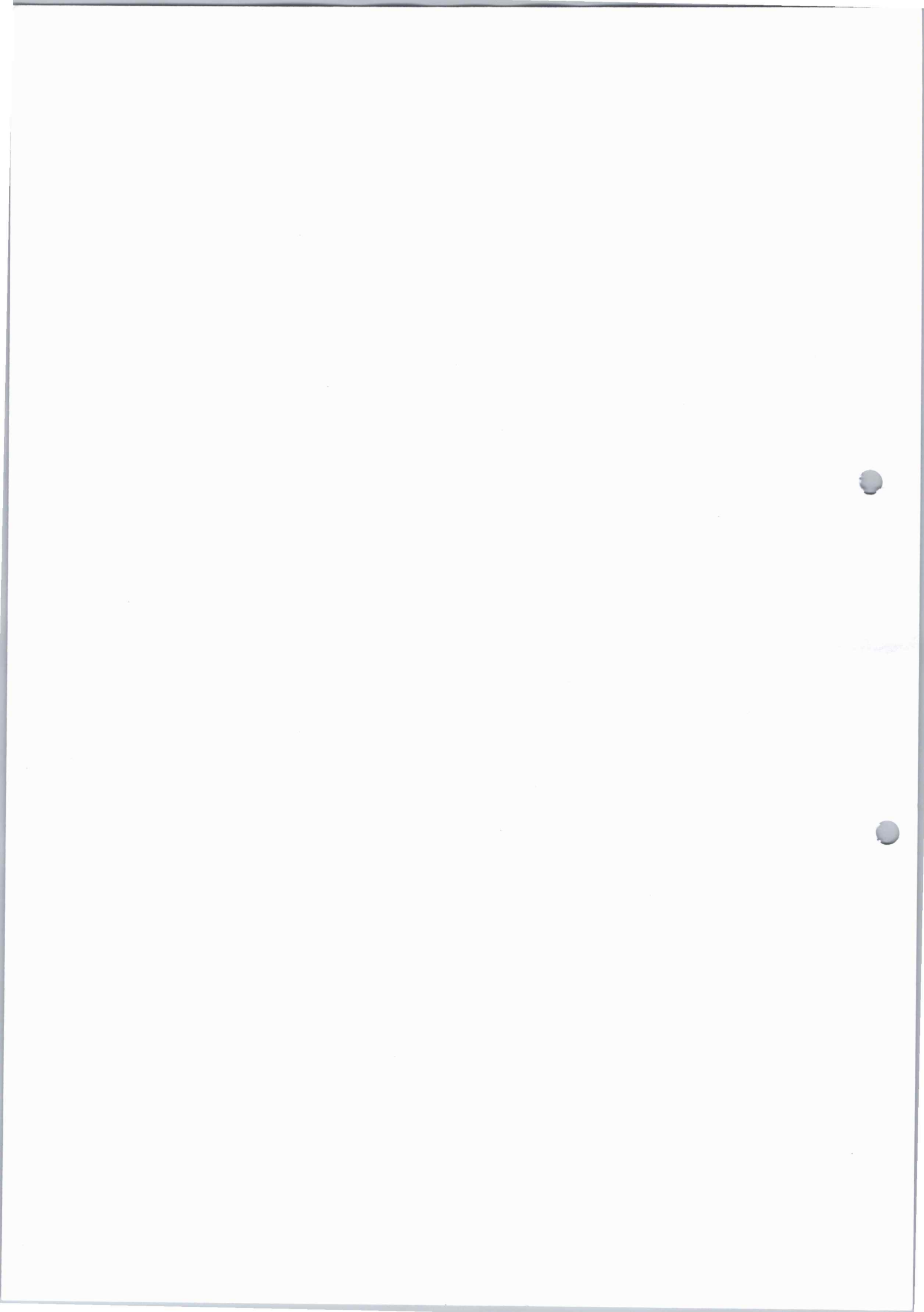
(CSE)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

1. A) Explain the respect for others and disrespect signs (CO1, K2, 14M)  
(OR)  
B) Explain: (CO1, K2, 14M)
  - A) Civic virtue
  - B) Self confidence
  - C) Cooperation
2. A) Discuss the role of professional engineers. (CO2, K2, 14M)  
(OR)  
B) Distinguish the theory of Lawrence Kohlberg's with Carol Gilligan's (CO2, K2, 14M)
3. A) Describe the concept of Human Rights. (CO3, K2, 14M)  
(OR)  
B) Explain the factors that influence Gender bias and Mayer Model. (CO3, K2, 14M)
4. A) What is collective bargaining? Explain the process of collective bargaining. (CO4, K2, 14M)  
(OR)  
B) Describe the Occupational crimes and explain types of Whistle Blowing. (CO4, K2, 14M)
5. A) What are the Engineers responsibilities towards safety and risk? (CO5, K2, 14M)  
(OR)  
B) Describe the concept of Risk-Benefit Analysis with an example. (CO5, K2, 14M)



## III B.Tech II Semester Supple. Examinations, October-2023

**Sub Code: R20CC3201 CRYPTOGRAPHY AND NETWORK SECURITY**

Time: 3 hours

CSE, CSE (AI), IT

Max. Marks: 70

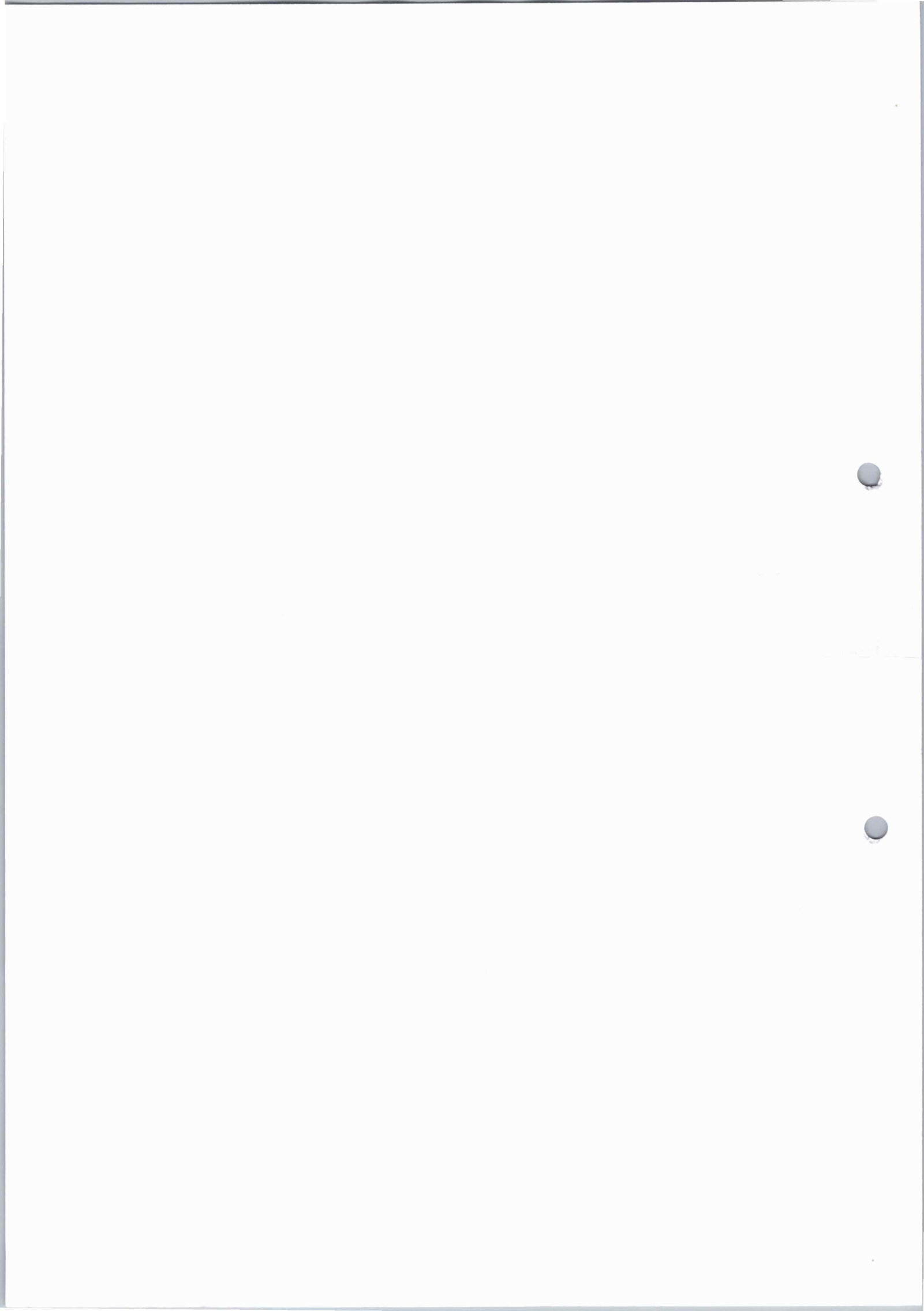
Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M
<b>Unit-I</b>				
1	a i) Differentiate between passive attacks and active attacks	2	1	7M
	ii) Explain the operations, requirements, components of Network security model	2	1	7M
	OR			
	b i) Briefly Explain the monoalphabetic cipher. What is the difference between a monoalphabetic cipher and a polyalphabetic cipher?	2	1	7M
	ii) Construct a Playfair matrix with the key largest. encrypt this message: MEET ME AT THE TOGA PARTY	3	1	7M
<b>Unit-II</b>				
2	a i) How do you convert a block cipher into a stream cipher by using the Cipher Feedback (CFB) mode? Explain	1	2	7M
	ii) How is expansion permutation function done in DES?	2	2	7M
	OR			
	b i) Describe about IDEA encryption and decryption	2	2	14M
<b>Unit-III</b>				
3	a i) What is discrete logarithm? What are their properties?	1	3	7M
	ii) State and explain Euler's theorem	2	3	7M
	OR			
	b i) Users A and B use the Diffie Hellman key exchange technique, a common prime $q=11$ and a primitive root $\alpha=7$ . (a)What is the shared secret key? Also write the algorithm. (b) How man in middle attack can be performed in Diffie Hellman algorithm.	3	3	14M
<b>Unit-IV</b>				
4	a i) Briefly explain the different message authentication functions with neat diagram	2	4	14M
	OR			
	b i) Differentiate digital signature from digital certificate.	2	4	7M
	ii) Explain about one-way authentication	2	4	7M
<b>Unit-V</b>				
5	a i) Analyze the Cryptographic algorithms used in S/MIME	4	5	7M
	ii) Give the structure of PGP message generation. Explain with a diagram	2	5	7M
	OR			
	b i) What is meant by Transport mode and tunnel mode? How is authentication header implemented in these two modes?	2	5	7M
	ii) Describe the SSL Specific protocol – Handshake action in detail	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CC3204

MACHINE LEARNING

Time: 3 hours

(CSE, IT)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M			
<b>Unit-I</b>							
1	a	i) What is multiple linear regression? Explain with the help of sample data.			2	1	7M
		ii) Discuss about Probably Approximately Correct (PAC) Learning.			2	1	7M
	OR						
	b	i) Discuss about Bayesian classification with an example.			2	1	7M
ii) Explain various dimensions of a Supervised Machine Learning Algorithm			2	1	7M		
<b>Unit-II</b>							
2	a	i) Distinguish between bias and variance with an example.			2	2	7M
		ii) Explain about Maximum Likelihood Estimation.			2	2	7M
	OR						
	b	Discuss about various Model Selection Procedures in detail.			2	2	14M
<b>Unit-III</b>							
3	a	i) Define association learning. List various techniques available for association learning.			2	3	7M
		ii) Explain the working of FP Growth Algorithm.			2	3	7M
	OR						
	b	i) What is Linear Discriminant Analysis. Give an example.			2	3	7M
ii) Discuss how Principal Components Analysis can be applied for dimensionality reduction?			2	3	7M		
<b>Unit-IV</b>							
4	a	Explain in detail the working of Hierarchical Clustering algorithm with an example.			2	4	14M
	OR						
	b	i) Discuss about k-means clustering.			2	4	7M
ii) What is spectral clustering? Give an example.			2	4	7M		
<b>Unit-V</b>							
5	a	i) Discuss how rule extraction can be done using trees.			2	5	7M
		ii) What is a univariate tree? Give an example.			2	5	7M
	OR						
b	Explain how decision trees are created by considering a sample dataset.			2	5	14M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CC3205

ADVANCED JAVA AND WEB TECHNOLOGIES

Time: 3 hours

CSE, CSE(AI)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M
Unit-I				
1	a Illustrate the servlet life cycle with example program	K2	1	14M
	OR			
	b Explain the steps to access the database using servlet	K2	1	14M
Unit-II				
2	a Explain the JSP processing detail.	K2	2	14M
	OR			
	b Explain the scripting elements and implicit objects of JSP in detail.	K2	2	14M
Unit-III				
3	a Explain the techniques of error handling and debugging of JSP	K3	3	14M
	OR			
	b Explain the JSP session tracking with sample code	K3	3	14M
Unit-IV				
4	a Explain about the JDBC Drivers.	K2	4	14M
	OR			
	b How to access the database using JDBC for JSP page? Justify.	K2	4	14M
Unit-V				
5	a With an example PHP program, illustrate the handling of http get and post requests	K3	5	14M
	OR			
	b Explain the process of handling all html form fields with PHP example program	K3	5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks\*\*\*

## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CC3206

**BIG DATA ANALYTICS**

Time: 3 hours

(CSE, IT)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) List and explain the important features of Hadoop.	2	1	7M
		ii) With a neat sketch explain the structure of google file system.	2	1	7M
	OR				
b	i) List various configuration files used in Hadoop Installation. What is use of mapredsite.xml?	2	1	14M	
2	Unit-II				
	a	i) Write a program to find maximum recorded temperature by year from data collected from national climate data center.	2	2	7M
		ii) Explain the differences between old and new Java MapReduce API.	2	2	7M
	OR				
b	i) Illustrate YARN based execution model and its functions With a neat diagram	2	2	14M	
3	Unit-III				
	a	i) What is Apache Spark? What are the advantages of using Apache Spark over Hadoop?	2	3	7M
		ii) Explain in brief four major libraries of Apache Spark	2	3	7M
	OR				
b	i) What is Resilient Distributed Dataset in Apache Spark? Explain in detail. Make a note on why RDD is better than Map Reduce data storage?	2	3	14M	
4	Unit-IV				
	a	i) Explain the principles to be considered while writing Pig scripts.	2	4	7M
		ii) Describe two modes for running scripts in Pig.	2	4	7M
	OR				
b	i) Analyze the components of Pig Architecture.	2	4	7M	
	ii) Analyze the Local and Distributed Modes of Running Pig scripts	2	4	7M	
5	Unit-V				
	a	i) Draw a neat sketch to explain components that are required when running the Command Line Interface.	2	5	7M
		ii) Explain the creating, dropping and altering databases using Apache Hive.	2	5	7M
	OR				
b	i) Illustrate main features and Architecture of Hive with neat diagram.	2	5	7M	
	ii) Explain any three HiveQL DDL commands with its syntax and example.	2	5	7M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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**III B.Tech II Semester Supple. Examinations, October-2023**

Sub Code: R20CE3201

DESIGN AND DRAWING OF STEEL STRUCTURES

Time: 3 hours

(CE)

Max. Marks: 70

**Answer any ONE Question from Part - A & Any THREE Questions from Part - B**

Q.No	Questions	KL	CO	Marks
<b>PART A</b>				
1	Design a welded plate girder for a simply supported bridge deck beam with a clear span of 16 m. Dead Load including self weight = 18 kNm and imposed load = 9 kNm. Two moving loads of 110 kN each spaced 2 m apart. Assume the top compression flange of the plate girder is restrained laterally and prevented from rotating. Design as an unstiffened plate girder with thick welds. Draw the plan and sectional elevation.	K4	CO5	[28M]
<b>OR</b>				
2	Design a built up laced column and associated connecting elements to carry an axial load 1000 kN and moment 30 kN-m. The column height is 12 m, hinged at bottom and top, and built with Four angle sections placed in the form of back to back and connected by field weld joints of laced system. Neatly sketch and detail the built up section and apply necessary design checks. Use steel grade Fe410	K4	CO4	[28M]
<b>PART B</b>				
3	An ISA 100x100x12 mm is used as a tie riveted to a gusset plate with 24mm rivets arranged in one row along the length of the angle. Determine the allowable tension on the angle if the allowable tensile stress is 150MPa.	K4	CO2	[14M]
4	Design a laced column for an axial load of 1200 kN with an effective span of 7.5m has one end fixed and the other end hinged. Use channels for main members and an angle for lacing bars.	K4	CO4	[14M]
5	A plate girder of span 15m is made-up of web plates of 1600mm x 8mm flange angles 150mmx 115mm x 10mm and two flange plates 480mm x 10mm it carries a uniformly distributed load of 100kN/m including its own weight. Design and sketch the web splices at 5m from one end.	K4	CO5	[14M]
6	Check whether an ISMB200 section can be used a laterally unrestrained beam of length 1.5 m (simply supported) to carry a factored UDL of 50 kN/m	K5	CO3	[14M]
7	An industrial roof system requires purlins to be designed. The purlins of 5 m length are to be spaced 1.275 m apart and the roof pitch is 11.3 degrees. If the live load is 0.4 kN/m <sup>2</sup> , dead load is 0.21 kN/m <sup>2</sup> and wind pressure is 2.6 kN/m <sup>2</sup> , check if ISMC150 section is suitable for the purlin.	K4	CO4	[14M]

## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CE3202

ENVIRONMENTAL ENGINEERING

Time: 3 hours

(CE)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Assume suitable data if necessary

Q.No	Questions	KL	CO	M																
<b>Unit-I</b>																				
1	i) Estimate the future population of a town in the year 2001 by using following data by incremental increase method (7)	K3	1	10M																
	<table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="width: 15%;">Year</td> <td style="width: 10%;">1941</td> <td style="width: 10%;">1951</td> <td style="width: 10%;">1961</td> <td style="width: 10%;">1971</td> <td style="width: 10%;">1981</td> <td style="width: 10%;">1991</td> </tr> <tr> <td>Population</td> <td>35000</td> <td>46600</td> <td>99500</td> <td>126000</td> <td>156000</td> <td>186000</td> </tr> </table>				Year	1941	1951	1961	1971	1981	1991	Population	35000	46600	99500	126000	156000	186000		
	Year	1941	1951		1961	1971	1981	1991												
	Population	35000	46600		99500	126000	156000	186000												
ii) Explain about the Design Period.	K2	1	4M																	
<b>OR</b>																				
b	Estimate the future population of a town in the year 2035 by using following data by decrease rate of growth method (10)	K3	1	14M																
	<table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="width: 15%;">Year</td> <td style="width: 10%;">1955</td> <td style="width: 10%;">1965</td> <td style="width: 10%;">1975</td> <td style="width: 10%;">1985</td> <td style="width: 10%;">1995</td> <td style="width: 10%;">2005</td> <td style="width: 10%;">2015</td> </tr> <tr> <td>Population</td> <td>22050</td> <td>26550</td> <td>36850</td> <td>51560</td> <td>67545</td> <td>78080</td> <td>84200</td> </tr> </table>				Year	1955	1965	1975	1985	1995	2005	2015	Population	22050	26550	36850	51560	67545	78080	84200
	Year				1955	1965	1975	1985	1995	2005	2015									
Population	22050	26550	36850	51560	67545	78080	84200													
<b>Unit-II</b>																				
a	i) Explain how to determine optimum coagulation dose in the laboratory	K2	2	7M																
	ii) Draw a flow diagram of surface water treatment plant and briefly describe the function of its each unit.	K2	2	7M																
<b>OR</b>																				
b	i) An ideal sedimentation tank with a surface area of 100 m <sup>2</sup> receives and inflow of 20 MLD. Particles specific gravity is 1.2, and diameters of particles is 0.3, 0.2, 0.1 mm, settling velocity is 0.39, 0.23, 0.09 cm/s respectively. Find out what percentage of each size would settle down.	K3	2	10M																
	ii) Differentiate between slow sand filters and rapid sand filters	K2	2	4M																
<b>Unit-III</b>																				
a	i) Explain the collection and conveyance of sewage from a community	K2	3	7M																
	ii) Explain how to determine quantity of sewage, write factors affects it	K2	3	7M																

		OR			
	b	i) The 5-day BOD at 20°C of a sewage sample was found to be 120 mg/L. Estimate 3 day BOD at 30°C for the same sample. assume $k_{20} = 0.1/\text{day}$	K4	3	9M
		ii) Explain sewage farming	K2		5M
		Unit-IV			
4	a	i) Estimate the minimum velocity and gradient required to transport coarse sand through a sewer of 60 cm diameter with sand particles of 1.5 mm diameter and specific gravity 2.65, Assume $\beta = 0.06$ and $f = 0.02$ assume the sewer to run half full. Take $N = 0.0125$	K4	4	9M
		ii) Explain design steps of grit chamber	K2	4	5M
		OR			
	b	i) Design a primary settling tank of rectangular shape for a town having a population of 60,000, with a water supply of 150 lpcd.	K4	4	7M
		ii) Explain Design steps for Septic tank	K3	4	7M
		Unit-V			
5	a	i) With the help of a neat sketch explain Activated Sludge Process.	K3	5	7M
		ii) Write a detailed note on anaerobic sludge digestion. Explain the effect of temperature and pH.	K2	5	7M
		OR			
	b	i) The sewage flows from a primary settling tank to a standard rate trickling filter at a rate of 5 MDL having a 5-day BOD of 150 mg/L. Design the depth and volume of the filter, adopting a surface loading of 2500 L/m <sup>2</sup> /d and an organic loading of 170 g/m <sup>3</sup> /d. Also determine the efficiency of the filter unit, using NRC formula.	K4	5	9M
		ii) Explain with a neat sketch of Oxidation pond.	K3	5	5M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CE3203  
Time: 3 hours

**HYDROLOGY AND IRRIGATION ENGINEERING**  
(CE)

Max. Marks: 70

Note: Answer All FIVE Questions.  
All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M														
1	Unit-I																	
	a	i) Discuss the various processes involved in the Hydrologic cycle using Horton's engineering representation.	K2	1	7M													
		ii) Define Precipitation. Distinguish between convection and Orographic precipitation.	K2	1	7M													
	OR																	
	b	i) List the importance of hydrology with an emphasis on global water availability.	K2	1	7M													
		ii) Define rain gauge. Describe with a neat sketch, the principle of working of symon's non-recording gauge and its demerits.	K2	1	7M													
2	Unit-II																	
	a	i) Explain how evaporation amount is measured using IS class-A pan? List the factors affecting it.	K2	2	7M													
		ii) Define evapotranspiration? Write its measurement using Lysimeter method, with sketch. And list the factors affecting evapotranspiration.	K2	2	7M													
	OR																	
	b	i) Define infiltration. With neat sketch, explain double ring infiltrometer.	K2	2	7M													
		ii) For a storm of 3hr duration the rainfall rates are as follows: <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Time Period(min-utes)</td> <td style="padding: 2px;">30</td> <td style="padding: 2px;">30</td> <td style="padding: 2px;">30</td> <td style="padding: 2px;">30</td> <td style="padding: 2px;">30</td> <td style="padding: 2px;">30</td> </tr> <tr> <td style="padding: 2px;">Rainfall rate(cm/hr)</td> <td style="padding: 2px;">1.4</td> <td style="padding: 2px;">3.4</td> <td style="padding: 2px;">4.8</td> <td style="padding: 2px;">3.2</td> <td style="padding: 2px;">2</td> <td style="padding: 2px;">1.2</td> </tr> </table> If the surface run off is 3.4cm determine the $\phi$ -index and W-index assume initial $\phi$ -index is more than 1.4 cm/hr.	Time Period(min-utes)	30	30	30	30	30	30	Rainfall rate(cm/hr)	1.4	3.4	4.8	3.2	2	1.2	K3	2
Time Period(min-utes)	30	30	30	30	30	30												
Rainfall rate(cm/hr)	1.4	3.4	4.8	3.2	2	1.2												
3	Unit-III																	
	a	i) Explain Runoff. And list out factors affecting it.	K2	3	7M													
		ii) Define Basic recharge, Direct runoff, Drainage density, Form factor, and Overland flow.	K2	3	7M													
	OR																	

	b	<p>i) Find out the ordinates of a storm hydrograph resulting from a 3 hours storm with rainfall of 3,4.5 and 1.5 cm during subsequent 3hr intervals. The ordinates of unit hydrograph are given in the table below.</p> <table border="1"> <tr> <td>Hours</td> <td>0</td> <td>3</td> <td>6</td> <td>9</td> <td>12</td> <td>15</td> <td>18</td> </tr> <tr> <td>OVH(cumecs)</td> <td>0</td> <td>90</td> <td>200</td> <td>350</td> <td>450</td> <td>350</td> <td>260</td> </tr> </table> <table border="1"> <tr> <td>Hours</td> <td>21</td> <td>24</td> <td>3</td> <td>6</td> <td>9</td> <td>12</td> </tr> <tr> <td>OVH(cumecs)</td> <td>190</td> <td>130</td> <td>80</td> <td>45</td> <td>20</td> <td>0</td> </tr> </table>	Hours	0	3	6	9	12	15	18	OVH(cumecs)	0	90	200	350	450	350	260	Hours	21	24	3	6	9	12	OVH(cumecs)	190	130	80	45	20	0	K3	3	7M						
		Hours	0	3	6	9	12	15	18																																
OVH(cumecs)	0	90	200	350	450	350	260																																		
Hours	21	24	3	6	9	12																																			
OVH(cumecs)	190	130	80	45	20	0																																			
	b	<p>ii) The hourly ordinates of a two hour unit hydrograph are given below. Derive a 6-hour unit hydrograph for the same catchment.</p> <table border="1"> <tr> <td>Time (hours)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>Discharge (cumecs)</td> <td>0</td> <td>1</td> <td>2.7</td> <td>5</td> <td>8</td> <td>9.8</td> <td>9</td> <td>7.5</td> </tr> </table> <table border="1"> <tr> <td>Time (hours)</td> <td>8</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> <td>15</td> </tr> <tr> <td>Discharge (cumecs)</td> <td>6.3</td> <td>5</td> <td>4</td> <td>2.9</td> <td>2.1</td> <td>1.3</td> <td>0.5</td> <td>0</td> </tr> </table>	Time (hours)	0	1	2	3	4	5	6	7	Discharge (cumecs)	0	1	2.7	5	8	9.8	9	7.5	Time (hours)	8	9	10	11	12	13	14	15	Discharge (cumecs)	6.3	5	4	2.9	2.1	1.3	0.5	0	K3	3	7M
		Time (hours)	0	1	2	3	4	5	6	7																															
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Time (hours)	8	9	10	11	12	13	14	15																																	
Discharge (cumecs)	6.3	5	4	2.9	2.1	1.3	0.5	0																																	
Unit-IV																																									
4	a	i) Explain the limitations of Darcy's Law?	K2	4	7M																																				
		ii) Explain the types of aquifers. And explain its parameters.	K2	4	7M																																				
OR																																									
	b	i) Explain briefly about Dupuit's equation.	K2	4	7M																																				
		ii) Derive an expression for specific storage in case of compressible aquifer.	K3	4	7M																																				
Unit-V																																									
	a	i) Define Irrigation. Discuss in brief the benefits and ill- effects of irrigation.	K2	5	7M																																				
		ii) Explain Bhandara Irrigation? List its advantages and disadvantages.	K3	5	7M																																				
OR																																									
5	b	i) Define Duty, delta and base period? Explain factors affecting Duty of water.	K2	5	7M																																				
		ii) Explain flow irrigations and lift irrigations. And explain types of flow irrigations.	K3	5	7M																																				



## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CE3204

FOUNDATION ENGINEERING

Time: 3 hours

(CE)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Explain the need for soil exploration. Discuss the sub soil exploration methods.	CO1	K2	7M
		ii) Explain Standard Penetration Test and corrections applied to observed N value. Illustrate test with figure	CO1	K2	7M
	OR				
	b	i) Discuss the boring methods. Write the bore log report for soil investigation.	CO1	K2	7M
		ii) What is depth of excavation? Define number of pits required for the various constructions?	CO1	K3	7M
2	Unit-II				
	a	i) Explain Bishop's simplified method. Derive an expression for the factor of safety.	CO3	K2	7M
		ii) The field 'N' value in a deposit of fully submerged fine sand was 50 at a depth of 8 m. The average saturated unit weight of soil is 19 kN/m <sup>3</sup> . Calculate the corrected 'N' value.	CO3	K2	7M
	OR				
	b	i) Give comparison of Rankine and Coulomb's theory.	CO3	K2	7M
		ii) Determine the safe height of a slope which is to be constructed at an angle of 30° with the horizontal. The required factor of safety with respect to both cohesion and angle of internal friction is 1.5, and the soil has the following properties: C= 10 kN/m <sup>2</sup> , $\Phi=22.5^\circ$ and density = 20 kN/m <sup>3</sup> . Taylor's stability numbers for mobilized friction angles of 22.5° and 15° are, respectively, 0.016 and 0.046.	CO3	K2	7M
3	Unit-III				
	a	i) Describe the types of foundation and discuss the selection criteria of a foundation.	CO3	K2	7M
		ii) Compute the safe bearing capacity of a square footing 1.5m x 1.5m located at a depth of 1m below the ground level in a soil of average density 20 kN/m <sup>3</sup> . $\Phi=20^\circ$ , $N_c=17.7$ , $N_q=7.4$ , $N_\gamma=5$ . Assume a suitable factor of safety and the water table is very deep. Also compute the reduction in safe bearing capacity of the footing if the water table rises to the ground level.	CO3	K2	7M
	OR				
	b	i) What are the assumptions made by Terzaghi for the ultimate bearing capacity of shallow foundation?	CO3	K2	7M
		ii) Determine the ultimate bearing capacity of a strip footing of 1.8m wide and having the depth of foundation of 1.4m. use terzaghi's theory and assume the general shear failure. Take $\phi=35^\circ$ , $\gamma=22\text{KN/m}^3$ , and cohesion of 19KN/m <sup>2</sup> by considering the bearing capacity factors of 57.8, 41.4, and 42.4 respectively.	CO3	K3	7M

		Unit-IV			
4	a	i) What is plate load test? Explain the procedure of plate load test of shallow foundations with neat sketch and assumptions?	CO2	K3	7M
		ii) Estimate the immediate settlement of a concrete footing 1.2 m X 1.5 m in size, if it is founded at a depth of 1.2 m in silty soil whose compression modulus is 9000 kPa. Footing is expected to transmit unit pressure of 200 kPa. Assume, $I_p = 1.06$ , $\mu = 0.3$ .	CO2	K2	7M
	OR				
	b	i) what is differential settlement ? what are the causes ? Explain the remedial measures to be taken to minimize the differential settlement.	CO2	K3	14M
		Unit-V			
5	a	i) What are the under-reamed piles ? Discuss the advantages and load transfer mechanism of under-reamed bulbs.	CO4	K2	7M
		ii) Discuss in detail the load carrying capacity of under-reamed piles in sandy soil.	CO4	K2	7M
	OR				
	b	i) With a neat sketch, state different components of a well foundation.	CO4	K2	7M
		ii) What are types of well foundation? Discuss different shapes of well foundation.	CO4	K2	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

**Sub Code: R20EE3201 MICROPROCESSOR AND MICROCONTROLLERS**

Time: 3 hours

(EEE)

Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Describe the register organization of 8086 microprocessor.	2	1	7M
		ii) The content of DS is 5678H. The amount of data that is to be stored in the data segment is 12KB. Where (address range) in memory, will this segment be located?	3	1	7M
	OR				
	b	i) Justify how 8086 microprocessor supports pipelining.	2	1	7M
		ii) For 8086, do the following calculation. The contents of the following segment registers are as given.  CS = 2001H, SS = 6046H , DS = 3456 H.  IP = 2456H, SP = 2200H, off set in data segment = 0040H.  Calculate the corresponding physical addresses for the addressed byte in  a) CS            b) SS            c) DS	3	1	7M
2	Unit-II				
	a	i) Find the status of the CF and ZF flags after the execution of each of the following sets of instructions. Given that AX=8976H.  a) ADD AX, 9034H    b) CMP AX,0B08H    c) XOR AL, AL d) MOV AL, 34H	3	2	7M
		ii) Sketch and analyze the IO write machine cycle of 8086 in maximum mode timing diagram.	4	2	7M
	OR				
	b	i) Draw the diagram showing address demultiplexing for 8086 in minimum mode. Explain the use of each IC in the system and the relevant pins and signals.	2	2	7M
ii) Write an 8086 ALP to find the average of 10 bytes stored in memory.		3	2	7M	
3	Unit-III				
	a	i) Illustrate the addressing modes of 8051 micro controller.	2	3	7M
		ii) Write a program to count the number of 1's in register R1. Take the data from 8051 RAM location.	4	3	7M
	OR				
	b	i) Discuss in detail about program flow control instructions of 8051 microcontrollers.	2	3	7M
ii) Outline the procedure to implement FOR Loop and IF-THEN-ELSE.		2	3	7M	

		Unit-IV			
4	a	i) Configure 8255 PPI Port A in Mode 2, Port B as o/p in mode 1. (PC5-0 are handshake lines for Port A and PC2-0 are handshake signals for port B). Write the suitable Control words and related program.	4	4	7M
		ii) Explain the basic architecture of 8259 programmable interrupt controller (PIC) with the help of block diagram and explain its functioning.	2	4	7M
	OR				
	b	i) Explain the interfacing of 8086 with DAC with a neat diagram. Write a program to generate a sawtooth waveform using a DAC chip. Assume that the suitable port addresses for 8255 PPI.	4	4	7M
ii) Analyse the functional block diagram of the 8257 DMA controller.		2	4	7M	
		Unit-V			
5	a	i) While debugging the 8051, the register contents are SCON=0x10, TMOD=0x11, TR1=1, TR0=0, TH1=0x52, and the oscillator frequency is 12MHZ.  a) Which timer is currently counting the clock pulses? b) Serial peripheral is operating in which mode? c) What are the modes of operation of Timer0 and Timer1? d) Is the serial receiver enabled? e) At what speed serial device transmits the data.?	4	5	7M
		ii) With respect to the 8051, answer the following questions  a) How is RAM organized? List the amount of byte-oriented RAM and bit-oriented RAM. b) How many register banks has it, and how is bank switching done?	2	5	7M
	OR				
	b	i) In 8051, port 0 and 1 are connected to two input devices. Write an assembly language program to take in data from these ports and compare them. If they are found to be equal, pin P2.0 should be set, otherwise, it should be cleared.	4	5	7M
ii) Discuss the bits of the PSW register of 8051 and how each bit is used.		2	5	7M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20EE3202

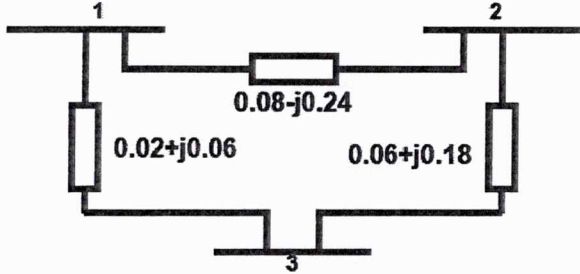
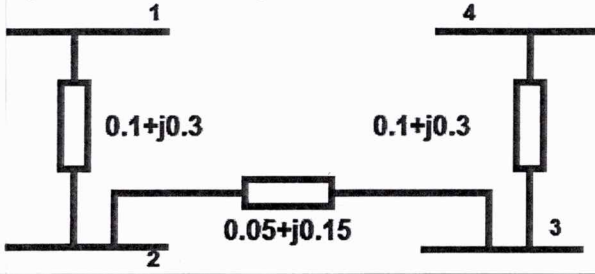
POWER SYSTEM ANALYSIS

Time: 3 hours

(EEE)

Max. Marks: 70

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
<b>Unit-I</b>					
1	a) i) A generation rated at 30MVA, 11kV has a reactance of 20%. Calculate its per unit reactance for a base of 50MVA and 10kV. Write down the properties of admittance matrix. ii) For the 3-bus system shown in Figure, obtain the Z-bus matrix.	K2	1	7M	
		K3	1	7M	
	<b>OR</b>				
	b) i) For the 4-bus system shown in figure, obtain the Z-bus matrix. ii) Give the applications of the Z <sub>bus</sub> building algorithm. Write the advantages of per unit system of representation.	K3	1	7M	
<b>Unit-II</b>					
2	a) i) With the help of neat flowchart, explain the Newton-Raphson method of load flow solution when the system contains voltage-controlled buses in addition to swing bus and load bus. ii) Compare Gauss-Seidal and Newton-Rapson method with respect to the number of iterations, convergence, initial value and assumptions.	K4	2	7M	
		K3	2	7M	
	<b>OR</b>				
	b) i) What is the significance of Jacobian matrix in load flow analysis using Newton-Rapson method. ii) Derive the expression for the limits of reactive power and discuss how it is considered for PV bus and PQ bus conversion.	K3	2	7M	
<b>Unit-III</b>					
3	a) i) Discuss about symmetrical and unsymmetrical faults with example. ii) A synchronous generator is rated at 150MVA, 22kV has a reactance of 0.25pu and is connected to an overhead line through a transformer rated 200MVA, 230/18kV star-delta with X <sub>pu</sub> = 0.21. Find the pu reactance by considering the	K2	3	6M	
	• Generator ratings and • Transformer ratings as base	K3	3	8M	

	OR				
	b	i) Obtain the symmetrical components of the following set of unbalanced currents $I_a = 1.6 \angle 250^\circ$ , $I_b = 1.0 \angle 180^\circ$ , and $I_c = 0.9 \angle 132^\circ$ . Also find out the neutral current.	K3	3	7M
	b	ii) Draw the equivalent circuit and derive the expression for the sub-transient reactance of alternator during the short circuit. Also compare the reactances before and after short circuit.	K4	3	7M
	Unit-IV				
	a	i) What is the requirement of symmetrical components in power system analysis.	K3	4	7M
	a	ii) Derive the necessary equations to determine the fault current for a double line to ground fault. Draw a diagram showing interconnection sequence networks.	K3	4	7M
	OR				
4	b	i) A 30MVA, 3-phase alternator, having its neutral solidly grounded is operating at no load, its voltage being 13.2 kV between lines. It has a reactance to positive sequence currents of 3 Ohm, the reactance to negative and zero sequence currents are 90% and 40% of the positive sequence value respectively. For a double line to ground fault determine <ul style="list-style-type: none"> <li>• Currents in faulty lines</li> <li>• Currents through ground</li> </ul>	K4	4	7M
		ii) Explain in detail about the steps to be followed for the calculation of current in neutral, in case of a line to ground fault.	K2	4	7M
	Unit-V				
	a	i) A 4 pole, 50Hz, 60 MVA turbo generator has a moment of inertia of $9 \times 10^3 \text{kg-m}^2$ . Find the kinetic energy in MJ at rated speed, the inertia constant M and H, the acceleration in degrees per sec <sup>2</sup> and in rpm/sec. If the input power is 20MW and the output power is 14 MW.	K4	5	7M
5	a	ii) An alternator supplies 50MW to the infinite bus bar, the steady state limit of the system being 100MW. Determine whether the alternator will remain the synchronism if the prime mover input is increased to 32MW by assuming the losses are zero.	K4	5	7M
	OR				
	b	i) Explain recent methods to improve the transient state stability.	K2	5	7M
	b	ii) Explain the application of equal area criterion to determine stability of asynchronous machine connected to an infinite bus through a transmission line.	K3	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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**III B.Tech II Semester Supple. Examinations, October-2023**

**Sub Code: R20EE3203      MEASUREMENTS AND INSTRUMENTATION**

Time: 3 hours

(EEE)

Max. Marks: 70

Note: Answer All FIVE Questions.      All Questions Carry Equal Marks (5 X 14 = 70M)

Sl.No	Questions	KL	CO	M
<b>Unit-I</b>				
1	a i) Define the following terms in measurement Accuracy, resolution, precision, sensitivity and offset	K2	1	7M
	ii) Explain the significance of calibration in an instrument while performing measurement operation. Explain how basic instruments are converted into higher range ammeters.	K3	1	7M
	<b>OR</b>			
	b i) Briefly explain how a DC potentiometer is used for the calibration of a voltmeter. ii) Differentiate between static and dynamic characteristics of an instrument.	K2 K3	1 1	7M 7M
<b>Unit-II</b>				
2	a i) Describe the constructional details and working of the electro-dynamometer type wattmeter.	K3	2	7M
	ii) Explain the operating principle of instrument transformer.	K3	2	7M
	<b>OR</b>			
	b i) Explain the purpose of shunts in the ammeter. List out the methods used for measurement of iron loss in ferromagnetic materials. Define creeping in energy meter. ii) Describe the basic magnetic measurement using BH curve.	K3 K3	2 2	7M 7M
<b>Unit-III</b>				
3	a i) Write a short note on grounding techniques.	K2	3	7M
	ii) Explain the kelvin double bridge for measuring the unknown resistance with neat diagrams.	K3	3	7M
	<b>OR</b>			
	b i) Explain the significance of Schering bridge with its suitable applications. ii) Describe Anderson's bridge method with the help of necessary circuit diagram.	K4 K3	3 3	7M 7M
<b>Unit-IV</b>				
4	a i) Write a short note on electrostatic and electromagnetic instruments.	K2	4	7M
	ii) With neat figure explain the working principle of a digital CRO.	K3	4	7M
	<b>OR</b>			
	b i) Explain the principle of working of a magnetic tape recorder. ii) Mention the role of data loggers in instrumentation system. Differentiate between LED and LCD. Compare plotters and printers.	K2 K3	4 4	7M 7M
<b>Unit-V</b>				
5	a i) Describe piezoelectric effect and how it is used for sensing applications. What is the difference between a sensor and a transducer? ii) Explain the concept of smart sensors.	K3 K2	5 5	7M 7M
	<b>OR</b>			
	b i) Describe the construction and working of LCDs. Mention the difference between light scattering and field effect types of LCDs.	K3	5	7M
	ii) Briefly explain the comparison between RTD, Thermistor, and Thermocouple for sensing temperature in an environment subjected to dynamic change in temperature.	K3	5	7M

## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20EE3205

**ELECTRIC DRIVES**

Time: 3 hours

(EEE)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Discuss the different modes of operation of electric drive with suitable examples	K3	CO1	7M
		ii) Explain the working of electric drive with different types of load torques	K3	CO1	7M
	OR				
	b	i) Describe regenerative braking of a dc shunt motor by drawing the speed-torque characteristics.	K3	CO1	7M
		ii) A 220 V, 1500 rpm, 50 A separately excited dc motor with armature resistance of 0.5 $\Omega$ is fed from a circulating current dual converter with ac source voltage (line) =165 V. Assuming continuous conduction, determine converter firing angles for (i) Motoring operation at rated motor torque and 950 rpm (ii) Motoring operation at rated motor torque and -950 rpm	K3	CO1	7M
2	Unit-II				
	a	i) Draw the speed-torque curves of single-phase half-controlled rectified fed separately excited DC motor and explain the same.	K4	CO2	7M
		ii) A 230 V, 750 rpm, 25 A, dc series motor is driving at rated conditions a load whose torque is proportional to speed squared. Armature resistance is 0.5 $\Omega$ and field resistance is 0.5 $\Omega$ . Calculate the motor terminal voltage and current for a speed of 600 rpm assuming that flux is proportional to field current. Compute the firing angle delay at this speed if the motor armature is fed by a single-phase half-controlled converter.	K4	CO2	7M
	OR				
b	Derive the speed-torque expression of class-B chopper operating in time ratio control, supplying to the armature of the separately excited dc motor and draw speed- torque Characteristics.	K4	CO2	14 M	
3	Unit-III				
	a	i) Explain how motoring operation of a dc series motor can be obtained using chopper control.	K3	CO3	7M
		ii) A 220 V, 24 A, 1000 rpm, separately excited dc motor has an armature resistance of 2 $\Omega$ . Motor is controlled by a chopper with frequency of 500 Hz and source voltage of 230 V. Calculate the duty ratio for 1.2 times rated torque and 500 rpm.	K3	CO3	7M
	OR				
	b	i) With suitable block diagram explain the closed-loop control scheme for control below and above base speed for chopper fed dc drive	K3	CO3	7M
	ii) A 230 V, 960 rpm and 200 A separately excited dc motor has an armature resistance of 0.02 $\Omega$ . The motor is now operated in dynamic braking with chopper control with a braking resistance of 2 $\Omega$ . (i) Calculate duty ratio of chopper for a motor speed of 600 rpm and braking torque of twice the rated value. (ii) What will be the motor speed for a duty ratio of 0.6 and motor torque equal to twice its rated torque?	K3	CO3	7M	



Unit-IV					
4	a	i) Explain stator voltage control method for speed control of Induction motor with the help of speed-torque characteristics.	K4	CO4	7M
		ii) With suitable block diagram, explain the closed-loop operation of induction motor drive.	K4	CO4	7M
	OR				
	b	With the help of a neat schematic, discuss the operation of a Static Scherbius drive. Derive the speed-torque expression and draw its speed-torque characteristics.	K4	CO4	14 M
Unit-V					
5	a	i) Write a short notes on Variable frequency control of synchronous motor	K4	CO5	7M
		ii) What is the difference between true synchronous mode and self-control mode for variable frequency control of synchronous motor?	K4	CO5	7M
	OR				
	b	i) Explain closed loop control operation of a synchronous motor drive.	K4	CO5	7M
		ii) Explain margin angle control of synchronous motor drive.	K4	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20ME3202

HEAT TRANSFER

Time: 3 hours

(ME)

Max. Marks: 70

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Derive a governing differential equation for steady state one dimensional heat conduction in cartesian coordinate system.	K3	CO1	7M
		ii) A steel pipeline( $K=50\text{W/m.k}$ ) of inner diameter 110mm is to be covered with two layers of insulation each having a thickness of 50mm. The thermal conductivity of the first insulation material is $0.06\text{W/m.k}$ and that of the second is $0.12\text{W/m.k}$ . Calculate the loss of heat per meter length of pipe and the interface temperature between the two layers of insulation when the temperature of the inside tube surface is $250^\circ\text{C}$ and that of the outside surface of the insulation is $50^\circ\text{C}$ .	K4	CO1	7M
	OR				
	b	i) Explain modes of heat transfer and their governing laws.	K2	CO1	7M
		ii) A composite cylinder is made of 6 mm thick layers each of two materials of thermal conductivities of $30\text{ W/m}^\circ\text{C}$ and $45\text{ W/m}^\circ\text{C}$ . The inside is exposed to a fluid at $500^\circ\text{C}$ with a convection coefficient of $40\text{ W/m}^2\text{C}$ and the outside is exposed to air at $35^\circ\text{C}$ with a convection coefficient of $25\text{ W/m}^2\text{K}$ . There is a contact resistance of $1 \times 10^{-3}\text{m}^2\text{C/W}$ between the layers. Determine the heat loss for a length of 2m and the surface temperatures. Inside dia = 20mm.	K4	CO1	7M
2	Unit-II				
	a	i) Describe various boundary conditions implemented at the fin tip.	K3	CO2	7M
		ii) What do you understand by lumped system analysis? What are the underlying assumptions?	K4	CO2	7M
	OR				
b	i) An egg with mean diameter of 4cm and initially at $20^\circ\text{C}$ is placed in boiling water pan for 4 min and found to be boiled to the consumer taste. For how long should a similar egg for same consumer to be boiled when taken from refrigerator at $5^\circ\text{C}$ ? Take the following properties for egg; $k=10\text{W/m.k}$ , $\rho=1200\text{Kg/m}^3$ , $C_p=2\text{kJ/Kg.K}$ and $h=100\text{W/m}^2\text{K}$ use lumped theory.	K5	CO2	7M	
	ii) Derive the steady state heat conduction equation for a plain slab.	K3	CO2	7M	
3	Unit-III				
	a	i) Derive an equation for forced convection by use of dimensional analysis $Nu = \phi(Re, Pr)$	K4	CO3	7M
		ii) Discuss the different methods of determining heat transfer co-efficient in forced convection.	K3	CO3	7M
	OR				
	b	i) Explain the principle of dimensional analysis. What are its advantages and limitations?	K3	CO3	7M
	ii) Water flows in a duct of rectangular cross-section of height of 6 mm and width 12 mm with a mean bulk temperature of $30^\circ\text{C}$ . If the duct wall temperature is constant at $60^\circ\text{C}$ and fully developed laminar flow is experienced, calculate the heat transfer per unit length.	K5	CO3	7M	

Unit-IV					
4	a	i) Determine the heat transfer rate by free convection from a plate 0.3m×0.3m for which one surface is insulated and the other surface is maintained at 110°C and exposed to atmosphere air at 30°C for the Plate is vertical case.	K4	CO4	7M
		ii) Define the NTU of a heat exchanger. What does it represent? Is it necessary to buy a heat exchanger with a very large value of NTU?	K3	CO4	7M
	OR				
	b	i) Explain the significance of Grashof number in natural convective heat transfer	K4	CO4	7M
ii) Water ( $C_p=4200 \text{ J/kg.K}$ ) enters a counter flow double pipe heat exchanger at 39°C at the rate of 273.6 kg/hr. It is heated by oil ( $C_p=1880 \text{ J/kg.K}$ ) flowing at the rate of 547.2 kg/hr from an inlet temperature of 118°C. Find the total heat transfer rate per $\text{m}^2$ . Take $U=342 \text{ W/m}^2.\text{K}$ .		K4	CO4	7M	
Unit-V					
5	a	i) Why is the drop wise condensation preferred to the film wise condensation?	K5	CO5	7M
		ii) Emissivity of two large parallel plates maintained at 800°C and 300°C respectively. Find the net radiant heat exchange per square meter of the plates. If a polished aluminum shield ( $\epsilon=0.05$ ) is placed between them, find the percentage reduction in heat transfer. The emissivity of plates is 0.5.	K4	CO5	7M
	OR				
	b	i) Consider film condensation on a vertical plate. Will the heat flux be higher at the top or at the bottom of the plate? Why?	K5	CO5	7M
ii) What is thermal radiation? How does it differ from other forms of electromagnetic radiation.		K3	CO5	7M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) A uniform disc of diameter 300 mm and of mass 5 kg is mounted on one end of an arm of length 600 mm. The other end of the arm is free to rotate in a universal bearing. If the disc rotates about the arm with a speed of 300 r.p.m. clockwise, looking from the front, with what speed will it precess about the vertical axis?	K4	CO1	7M
		ii) Explain the effect of the gyroscopic couple on the reaction of the four wheels of a vehicle negotiating a curve.	K3	CO1	7M
	OR				
	b	i) An aeroplane makes a complete half circle of 50 metres radius, towards left, when flying at 200 km per hr. The rotary engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it.	K4	CO1	7M
		ii) What will be the effect of the gyroscopic couple on a disc fixed at a certain angle to a rotating shaft?	K3	CO1	7M
2	Unit-II				
	a	i) A conical friction clutch is used to transmit 90 kW at 1500 r.p.m. The semi cone angle is 20° and the coefficient of friction is 0.2. If the mean diameter of the bearing surface is 375 mm and the intensity of normal pressure is not to exceed 0.25 N/mm <sup>2</sup> , find the dimensions of the conical bearing surface and the axial load required.	K4	CO2	7M
		ii) A car moving on a level road at a speed 50 km/h has a wheel base 2.8 metres, distance of C.G. from ground level 600 mm, and the distance of C.G. from rear wheels 1.2 metres. Find the distance travelled by the car before coming to rest when brakes are applied, To the rear wheels, To the front wheels, and To all the four wheels. The coefficient of friction between the tyres and the road may be taken as 0.6.	K4	CO2	7M
	OR				
	b	i) A centrifugal clutch is to transmit 15 kW at 900 r.p.m. The shoes are four in number. The speed at which the engagement begins is 3/4th of the running speed. The inside radius of the pulley rim is 150 mm and the centre of gravity of the shoe lies at 120 mm from the centre of the spider. The shoes are lined with Ferrodo for which the coefficient of friction may be taken as 0.25. Determine: 1. Mass of the shoes and 2. Size of the shoes, if angle subtended by the shoes at the centre of the spider is 60° and the pressure exerted on the shoes is 0.1 N/mm <sup>2</sup> .	K5	CO2	7M
		ii) Describe with a neat sketch the working of a single plate friction clutch.	K3	CO2	7M
3	Unit-III				
	a	i) The mass of flywheel of an engine is 6.5 tonnes and the radius of gyration is 1.8 metres. It is found from the turning moment diagram that the fluctuation of energy is 56 kN-m. If the mean speed of the engine is 120 r.p.m., find the maximum and minimum speeds.	K4	CO3	7M
		ii) What is the function of a governor? How does it differ from a flywheel? And Explain the terms relating to governor Sensitiveness, Hunting and Stability?	K3	CO3	7M
	OR				
	b	i) An engine flywheel has a mass of 6.5 tonnes and the radius of gyration is 2 m. If the maximum and minimum speeds are 120 r. p. m. and 118 r. p. m. respectively, find maximum fluctuation of energy ?	K4	CO3	7M
		ii) The following data refers to a Hartnell governor. Length of horizontal arms of bell crank lever = 40 mm and Length of vertical arms of bell crank lever = 80 mm Mass of each flying ball 1.2 kg. , The maximum radius of rotation = 100 mm, The minimum radius of rotation = 70 mm, The distance of fulcrum to axis of rotation = 75 mm, Minimum equilibrium speed = 400 rpm, Maximum equilibrium speed 5 % higher than	K5	CO3	7M

		minimum equilibrium speed. Neglecting obliquity of arms determine: a) spring stiffness b) initial compression.			
		Unit-IV			
4	a	i) Four masses $m_1, m_2, m_3$ and $m_4$ are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are $45^\circ, 75^\circ$ and $135^\circ$ . Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m.	K4	CO 4	7M
		ii) Explain clearly the terms 'static balancing' and 'dynamic balancing'. State the necessary conditions to achieve them. and Discuss how a single revolving mass is balanced by two masses revolving in different planes.	K3	CO 4	7M
	OR				
	b	i) Four masses A, B, C and D are attached to a shaft and revolve in the same plane. The masses are 12 kg, 10 kg, 18 kg and 15 kg respectively and their radii of rotations are 40 mm, 50 mm, 60 mm and 30 mm. The angular position of the masses B, C and D are $60^\circ, 135^\circ$ and $270^\circ$ from the mass A. Find the magnitude and position of the balancing mass at a radius of 100 mm	K4	CO 4	7M
ii) Explain the method of balancing of different masses revolving in the same plane.		K3	CO 4	7M	
		Unit-V			
5	a	i) The following data refer to two cylinder locomotive with cranks at $90^\circ$ : Reciprocating mass per cylinder = 300 kg ; Crank radius = 0.3 m ; Driving wheel diameter = 1.8 m ; Distance between cylinder centre lines = 0.65 m ; Distance between the driving wheel central planes = 1.55 m. Determine : 1. the fraction of the reciprocating masses to be balanced, if the hammer blow is not to exceed 46 kN at 96.5 kmph. ; 2. the variation in tractive effort ; and 3. the maximum swaying couple.	K5	CO 5	7M
		ii) The three cylinders of an air compressor have their axes $120^\circ$ to one another, and their connecting rods are coupled to a single crank. The stroke is 100 mm and the length of each connecting rod is 150 mm. The mass of the reciprocating parts per cylinder is 1.5kg. Find the maximum primary and secondary forces acting on the frame of the compressor when running at 3000 r.p.m. Describe clearly a method by which such forces may be balanced.	K4	CO 5	7M
	OR				
	b	i) A four cylinder vertical engine has cranks 150 mm long. The planes of rotation of the first, second and fourth cranks are 400 mm, 200 mm and 200 mm respectively from the third crank and their reciprocating masses are 50 kg, 60 kg and 50 kg respectively. Find the mass of the reciprocating parts for the third cylinder and the relative angular positions of the cranks in order that the engine may be in complete primary balance.	K4	CO 5	7M
ii) How to do balancing of radial engines using Direct and reverse crank method of analysis?		K3	CO 5	7M	

## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20ME3207

ROBOTICS AND APPLICATIONS

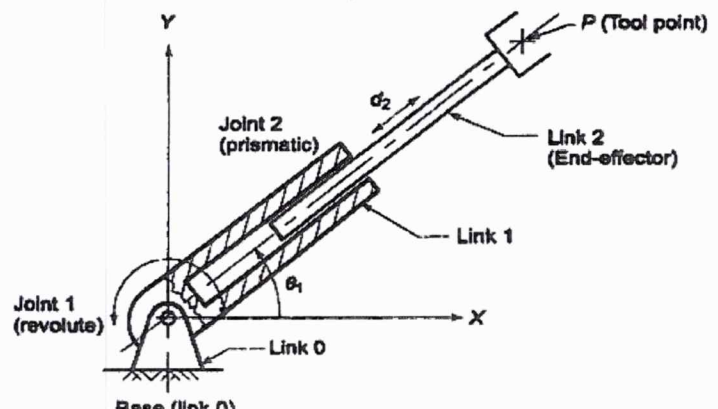
Time: 3 hours

(ME)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	<b>Unit-I</b>				
	a	Draw and explain the four basic configurations of arm in robotic manipulators.	K5	CO1	14M
	<b>OR</b>				
b	What is homogeneous transformation matrix? Explain DH (Denavit-Hartenberg) representation with neat sketch.	K1	CO1	14M	
2	<b>Unit-II</b>				
	a	i) Explain the working principle of pneumatic type actuator with neat sketch.	K2	CO2	7M
	ii)	What are stepper motors? Explain in detail basic elements of stepper motors with suitable sketch.	K1	CO2	7M
	<b>OR</b>				
	b	i) Briefly explain the working principle of any one type of position sensors with a neat sketch.	K2	CO2	7M
ii)	What are sensors? Explain analog and discrete measuring device.	K1	CO2	7M	
3	<b>Unit-III</b>				
	a	Derive the kinematics relationship between adjacent links of Robot Arm.	K4	CO3	14M
	<b>OR</b>				
b	Obtain the position and orientation of the tool point P with respect to the base for the 2-DOF, RP planar manipulator shown in <b>Figure.1</b> .	K5	CO3	14M	
 <p style="text-align: center;"><b>Figure.1.</b></p>					

<b>Unit-IV</b>					
<b>4</b>	<b>a</b>	Drive the dynamic formulation of two link manipulator using Lagrange-Euler formulation.	<b>K4</b>	<b>CO4</b>	<b>14M</b>
	<b>OR</b>				
	<b>b</b>	Derive the Jacobian matrix for a planar RR manipulator.	<b>K4</b>	<b>CO4</b>	<b>14M</b>
<b>Unit-V</b>					
<b>5</b>	<b>a</b>	Explain the various future application of robot keeping in present industry requirement.	<b>K2</b>	<b>CO5</b>	<b>14M</b>
	<b>OR</b>				
	<b>b</b>	Explain the requirements and benefits of the robot for spray-coating applications.	<b>K2</b>	<b>CO5</b>	<b>14M</b>

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

**Sub Code: R20EC3201 MICRO WAVE AND OPTICAL COMMUNICATIONS**

Time: 3 hours

(ECE)

Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Analyze TE/TM modes in rectangular waveguides.	K2	1	7M
		ii) Designate various bands in the frequency spectrum with their applications.	K2	1	7M
	OR				
	b	i) Discuss in detail about circular waveguides.	K2	1	7M
	ii) Differentiate dominant and degenerate Modes with suitable illustrations.	K2	1	7M	
2	Unit-II				
	a	i) A reflex klystron operates under the following conditions. $V_0 = 500V$ , $L = 1$ mm, $R_{sh} = 10k\Omega$ , $f_r = 8GHz$ , $e/m = 1.759 \times 10^{11}$ (MKS system). The tube is oscillating at $f_r$ at the peak of the $n = 2$ mode. Assume that the transit time through the gap and beam loading can be neglected. (a) Find the repeller voltage (b) Find the direct current necessary to give a maximum gap voltage of 200V. (c) What is the electronic efficiency under this condition?	K2	2	7M
		ii) Discuss in detail calculation of scattering matrix for E-Plane	K4	2	7M
	OR				
	b	i) With neat diagram illustrate the Faraday rotation in ferrite devices? ii) A travelling-wave tube (TWT) operates under the following parameters:  Beam voltage : $V_0 = 3$ kV,      Beam current: $I_0 = 30$ mA Circuit Length: $N = 50$ ,      Frequency: $f = 10$ GHz Characteristic Impedance of helix: $Z_0 = 10 \Omega$ . Then determine: (a) the gain parameter C; (b) the output power gain $A_p$ in decibels;	K2	2	7M
		K3	2	7M	
3	Unit-III				
	a	i) Explain the construction and operation of the IMPATT diode	K2	3	7M
		ii) What are the various methods to measure microwave power? Explain one low-power measurement method with a relevant diagram.	K2	3	7M
	OR				
	b	i) Describe Ridley-Watkins-Hilsum theory with reference to the Gunn diode operation? ii) Describe the slotted line method to measure the value of VSWR?	K2	3	7M
		K2	3	7M	



		Unit-IV			
4	a	i) Describe briefly about the ray and mode theory of light.	K2	4	7M
		ii) Derive the acceptance angle of a skew ray propagating in optical fiber.	K4	4	7M
	OR				
	b	i) Write down the merits and demerits of guided optical signal transmissions.	K4	4	7M
ii) A step index fiber has a normalized frequency $V=26.6$ at a 1300nm wavelength. If the core radius is $25\mu\text{m}$ , find the numerical aperture.		K3	4	7M	
		Unit-V			
5	a	i) Derive the expression for LED internal quantum efficiency and power.	K4	5	7M
		ii) Calculate the quantum limit in terms of quantum efficiency of the photo detector for an optical fiber link operating at 1350nm with a BER of $10^{-8}$ . Let the quantum efficiency is 100% and Bit Rate is 15Mbps.	K4	5	7M
	OR				
	b	i) A GaAlAs laser diode has $600\mu\text{m}$ cavity length has an effective absorption coefficient of $15\text{cm}^{-1}$ . For coated facets, the reflectiveness is 0.3 at each end. <ul style="list-style-type: none"> <li>a) What is the optical gain at the laser threshold?</li> <li>b) If one end of the laser is coated with a dielectric reflector so that its reflectivity is now 80%. What is the optical gain at lasing threshold?</li> </ul>	K4	5	7M
iii) Evaluate the maximum bit rate for the given 8km optical link using an RZ format. Optical link specifications are as followed: <ul style="list-style-type: none"> <li>Rise time of the LED and its drive electronics = 10ns</li> <li>Material dispersion related rise time degradation = 18ns</li> <li>Band width of optical receiver = 35MHz</li> <li>Band width-distance product of the fiber = 350MHz-Km</li> <li>Mode fixing factor, q over 8km fiber = 1.0</li> </ul>		K4	5	7M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20EC3202

VLSI DESIGN

Max. Marks: 70

Time: 3 hours

(ECE)

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Explain in detail the p-well process for CMOS fabrication indicating the masks used	2	1	7M
		ii) Determine pull-up to pull-down ratio of an NMOS inverter when driven through one or more pass transistors	2	1	7M
	OR				
	b	i) Explain the MOS transistor operation with the help of neat sketches in the Depletion mode.	3	1	7M
		ii) Explain various regions of CMOS inverter transfer characteristics	3	1	7M
2	Unit-II				
	a	i) Explain the concept of Switch logic networks in detail	1	2	7M
		ii) What is inverter delay? How delay is calculated for multiple stages? Explain	1	2	7M
	OR				
	b	i) Explain the issues involved in driving large capacitor loads in VLSI circuit regions	4	2	7M
		ii) Derive the expression for propagation delay in the case of cascaded pass transistors	4	2	7M
3	Unit-III				
	a	i) What is a stick diagram? Draw the stick diagram and layout for a CMOS inverter	2	3	7M
		ii) Explain 2 $\mu$ m Double Metal, Double Poly CMOS / Bi-CMOS Rules.	2	3	7M
	OR				
	b	i) Draw a Single stage amplifier with resistive load and explain its operation	5	3	7M
		ii) What are the Limitations of scaling-Limits due to sub threshold currents	5	3	7M
4	Unit-IV				
	a	i) List out different Issues in Dynamic Design and explain	3	4	7M
		ii) write short notes on Pass Transistor Logic in detail	3	4	7M
	OR				
	b	i) Draw and explain the operation of Cascading Dynamic Gates	1	4	7M
		ii) write short notes on Speed and Power Dissipation of Dynamic Logic	1	4	7M
5	Unit-V				
	a	i) Draw and explain the basic architecture of FPGA	4	5	7M
		ii) Write down the step by step approach for FPGA design process on XILINX environment?	4	5	7M
	OR				
	b	i) What is Short channel effects? Explain	3	5	6M
		ii) Explain the following (i) Metal Gate Technology (ii) Fin-FET	3	5	8M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20EC3203    MICROPROCESSOR AND MICRO CONTROLLERS

Time: 3 hours

(ECE)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
<b>Unit-I</b>					
1.	a	i) Draw and explain the flag register of 8085 microprocessor.	<b>KL1</b>	<b>1</b>	<b>[7M]</b>
		ii) Write an assembly language program to arrange the given 16-bit hexadecimal numbers in ascending order.	<b>KL3</b>	<b>1</b>	<b>[7M]</b>
<b>OR</b>					
	b	i) Explain the physical address formation in 8086 microprocessor and find the physical addresses for the following values of CS and IP registers (i) CS = 2500H and IP = 1A00H (ii) CS = 3E00H and IP = 2420H (iii) CS = 1FF0H and IP = 3FFFH	<b>KL3</b>	<b>1</b>	<b>[7M]</b>
		ii) Explain the implementation of the IF-THEN-ELSE feature in 8086 programming.	<b>KL3</b>	<b>1</b>	<b>[7M]</b>
<b>Unit-II</b>					
2.	a	i) Give the difference between minimum mode and maximum mode of operation in 8086 microprocessor?	<b>KL3</b>	<b>2</b>	<b>[7M]</b>
		ii) What is an interrupt? What are different interrupts available in 8086?	<b>KL2</b>	<b>2</b>	<b>[7M]</b>
<b>OR</b>					
	b	i) Draw and explain the timing diagrams for external data memory for read and write cycle in maximum mode.	<b>KL2</b>	<b>2</b>	<b>[7M]</b>
		ii) Write the features of Pentium processors.	<b>KL2</b>	<b>2</b>	<b>[7M]</b>
<b>Unit-III</b>					
3.	a	i) Design 8086's memory system interface consisting of 512K bytes of RAM memory and 128K bytes of ROM. RAM memory is to reside over the address range 00000H through 7FFFFH and the address range of the ROM is to be A0000H through BFFFFH.	<b>KL3</b>	<b>3</b>	<b>[7M]</b>
		ii) Draw the block diagram of 8251 and explain about each block.	<b>KL2</b>	<b>3</b>	<b>[7M]</b>
<b>OR</b>					
	b	i) Explain about interfacing of a DAC 0809 with 8086 using 8255?	<b>KL2</b>	<b>3</b>	<b>[7M]</b>
		ii) Explain the need of DMA. Discuss in detail about DMA data transfer method	<b>KL2</b>	<b>3</b>	<b>[7M]</b>
<b>Unit-IV</b>					
4.	a	i) Explain about the memory organization of 8051 microcontroller.	<b>KL2</b>	<b>4</b>	<b>[7M]</b>
		ii) Describe the serial port operation in 8051 microcontroller?	<b>KL2</b>	<b>4</b>	<b>[7M]</b>

OR

	b	i)	Explain various modes of operation of timer /counters in 8051?	<b>KL2</b>	<b>4</b>	<b>[7M]</b>
		ii )	Discuss about the priority of the interrupts in 8051. And state for which interrupt highest priority is given?	<b>KL3</b>	<b>4</b>	<b>[7M]</b>
Unit-V						
5.	a	i)	List different applications of microcontrollers.	<b>KL2</b>	<b>5</b>	<b>[5M]</b>
		ii )	With a neat schematic, explain the interfacing of A to D converters with 8051 microcontroller.	<b>KL1</b>	<b>CO 5</b>	<b>[9M]</b>
OR						
	b	i)	Explain the interfacing of LEDs to 8051 microcontroller.	<b>KL3</b>	<b>5</b>	<b>[7M]</b>
		ii )	Explain the interfacing of a seven-segment display to 8051 microcontroller.	<b>KL3</b>	<b>5</b>	<b>[7M]</b>

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20EC3207

DIGITAL IMAGE PROCESSING

Time: 3 hours

(ECE)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Explain image sensing and acquisition.	K2	1	7M
		ii) Explain principle of Hadamard transform.	K2	1	7M
	OR				
	b	i) Explain principle of Hotelling transformation.	K2	1	7M
		ii) Explain relationship between pixels.	K2	1	7M
2	Unit-II				
	a	Explain image enhancement in spatial and frequency domain.	K2	2	14M
	OR				
	b	Explain image restoration techniques in detail.	K2	2	14M
3	Unit-III				
	a	i) Explain CMY color model.	K2	3	7M
		ii) Explain color image compression.	K2	3	7M
	OR				
	b	i) Explain RGB color model.	K2	3	7M
		ii) Write a short notes on smoothing and sharpening.	K2	3	7M
4	Unit-IV				
	a	i) Write a short notes on image compression methods.	K2	4	7M
		ii) Explain digital image water marking.	K2	4	7M
	OR				
	b	i) Explain wavelet transforms in two dimensions.	K2	4	7M
		ii) Explain sub band coding.	K2	4	7M
5	Unit-V				
	a	i) Explain image segmentation using Morphological watersheds.	K2	5	7M
		ii) Explain Erosion, dilation, opening and closing.	K2	5	7M
	OR				
	b	i) Write short notes on basic morphology algorithms.	K2	5	7M
		ii) Explain significance of thresholding in image segmentation.	K3	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20IT3202

AGILE METHODOLOGIES

Time: 3 hours

(IT)

Max. Marks: 70

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i)Distinguish between Agile software development models and traditional development models.	2	1	7M
		ii)Briefly explain Agile manifesto values and principles.	1	2	7M
	OR				
	b	i)Discuss the role of Agile drivers in software testing.	4	1	7M
		ii)Write short note the disadvantages of Agile methodologies and suggest suitable methods to overcome them.	4	3	7M
2	Unit-II				
	a	i)Write short notes on the lean production techniques Scrum and Crystal.	1	1	7M
		ii)What are the various phases of Agile process life cycle? Briefly explain each phase.	2	2	7M
	OR				
	b	i)Explain feature driven software development. Mention any two categories of software applications where feature driven development is advisable.	2,3	4	7M
		ii)Discuss the roles and practices of Agile Work products.	4	2	7M
3	Unit-III				
	a	i) Discuss the importance of Knowledge Management in Software Engineering.	5	3	7M
		ii)Illustrate any two challenges of migrating to Agile methodologies with an example application.	3	2	7M
	OR				
	b	i)Briefly explain merits and demerits of Story Card Maturity model.	2	2	7M
		ii)What do you mean by Agile Knowledge sharing? Write short note on any one of the most effective way of knowledge sharing in a team while following Agile approach.	1,2	5	7M
4	Unit-IV				
	a	i)Explain the proper ways of managing unstable requirements.	2	3	7M
		ii)Highlight the current Agile practices.	1	1	7M
	OR				
	b	i)Explain Agile Requirements Abstraction model.	2	2	7M
		ii)What is Concurrency in Agile requirements generation? Explain.	1	5	7M
5	Unit-V				
	a	i)What is the importance of Quality Assurance? Explain Agile approach to Quality Assurance.	4,5	4	7M
		ii)What is Feature Driven Development(FDD)? Write short notes on the financial and production metrics in FDD.	2,4	2	7M
	OR				
	b	i)Is Quality Assurance necessary for Agile testing? How do you justify your answer?	6	4	7M
		ii)Discuss the role of Agile methods in Global Software Development.	4,6	3	7M

## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20AI3204

DEEP LEARNING

Time: 3 hours

CSE (AI)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
<b>Unit-I</b>					
1	a	i) What are the different types of a Machine Learning models?	1	1	7M
		ii) Differentiate and explain supervised and un-supervised learning algorithms.	2	1	7M
	<b>OR</b>				
	b	i) Which disciplines have their influence on machine learning? Explain with examples.	2	1	7M
ii) List and explain the features of Bayesian learning methods		2	1	7M	
<b>Unit-II</b>					
2	a	i) Write an example of learning XOR function to explain a fully functioning feed forward network	2	2	7M
		ii) Explain the Back propagation with its algorithm.	2	2	7M
	<b>OR</b>				
	b	i) Explain in-detail about the concept of gradient based learning.	2	2	7M
ii) What is semi – supervised learning? Explain in-detail.		2	2	7M	
<b>Unit-III</b>					
3	a	i) Explain, how Learning is different from Pure Optimization	2	3	7M
		ii) Write in-detail about Parameter Initialization Strategies.	2	3	7M
	<b>OR</b>				
	b	i) Discuss the application of second-order methods to the training of deep networks.	2	3	7M
ii) Discuss in-detail about the Optimization Strategies		2	3	7M	
<b>Unit-IV</b>					
4	a	i) Draw and explain the architecture of convolutional network.	2	4	7M
		ii) List and explain the Unsupervised Features of Convolutional network.	2	4	7M
	<b>OR</b>				
	b	i) List and explain the characteristics of Efficient Convolution Algorithms	2	4	7M
ii) Explain the Convolution Operation, Motivation and Pooling.		2	4	7M	
<b>Unit-V</b>					
5	a	i) Explain Long Short Term Memory in-detail.	2	5	7M
		ii) Write in-detail about Bidirectional Recurrent Neural Networks.	2	5	7M
	<b>OR</b>				
	b	i) Explain Deep Recurrent Networks in-detail.	2	5	7M
ii) Discuss the Challenge of Long-Term Dependencies.		2	5	7M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CC2OE16

**CLOUD COMPUTING**

Time: 3 hours

(IT, CSE)

Max. Marks: 70

Note: Answer All FIVE Questions.

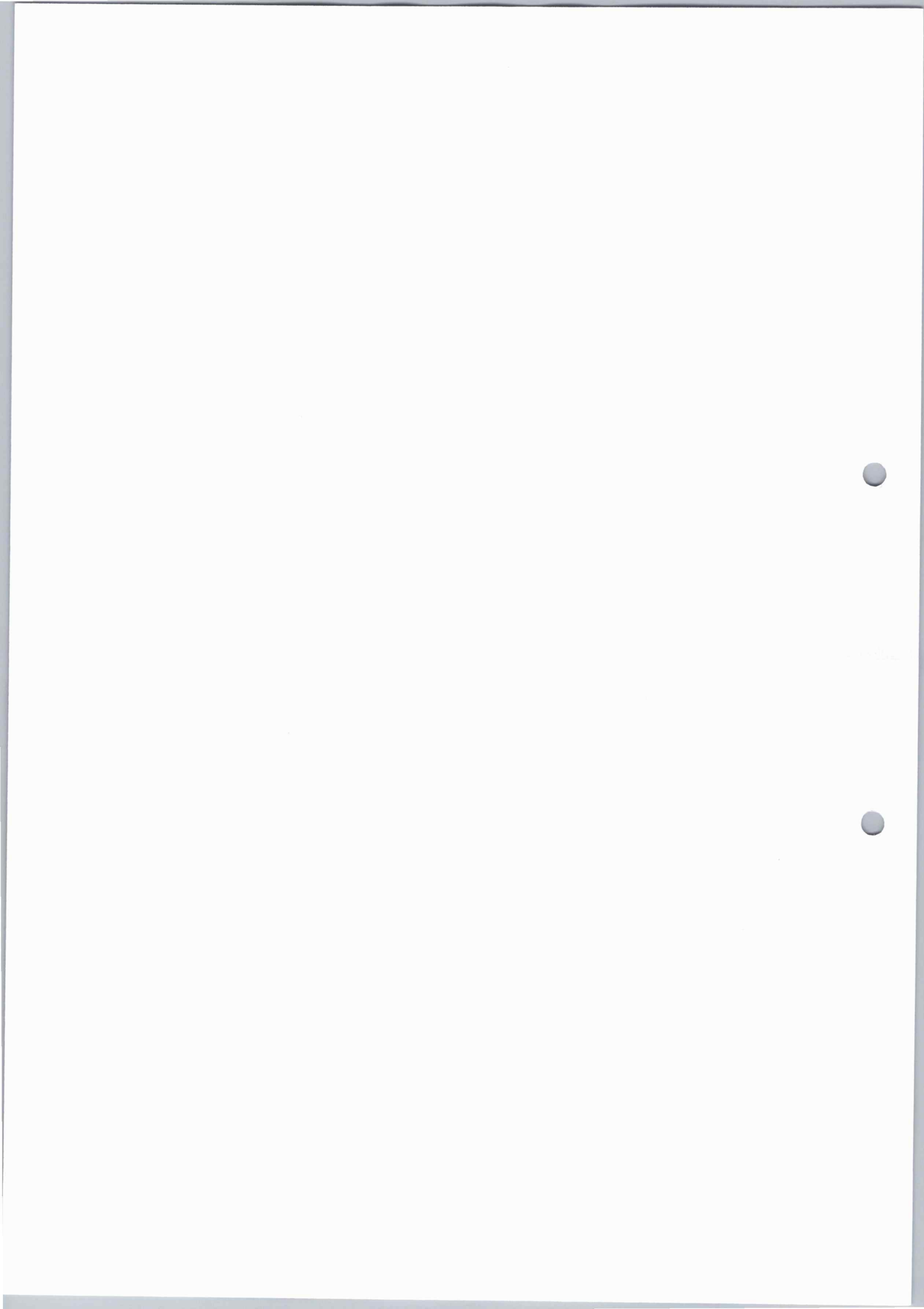
All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	<b>Unit-I</b>				
	a	i) Explain various types and characteristics of Cloud computing.	2	1	7M
		ii) Explain the limitations of cloud computing	2	1	7M
	<b>OR</b>				
	b	i) Explain the vendors of Cloud computing	2	1	7M
		ii) What are the advantages of Cloud computing over the Internet? Explain?	2	1	7M
2	<b>Unit-II</b>				
	a	i) What is virtualization? Explain how virtualization helps in realizing cloud computing	2	1	7M
		ii) Describe the virtual machines.	2	1	7M
	<b>OR</b>				
	b	i) What are the design aspects of cloud application architecture? Explain	2	2	7M
		ii) Explain the similarities and differences between Grid and Cloud computing.	2	2	7M
3	<b>Unit-III</b>				
	a	i) Explain different cloud service deployment models	2	2	7M
		ii) Discuss SaaS model?	2	2	7M
	<b>OR</b>				
	b	i) Describe the major features of the Jericho Model.	2	2	7M
		ii) Explain about cloud storage.	2	2	7M
4	<b>Unit-IV</b>				
	a	i) Briefly explain Cloud Management Products	2	3	7M
		ii) How to Migrating to Clouds. Explain	2	3	7M
	<b>OR</b>				
	b	i) Discuss about disasters in the cloud	2	3	14M
	5	<b>Unit-V</b>			
a		i) What is AWS? Explain the features of AWS	2	4	7M
		ii) Discuss about advantages and disadvantages of AWS.	2	4	7M
<b>OR</b>					
	i) Differentiate between the traditional and Azure cloud models	2	4	14M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CC2OE06

INDUSTRIAL ROBOTICS

Time: 3 hours

EEE, CSE (AI)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Discuss the anatomy of Robot and explain the important parts of a robot with a neat sketch.	K2	CO1	7M
		ii) What is the future scope of Robotics. Explain.	K3	CO1	7M
	OR				
	b	i) Sketch and explain the four basic robot configurations classified according to the coordinate system.	K3	CO1	7M
		ii) Differentiate CAD/CAM and robotics.	K2	CO1	7M
2	Unit-II				
	a	i) Compare the features of most commercially used electrical actuators in robots.	K2	CO2	7M
		ii) Describe the types of end effector & gripper mechanisms with simple sketches.	K2	CO2	7M
	OR				
	b	i) Discuss about the salient features of stepper motor with limitations.	K2	CO2	7M
		ii) Explain the working of DC servo motors used in robotics.	K2	CO2	7M
3	Unit-III				
	a	i) Briefly explain the working principle of any two types of position sensors with neat sketch.	K2	CO3	7M
		ii) Explain the various touch sensors with neat sketch.	K2	CO3	7M
	OR				
	b	i) Briefly explain the function of a piezoelectric sensor.	K2	CO3	7M
		ii) Differentiate between the sensor & transducer.	K2	CO3	7M
4	Unit-IV				
	a	i) Determine the manipulator jacobian matrix and singularities for the 3-DOF articulated arm.	K3	CO4	7M
		ii) Differentiate forward and inverse kinematic model.	K2	CO4	7M
	OR				
	b	i) Find the D-H matrix for R-R manipulators	K3	CO4	7M
		ii) Derive the jacobian matrix for the two link planer manipulator.	K3	CO4	7M
5	Unit-V				
	a	i) Describe the Spray coating operation with robot system.	K2	CO5	7M
		ii) Explain application of robot in robot continuous arc welding.	K2	CO5	7M
	OR				
	b	i) Explain the function of robots in assembly and inspection	K2	CO5	7M
		ii) Explain applications of robot in machine loading and unloading.	K2	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CC2OE13

DIGITAL MARKETING

Time: 3 hours

(ME)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Discuss the need and scope of digital marketing	K2	C01	7M
		ii) Explain keywords in Digital marketing? How important is it for SEO?	K4	C01	7M
	OR				
	b	i) List the Digital Marketing Platforms.	K1	C01	7M
	ii) Explain types of strategies in digital marketing	K4	C01	7M	
2	Unit-II				
	a	i) Discuss the benefits of Pay per click	K2	C02	7M
		ii) Explain how do Google Ad Words help in this type of search	K4	C02	7M
	OR				
b	Describe various channels of digital marketing.	K2	C02	14M	
3	Unit-III				
	a	Define the marketing strategy. Explain various strategies and plans in the digital marketing plan.	K4	C03	14M
	OR				
b	Analyze the marketing plan and implementation plan of digital marketing	K4	C03	14M	
4	Unit-IV				
		Classify the types of SEO. Explain	K4	C04	14M
	OR				
b	Discriminate on-page and off-page optimization	K4	C04	14M	
5	Unit-V				
	a	List the various modes of social media marketing. Explain with suitable examples.	K4	C05	14M
	OR				
b	Describe the digital media performance with suitable examples.	K2	C05	14M	



## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CC2OE01

REMOTE SENSING AND GIS

Time: 3 hours

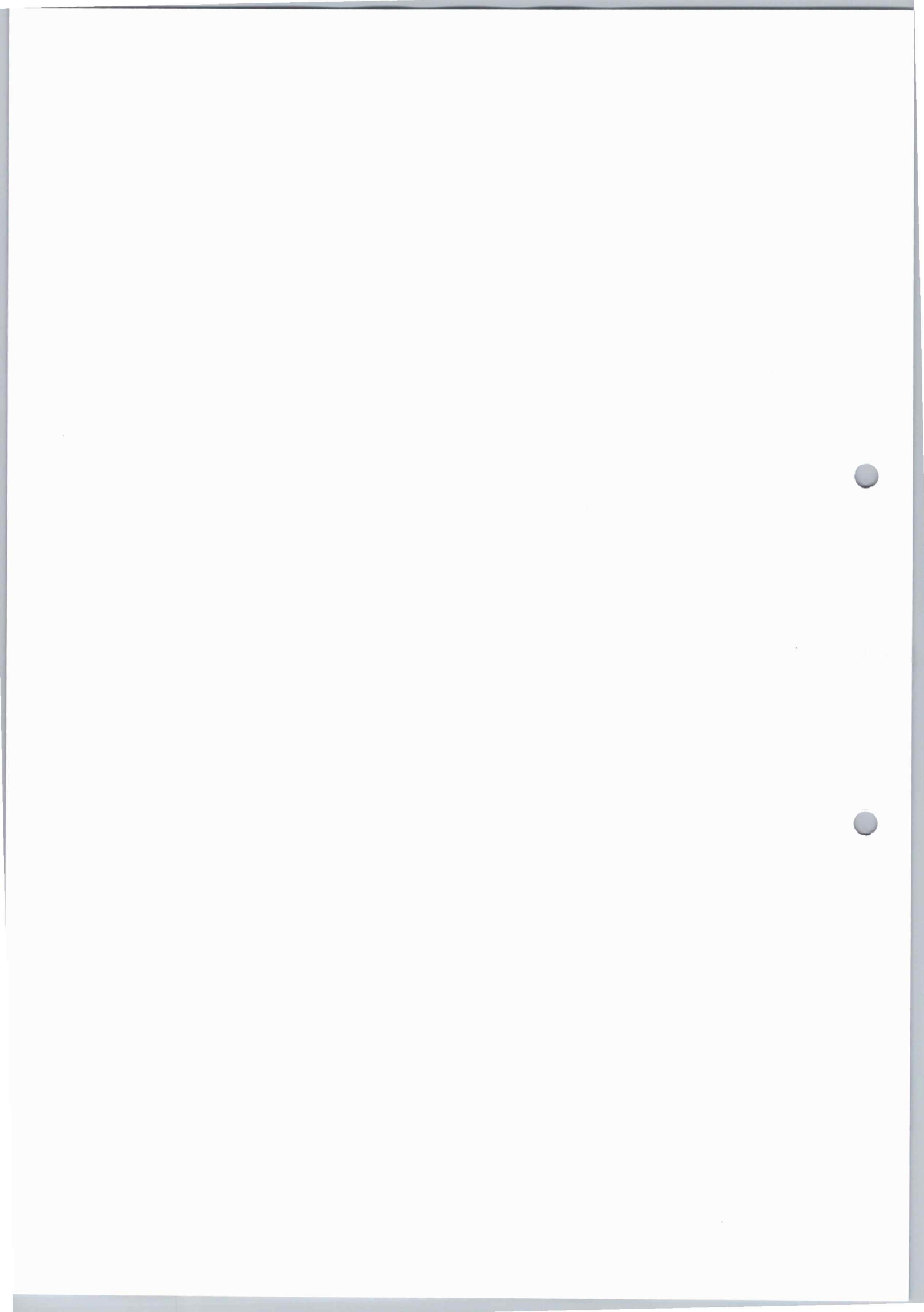
(CE)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
<b>Unit-I</b>					
1	a	i)What are the advantages and limitations of remote sensing?			
		K2	CO1	7M	
		ii)Briefly explain remote sensing process.			
		K2	CO1	7M	
OR					
	b	What is resolution of a sensor? Describe all sensor resolutions?			
		K3	CO1	14M	
<b>Unit-II</b>					
2	a	Discuss about the following image enhancement techniques i) Image reduction and magnification ii) Contrast enhancement			
		K4	CO2	14M	
	OR				
		b	What are raster and vector? Write the basic differences between raster and vector?		
		K1	CO2	14M	
<b>Unit-III</b>					
3	a	i)Define GIS. Describe the key components of GIS.			
		K1	CO3	7M	
		ii)Explain the importance and applications of GIS.			
		K2	CO3	7M	
OR					
	b	Explain how spatial data and attribute data integrated to make a GIS.			
		K2	CO3	14M	
<b>Unit-IV</b>					
4	a	Define a spatial data model and explain in types.			
		K3	CO4	14M	
	OR				
		b	Discuss the raster and vector models in GIS		
		K3	CO4	14M	
<b>Unit-V</b>					
5	a	Define topology and explain its importance			
		K2	CO5	14M	
	OR				
		b	Describe how data are collected using satellite navigation system or GPS		
		K4	CO5	14M	



## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CC2OE10

OOPS THROUGH JAVA

Time: 3 hours

(ECE)

Max. Marks: 70

Note: Answer All FIVE Questions.  
All Questions Carry Equal Marks (5 X 14 = 70M)

QNo	Questions	KL	CO	M
<b>Unit-I</b>				
1	a	i) What are the Principles of Object-Oriented Languages? Compare Compilation and Interpretation.		
		1	1	7M
		ii) Explain the JVM architecture.		
		1	1	7M
OR				
b	i) What are the Features of Java Programming? Compare Procedural languages and Object-Oriented Programming Languages.			7M
		2	1	
	ii) Explain the structure of a Java Program.			7M
		3	1	
<b>Unit-II</b>				
2	a	i) Describe all the primitive data types supported by Java with appropriate examples. Also specify their storage capacity or ranges.		
		2	2	7M
		ii) Write a program for calculating Matrix Multiplication Operations.		
		3	2	7M
OR				
b	i) What is the difference between the >> and >>> operators? Explain with the help of a program?			7M
		2	2	
	ii) Write a Java Program for matrix addition.			7M
		3	2	
<b>Unit-III</b>				
3	a	i) Explain the difference between a static and a non-static inner class.		
		2	3	7M
		ii) You want subclasses in any package to have access to members of a superclass. Which is the most restrictive access modifier that will accomplish this objective? Explain with example.		
		3	3	7M
OR				
b	i) What is Dynamic method dispatch? Explain the difference between Abstract class & interface.			7M
		2	3	
	ii) Write a java program to create own exception for Negative Value Exception if the user enter negative value.			7M
		3	3	
<b>Unit-IV</b>				
4	a	i) What is mean by multi-threading? What are the 2 ways of creating a thread? Which is the best way and why?		
		2	4	7M
		ii) Write a program for interthread communication process. In this case they have three classes consumer, producer, and stock.		
		3	4	7M
OR				
b	i) What are the high-level thread states? When a thread blocks on I/O, what state does it enter?			7M
		2	4	
	ii) Write a java program to implement join() method in multithreading.			7M
		3	4	

Unit-V					
5	a	i) What is AWT? Discuss about AWT controls.	1	5	7M
		ii) Write an applet that asks the user to enter two floating-point numbers, obtains the two numbers from the user and draws their sum, product (multiplication), difference and quotient (division).	3	5	7M
	OR				
	b	i) Explain about the Event delegation model.	2	5	7M
ii) Write a java Program to implement an AWT based calculator with basic operations.		3	5	7M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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## III B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20AI3206

NATURAL LANGUAGE PROCESSING

Time: 3 hours

CSE (AI)

Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No	Questions	KL	CO	M	
<b>Unit-I</b>					
1	a	i) Explain the difficulties in spelling and grammar of NLP Process?	2	1	7M
		ii) Explain the applications of NLP.	2	1	7M
	OR				
	b	i) Explain different phases of Natural language processing.	2	1	7M
	ii) What is NLP? Explain two major approaches to NLP	2	1	7M	
<b>Unit-II</b>					
2	a	i) List the problem associated with n-gram model. Explain how these problems are handled.	2	2	7M
		ii) Discuss about basic smoothing techniques?	2	2	7M
	OR				
	b	i) Explain extrinsic and intrinsic evaluation language model with an example	2	2	7M
	ii) Discuss in detail about the applications and limitations of n-gram model in NLP.	2	2	7M	
<b>Unit-III</b>					
3	a	i) Illustrate parts of speech tagging and explain different categories of POS tagging.	2	3	7M
		ii) What is meant by Tag set? Explain TBL tagging.	2	3	7M
	OR				
	b	i) What is POS tagging? Explain Rule based tagger .	2	3	7M
	ii) Explain POS tagging using neural models.	2	3	7M	
<b>Unit-IV</b>					
4	a	i) Explain top-down parsing with an example?	2	4	7M
		ii) List out the disadvantages of Probabilistic Context free grammar (PCFG)?	2	4	7M
	OR				
	b	i) Differentiate between top down and bottom-up parsing. What algorithms are used for each of these types of parsing.	2	4	7M
	ii) Explain bottom- up parsing with an example.	2	4	7M	
<b>Unit-V</b>					
5	a	i) How similarity metrics in NLP are computed? Explain any TWO metrics	2	5	7M
		ii) What are the main differences between skip-gram and CBOW?	2	5	7M
	OR				
	b	i) What is word sense disambiguation? Explain any TWO methods for implementation of WSD.	2	5	7M
	ii) Discuss in detail about how word embedding models are used for prediction purposes.	2	5	7M	