R20

III B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2024

NARASARAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC1OE10

III B.Tech. - I Semester Supple Examinations, April-2024

DATABASE MANAGEMENT SYSTEM

(EEE,ECE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	i) Recall the differences between file system and DBMS.	K1	1	7M
		ii) Explain the architecture of DBMS with neat diagram.	K2	1	7M
		OR			
	b	i) Explain about Centralized and Client Server architecture for the database	K2	1	10M
		ii) Describe the responsibilities of a DBA.	K2	1	4M
2		**Unit-II**			
	a	i) Discuss different types of attributes representation in E/R diagram. Explain with any example.	K2	2	7M
		ii) Explain the database design with E/R Model for Super Market Management System.	K2	2	7M
		OR			
	b	i) Construct ER Diagram which describes the functionalities of online banking system.	K3	2	7M
		ii) Explain various ER Model Relationships with examples.	K2	2	7M
3		**Unit-III**			
	a	i) What is SQL query? Describe the form of SQL query.	K1	3	7M
		ii) Explain different types of joins in Relational Algebra.	K2	3	7M
		OR			
	a	i) Write SQL syntax for creating table EMP (EMPNO, FIRSTNAME, LASTNAME, SALARY, JDATE, DEPENDENT, SUPERVISOR). ii) Write SQL syntax for insert two rows in table, delete one row from table, update salary. iii) Retrieve the name of each employee who has a dependent with the same first name as the employee. iv) Retrieve the names of all employees who do not have supervisors	K3	3	14M
4		**Unit-IV**			
	a	i) What is functional dependency? Write the inference rules of functional dependencies.	K2	4	7M
		ii) Illustrate problems caused due to redundancy.	K3	4	7M
		OR			
	b	Infer the purpose of normalization. Why is it done? Explain about 1NF, 2NF and 3NF.	K2	4	14M

5		**Unit-V**			
	a	i) Explain different types of indexing techniques with neat diagram.	**K2**	**5**	**14M**
		OR			
	b	i) Explain ACID properties in detail	**K2**	**5**	**7M**
		ii) Infer the use of B+ tree index structure. Write its advantages	**K2**	**5**	**7M**

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

NAKASAKAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC3102

III B.Tech. - I Semester Supple Examinations,April-2024

DATA WAREHOUSING AND DATA MINING

(CSE,IT,AI)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	KL	CO	Mark
1		**Unit-I**			
	a	Compare and contrast supervised and unsupervised learning in the context of data mining.	4	1	7M
		What are the different types of data attributes, and how do they impact the data mining process?	2	1	7M
		OR			
	b	Explain the concept of data preprocessing and its significance in data mining.	2	1	7M
		Discuss the historical origins and evolution of data mining	2	1	7M
2		**Unit-II**			
	a	Discuss the importance of sampling in data preprocessing and the different sampling techniques.	2	2	7M
		What are the multivariate summary statistics in data exploration?Explain	2	2	7M
		OR			
	b	What are the Measures of similarity and dissimilarity . Explain with example.	2	2	14M
3		**Unit-III**			
	a	Explain the concept of a multidimensional data model and how it differs from traditional relational databases.	2	3	7M
		Describe the three-tier data warehouse architecture and its components	2	3	7M
		OR			
	b	Compare and contrast ROLAP, MOLAP, and HOLAP OLAP server architectures	4	3	7M
		Define the role of a metadata repository in data warehouse management.	2	3	7M
4		**Unit-IV**			
	a	Describe the process of building a decision tree for a classification problem	2	4	7M
		Describe pruning techniques used to control the complexity of decision trees.	2	4	7M
		OR			
	b	What is overfitting in the context of classification, and how does it affect model performance?	2	4	7M
		Explain Bayes' Theorem and how it is used for classification in the Bayesian classifier.	2	4	7M
5		**Unit-V**			
	a	Explain techniques for handling imbalanced data, such as oversampling and undersampling.	2	5	7M
		Describe the basic K-means algorithm for clustering. What are the additional issues related to K-means clustering?	2	5	7M
		OR			
	b	Explain the Apriori principle and its role in frequent itemset generation.	2	5	7M
		Explain the DBSCAN algorithm for density-based clustering. What are its strengths and weaknesses?	2	5	7M

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC3104

III B.Tech. - I Semester Supple Examinations, April-2024

COMPUTER NETWORKS

(CSE,AI)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Explain the types of transmission modes.	K2	CO1	**7M**
		Compare Connection oriented and connectionless service	K2	CO2	**7M**
		OR			
	b	With a neat diagram describe in detail about the Network architecture.	K2	CO1	**7M**
		Discuss the Features of LAN, MAN, WAN.	K2	CO1	**7M**
2		**Unit-II**			
	a	Explain CRC-32 with an example.	K2	CO3	**7M**
		Write a note on IEEE 802.11 Standards	K2	CO3	**7M**
		OR			
	b	Briefly discuss about data link layer design issues?	K2	C03	**14M**
3		**Unit-III**			
	a	Discuss about GO BACK NARQ	K2	CO5	**7M**
		Explain Stop and wait ARQ error control mechanism	K2	CO5	**7M**
		OR			
	b	Discuss about channel allocation problem.	K2	CO5	**7M**
		. Explain HDLC protocol in detail	K4	CO4	**7M**
4		**Unit-IV**			
	a	What are the responsibilities of Network Layer?	K2	CO6	**7M**
		Change the following IPv4 addresses from binary notation to dotted-decimal notation.. 10000001 00001011 00001011 11101111	K2	CO6	**7M**
		OR			
	b	Explain distance vector routing in detail	K4	CO4	**7M**
		A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. a. What is the first address in the block? b. Find the last address for the block	K2	CO5	**7M**
5		**Unit-V**			
	a	Explain about elements of transport protocols	K2	CO5	**7M**
		List and discuss the types of DNS records	K2	CO6	**7M**
		OR			
	b	Describe about Avoidance of congestion in TCP	K2	CO2	**7M**
		Explain the working of Electronic mail. How SMTP used in Email applications.	K2	CO6	**7M**

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech I Semester Supple Examinations, April-2024

Sub Code:R20CE3101 **DESIGN AND DRAWING OF CONCRETE STRUCTURES**

Time: 3 hours (CE) Max. Marks: 70

Note: Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS: 456-2000 and design charts from SP-16 is allowed.

Q.No.		Questions	KL	CO	Marks
		PART A			
1		A reinforced concrete floor slab of 125 mm thickness is supported by RCC beams of width 300 mm spaced at 3.6 m c/c. The beams are simply supported on 300 mm × 300 mm columns with a clear span of 5 m and cast monolithic with the slab. The imposed live load on the floor is 3 kN/m^2 and the floor finish is 1.5 kN/m^2. Design the T-beam section using M 25 grade concrete and Fe 500 steel. Draw longitudinal and cross-sectional details of the T-beam.	4	5	[28M]
		OR			
2		Design an RCC slab of clear dimensions 5 m × 6 m with two adjacent edges continuous. The slab is subjected to live load of 4 kN/m^2 and floor finish of 1 kN/m^2. Assume the width of the supports is 300 mm. Use M 25 grade concrete and Fe 500 steel. Sketch the reinforcement details.	4	5	[28M]
		PART B			
3	a	Explain the behaviour of different types of RCC beam sections based on the area of steel reinforcement.	2	1	[7M]
	b	A reinforced concrete simply supported rectangular beam of effective span 4.5 m and size 230 mm × 400 mm effective depth is reinforced with 4-12 Ø . Determine the safe uniformly distributed load which the beam can resist in addition to its self-weight. Use M 25 concrete and Fe 415 steel. Adopt working stress method of design.	3	2	[7M]
4		An RC beam of size 300 mm × 450 mm (overall depth) is subjected to an ultimate bending moment of 150 kNm, a factored shear force of 60 kN and a factored torsional moment of 45 kNm. Design the longitudinal and transverse reinforcement. Use M 25 concrete and Fe 500 steel.	4	3	[14M]
5		Design a simply supported RCC slab for a room of clear dimensions 3 m × 7 m subjected to live load of 3 kN/m^2 and floor finish of 1 kN/m^2. Assume the width of the supports is 300 mm. Use M 25 concrete and Fe 500 steel.	4	4	[14M]
6		Design the reinforcement for a column of section 350 mm × 350 mm, subjected to a factored axial load of 1000 kN and a factored moment of 150 kNm. Use M 30 grade concrete and Fe 500 steel. The effective length of the column is 3.6 m.	4	4	[14M]
7		Design the footing for a rectangular column 300 mm × 450 mm subjected to an axial load of 1250 kN. Assume the bearing capacity of soil is 180 kN/m^2. Use M 30 concrete and Fe 500 steel.	4	4	[14M]

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CE3102

III B.Tech. - I Semester Supple Examinations, April-2024

SOIL MECHANICS

(CE)

Time: 3 hours **Max. Marks: 70**

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

Q.No		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Explain the soil classification system.	K2	CO1	7M
	a	Two clay samples A and B have the following properties: **Atterberg limits** / **Clay A** / **Clay B** Liquid limit / 44% / 55% Plastic limit / 29% / 35% Natural water content / 30% / 50% Which of the clays A or B would experience larger settlement under identical loads? Conclude with your comments.	K2	CO1	7M
		OR			
	b	Discuss about the grain size distribution of soil by sieve analysis.	K2	CO1	7M
	b	Discuss about the grain size distribution of soil by hydrometer methods.	K2	CO1	7M
2		**Unit-II**			
	a	Explain the theory of quick sand conditions in soil.	K3	CO2	7M
	a	The falling head permeability test was conducted on a soil sample of 4 cm diameter and 18 cm length. The head fell from 1.0 m to 0.40 m in 20 minutes. If the cross-sectional area of the stand pipe was 1 cm^2. Determine the coefficient of permeability.	K3	CO2	7M
		OR			
	b	The water table in a deposit of sand 8m thick is at a depth of 3 m below the ground surface. Above the water table, the sand is saturated with capillary water. The bulk density of sand is 19.62 kN/m^3. Calculate the effective pressure at 1 m, 3 m and 8 m below the ground surface. Hence plot the variation of total pressure, neutral pressure and effective pressure over the depth of 8 m.	K3	CO2	7M
		What is permeability? Discuss the factors affecting permeability.	K3	CO2	7M
3		**Unit-III**			
	a	Discuss the characteristics and uses of flow nets.	K3	CO3	7M
	a	A water tank is supported by a ring foundation having outer diameter of 10 m and inner diameter of 7.5 m. The ring foundation transmits uniform load intensity of 160 kN/m^2. Compute the vertical stress induced at depth of 4 m, below the centre of ring foundation, using Westergaard's analysis, taking $\mu = 0$.	K3	CO3	7M
		OR			
	b	Describe about the Newmark's influence chart.	K3	CO3	7M
		A line load of 100 kN/m run extends to a long distance. Determine the intensity of vertical stress at a point 2 m below the surface, directly under the line load and at a distance 2 m perpendicular to the line. Use Boussinesq's theory.	K3	CO3	7M

4		**Unit-IV**			
	a	Explain with a neat sketch the Terzaghi's one dimensional consolidation theory.	**K3**	**CO4**	**7M**
		There is a layer of soft clay 4 m thick under a newly constructed building. The overburden pressure over the center of the clay layer is 300 kN/m^2. Compute the settlement, if there is an increase in pressure due to construction of 100 kN/m^2. Take Cc = 0.5, G = 2.7. The water content of the deposit was found to be 50%.	**K3**	**CO4**	**7M**
		OR			
	b	How will you determine pre-consolidation pressure? Discuss in detail.	**K3**	**CO4**	**7M**
		In a consolidation test on a soil, the void ratio of the sample decreased from 1.25 to 1.10 when the pressure is increased from 200 kN/m^2 to 400 kN/m^2. Calculate the coefficient of consolidation if the coefficient of permeability is 8×10^{-8} cm/sec.	**K3**	**CO4**	**7M**
5		**Unit-V**			
	a	Explain the factors affecting the compaction of soil.	**K2**	**CO5**	**7M**
		Describe the mechanism of compaction.	**K2**	**CO5**	**7M**
		OR			
	b	Discuss the effects of compaction on soil properties.	**K2**	**CO5**	**7M**
		Explain in detail about field compaction equipment.	**K2**	**CO5**	**7M**

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

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CE3103

III B.Tech. - I Semester Supple Examinations, April-2024

HIGHWAY ENGINEERING

(CE)

Time: 3 hours **Max. Marks: 70**

Note: Answer All **FIVE** Questions.

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

QNo		Questions	KL	CO	Marks
1		**Unit-I**			
	a	How the preparation of master plan is done?	2	1	7M
		Discuss the factors controlling alignment	2	1	7M
		OR			
	b	What is classification of highways adopted in different road Development Plans? Discuss	2	1	7M
		Write about the necessity of highway planning surveys	2	1	7M
2		**Unit-II**			
	a	While aligning a highway in a built up area, it was necessary to provide a horizontal circular curve of radius 446 m. The design speed is 85 Kmph, the length of wheel base is 8m and the pavement width is 12m. Design super elevation, extra widening and length of transition curve	3	2	7M
		What are the desirable Properties of Road aggregates? Explain	2	2	7M
		OR			
	b	(i)What are the factors required for overturning sight distance? (ii)What are the various tests conducted on bituminous materials?	2	2	14M
3		**Unit-III**			
	a	Explain the procedure of traffic volume data collection by manual method	2	3	7M
		Explain different types of Intersections	2	3	7M
		OR			
	b	What are the various types of Traffic Studies generally carried out to understand the traffic movement on roads? Briefly discuss.	2	3	14M
4		**Unit-IV**			
	a	Describe Westergaard's stress equation for wheel loads.	2	4	7M
		What are the differences between Flexible and Rigid Pavements?	2	4	7M
		OR			
	b	Enumerate the various methods of flexible pavement design. Briefly indicate the basis of design in each case?	2	4	14M
5		**Unit-V**			
	a	Explain about Construction of Bitumen Pavements	2	5	7M
		Explain the Construction of Cement Concrete Pavements	2	5	7M
		OR			
	b	Explain the construction of Water Bound Macadam Roads	2	5	7M
		Write the importance of Maintenance of Highways	2	5	7M

NAKASARAOPETA
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(AUTONOMOUS)

Subject Code: R20CE3104

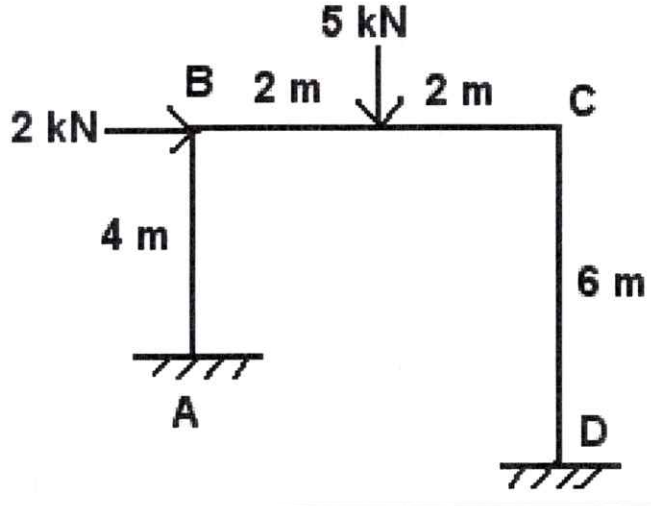
III B.Tech. - I Semester Supple Examinations, April-2024

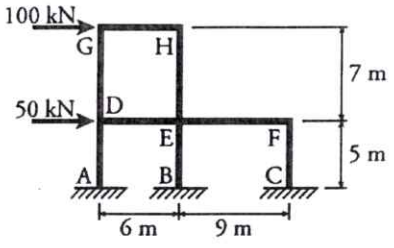
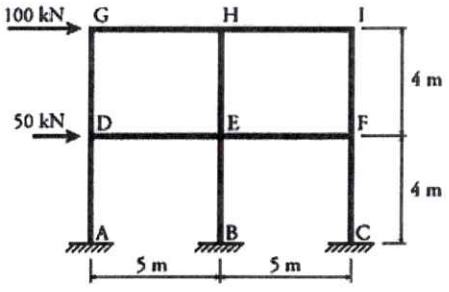
ADVANCED STRUCTURAL ANALYSIS

(CE)

Time: 3 hours **Max. Marks: 70**

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

Q.No		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Derive the expression of expression of strain energy due to axial load.	K3	CO1	7M
		State and prove Castigliano's first theorem.	K3	CO1	7M
		OR			
	b	Derive the expression of strain energy due to bending moment.	K3	CO1	7M
		Derive the expression of strain energy due to shear force.	K3	CO1	7M
2		**Unit-II**			
	a	Analyse the portal frame shown in the figure by moment distribution method. Draw the bending moment diagram. EI = constant. 	K4	CO2	14M
		OR			
	b	A portal frame ABCD with supports A is fixed and D is hinged at same level carries a single central concentrated load of 100 kN on the span BC and a single concentrated load of 50 kN acts horizontally on the joint B. Span AB = Span CD = 3 m and Span BC = 6 m. Take I for span AB and 2I for span BC and CD. Analyse the portal frame by moment distribution method. Draw the bending moment diagram.	K4	CO2	14M
3		**Unit-III**			
	a	A parabolic three hinged arch carries a uniformly distributed load of 30 kN/m on the left half of the span. It has a span of 16 m and a central rise of 3 m. Determine the resultant reactions at supports. Find the bending moment, radial shear and normal thrust at 2 m from the left support.	K4	CO3	14M
		OR			
	b	A parabolic arch hinged at the ends has a span of 60 m and a rise of 12 m. A concentrated load of 8 kN acts at 15 m from the left hinge. Calculate the horizontal thrust and the reactions at the hinge. Also calculate the bending moment at the section.	K4	CO3	14M

		Unit-IV			
4	a	Analyse the frame using cantilever method. Draw the bending moment diagram. 	**K4**	**CO4**	**14M**
		OR			
	b	Analyse the frame using portal method. Draw the bending moment diagram. 	**K4**	**CO4**	**14M**
5		**Unit-V**			
	a	A suspension cable of horizontal span 100 m is supported at two different levels. The left support is lower than right support by 3.5 m. The dip to the lowest point of the cable below the left support is 6 m. The cross-section area of the cable is 4000 mm^2. Find the UDL that can be carried by the cable, if the maximum stress is 830 N/mm^2.	**K3**	**CO5**	**14M**
		OR			
	b	The three hinged stiffening girder of suspension bridge of 100 m span subjected to two-point load 200 kN each 20 m and 40 m respectively from the left-hand hinge. Determine B.M and S.F. in the girder at section at 30 m from left end. Also determine the maximum tension in the cable which has a central dip of 8 m.	**K3**	**CO5**	**14M**

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

NARASARAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CE3107

III B.Tech. - I Semester Supple Examinations, April-2024

SOLID WASTE AND HAZARDOUS MANAGEMENT

(CE)

Time: 3 hours **Max. Marks: 70**

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

Q.No		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Define solid wastes. Explain the classification of solid wastes	**K1**	**CO1**	**7M**
		Discuss about the regulatory aspect of solid waste management and their problems.	**K2**	**CO1**	**7M**
		OR			
	b	Explain the methods of sampling and characterization of solid wastes.	**K2**	**CO1**	**7M**
		Discuss about the environmental impacts on open duping.	**K2**	**CO1**	**7M**
2		**Unit-II**			
	a	Briefly explain the inter-relationship of different functional elements in a solid waste management system Explain the factors affecting generation rate?	**K2**	**CO2**	**7M**
		Discuss the methods used to estimate the quantities of solid waste generation?	**K2**	**CO2**	**7M**
		OR			
	b	Discuss in detail about the physical, chemical and biological properties of MSW	**K3**	**CO2**	**14M**
3		**Unit-III**			
	a	Discuss 'Optimization of Collection Routes' with special reference to Environmental aspects	**K3**	**CO3**	**7M**
		Define transfer stations? Briefly describe the considered in the design of transfer stations.	**K3**	**CO3**	**7M**
		OR			
	b	Discuss about the 4R Rules in waste minimization in detail.	**K2**	**CO3**	**7M**
		Discuss about the segregation and transportation of solid waste.	**K2**	**CO3**	**7M**
4		**Unit-IV**			
	a	Explain briefly mechanical process of composting.	**K3**	**CO4**	**7M**
		What is the process technology of incineration? compare the merits and demerits.	**K4**	**CO4**	**7M**
		OR			
	b	write a short note on i) Vermi-composting ii) Fermentation iii) Termigradation	**K3**	**CO4**	**7M**
		Discuss about the refuse processing technologies.	**K2**	**CO4**	**7M**
5		**Unit-V**			
	a	Draw the diagram of double liner system of landfill and explain the functions of various components.	**K3**	**CO5**	**7M**
		Define waste disposal. Point out the factors to be considered while disposing solid waste.	**K2**	**CO5**	**7M**

		OR			
	b	Explain the various factors to be considered in the selection of a site for a sanitary land fill Explain site investigation and selection for solid waste disposal.	**K2**	**CO5**	**7M**
		Discuss about the types of landfilling for solid waste.	**K2**	**CO5**	**7M**

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

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC1OE01

III B.Tech. - I Semester Supple Examinations, April-2024

DISASTER MANAGEMENT

(CE&IT)

Time: 3 hours **Max. Marks: 70**

Note: Answer All **FIVE** Questions.

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	i) Explain the characteristics and damage potential of earthquake hazards.	K2	1	7M
		ii) Explain the vulnerability assessment of various man-made hazards.	K4	1	7M
		OR			
	b	i) Explain the various forewarning levels of natural hazards.	K1	1	7M
		ii) Explain the dimensions of vulnerability factors for man-made hazards.	K2	1	7M
2		**Unit-II**			
	a	Explain the different phases of disaster management cycle.	K2	2	14 M
		OR			
	b	i) Explain the various functions of disaster crisis management.	K2	2	7M
		ii) Explain the steps to be adopted for mitigation of a disaster.	K2	2	7M
3		**Unit-III**			
	a	i) Explain the necessity of legislative support at State and National levels for capacity building.	K4	3	7M
		ii) Explain the use of various counter-disaster resources in disaster management.	K4	3	7M
		OR			
	b	i) Explain the importance of structural and non-structural measures in capacity assessment.	K3	3	14 M
4		**Unit-IV**			
	a	i) Explain the role of mass media in disaster management.	K3	4	7M
		ii) Explain the changing concepts of disaster management.	K2	4	7M
		OR			
	b	Explain the different coping strategies generally implemented in disaster management.	K4	4	14 M
5		**Unit-V**			
	a	i) Explain the various parameters influencing the preparation of state disaster management plan.	K2	5	7M
		ii) Explain the different strategies used in disaster management planning.	K4	5	7M
		OR			
	b	i) Explain the organizational structure of disaster management in India.	K2	5	7M
		ii) Explain the different steps for formulating a disaster risk reduction plan.	K4	5	7M

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC1OE10

III B.Tech. - I Semester Supple Examinations, April-2024
DATABASE MANAGEMENT SYSTEM
(EEE,ECE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	i) Recall the differences between file system and DBMS.	K1	1	7M
		ii) Explain the architecture of DBMS with neat diagram.	K2	1	7M
		OR			
	b	i) Explain about Centralized and Client Server architecture for the database	K2	1	10M
		ii) Describe the responsibilities of a DBA.	K2	1	4M
2		**Unit-II**			
	a	i) Discuss different types of attributes representation in E/R diagram. Explain with any example.	K2	2	7M
		ii) Explain the database design with E/R Model for Super Market Management System.	K2	2	7M
		OR			
	b	i) Construct ER Diagram which describes the functionalities of online banking system.	K3	2	7M
		ii) Explain various ER Model Relationships with examples.	K2	2	7M
3		**Unit-III**			
	a	i) What is SQL query? Describe the form of SQL query.	K1	3	7M
		ii) Explain different types of joins in Relational Algebra.	K2	3	7M
		OR			
	a	i) Write SQL syntax for creating table EMP (EMPNO, FIRSTNAME, LASTNAME, SALARY, JDATE, DEPENDENT, SUPERVISOR). ii) Write SQL syntax for insert two rows in table, delete one row from table, update salary. iii) Retrieve the name of each employee who has a dependent with the same first name as the employee. iv) Retrieve the names of all employees who do not have supervisors	K3	3	14M
4		**Unit-IV**			
	a	i) What is functional dependency? Write the inference rules of functional dependencies.	K2	4	7M
		ii) Illustrate problems caused due to redundancy.	K3	4	7M
		OR			
	b	Infer the purpose of normalization. Why is it done? Explain about 1NF, 2NF and 3NF.	K2	4	14M

5		**Unit-V**			
	a	i) Explain different types of indexing techniques with neat diagram.	**K2**	**5**	**14M**
		OR			
	b	i) Explain ACID properties in detail	**K2**	**5**	**7M**
		ii) Infer the use of B+ tree index structure. Write its advantages	**K2**	**5**	**7M**

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

Subject Code: R20EE3101

III B.Tech. - I Semester Supple Examinations, April-2024

PROBLEM SOLVING WITH PYTHON

(EEE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	List and explain the Hardware components of modern computer system.	K2	CO1	7M
		List different types of software components used in coding process. Explain.	K2	CO1	7M
		OR			
	b	Like most areas of study, computer science focuses on a broad set of interrelated ideas. Two of the most basic ones are algorithms and information processing. Explain these ideas in brief.	K2	CO1	7M
		Explain the process of storing the data in computer memory in detail.	K2	CO1	7M
2		**Unit-II**			
	a	Explain the steps involved in interpreting Python program with neat sketch.	K2	CO2	7M
		You can calculate the surface area of a cube if you know the length of an edge (surfaces of the cube and is given by $A= 6a^2$, where a is edge). Construct a program that takes the length of an edge (an integer) as input and prints the cube's surface area as output.	K3	CO2	7M
		OR			
	b	List different types of control structures in Python and explain with relevant examples.	K2	CO2	7M
		An employee's total weekly pay equals the hourly wage multiplied by the total number of regular hours plus any overtime pay. Overtime pay equals the total overtime hours multiplied by 1.5 times the hourly wage. Construct a program that takes as inputs the hourly wage, total regular hours, and total overtime hours and displays an employee's total weekly pay.	K3	CO2	7M
3		**Unit-III**			
	a	Define a function named even. This function expects a number as an argument and returns True if the number is divisible by 2, or it returns False otherwise.	K3	CO2	7M
		Infer the use of recursive functions with a simple example.	K2	CO2	7M
		OR			
	b	Define a function named summation. This function expects two numbers, named low and high, as arguments. The function computes and returns the sum of the numbers between low and high, inclusive.	K3	CO2	7M
		Illustrate the concept of lambda functions with an example program.	K3	CO2	7M
4		**Unit-IV**			
	a	Assume that the variable **data** refers to the list [5, 3, 7, 0, 10, 20, 0], and **result** refers to an empty list. Develop a loop that adds the nonzero values in **data** to the **result** list, also mean value of result list.	K3	CO3	7M
		List different types of methods available in list data structure and explain with simple examples.	K2	CO3	7M

		OR			
	b	List and explain commonly used dictionary operations in Python.	K2	CO3	7M
		Write a code segment that opens a file named myfile.txt for input and prints the number of lines in the file.	K3	CO3	7M
5		**Unit-V**			
	a	Interpret the role of constructors. List types of constructors and explain any one type with simple example.	K3	CO4	7M
		Write the use of operator overloading and explain with suitable example.	K2	CO4	7M
		OR			
	b	Interpret the advantages of Abstract class. Explain with suitable example.	K3	CO4	7M
		Illustrate the use of exception handling in Python with suitable example.	K3	CO4	7M

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

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech. - I Semester Supple Examinations, April-2024

Sub Code: R20EE3102 **Power Electronics**

(EEE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	i) Describe the basic behavior of thyristor using a two-thyristor using a two-transistor model?	K3	1	7M
		ii) Explain the turn on and turn off characteristics of IGBT with neat sketch?	K2	1	7M
		OR			
	b	i) What is power MOSFET? Write the difference between general purpose MOSFET and power MOSFET?	K2	1	7M
		ii) Draw and explain the operation of Snubber circuit?	K2	1	7M
2		**Unit-II**			
	a	i) Explain how a free wheeling diode improves power factor in a converter?	K2	2	7M
		ii) A single phase fully controlled bridge converter with RL load is supplied from 220V, 50 HZ Ac supply. If the firing angle is 45^0, determine i) average output voltage ii) Output current iii) input power factor	K2	2	7M
		OR			
	b	What is phase-controlled technique? Explain the operation of single-phase fully controlled rectifier with R-laod? Derive the expression for average DC output voltage?	K3	2	14M
3		**Unit-III**			
	a	i) Describe the operation of three phase full converter with RL load? Draw the waveforms?	K2	3	7M
		ii) Describe the working of six pulse converter. Sketch the waveforms for $\alpha=30^0$ and $\alpha=120^0$	K3	3	7M
		OR			
	b	A three-phase full converter is connected to a load resistance is connected to a load resistance of 5 ohm and it is supplied from a 220V, 50 HZ AC supply. If the firing angle of thyristor is $\alpha=30^0$. Draw the relevant waveforms and determine i) average output voltage ii0 average output current iii) rms output voltage iv) rms output current	K3	3	14M
4		**Unit-IV**			
	a	i) For a single-phase AC voltage controller fed from a single-phase source and is controlling power to R-load, derive the expressions for rms output voltage, rms output current and line power factor?	K2	4	7M
		ii) An ac voltage controller supplies power to a resistive load of 20 ohm. The rms voltage is 220V at 50 HZ. The thyristors are switched on for 30 cycles and off for 70 cycles. Calculate the values of a) rms output voltage b) input power factor	K2	4	7M
		OR			
	b	What is cyclo converter? Discuss the working of single phase bridge type cyclo converter with RL loads and for discontinuous operations with relevant output waveforms and circuit diagram for $F_0 = ½$ F?	K2	4	14M

5		**Unit-V**			
	a	With the help of a neat diagram and associated waveforms discuss the operation of Buck-Boost converter?	**K2**	**5**	**14M**
		OR			
	b	Explain the working of a single-phase full bridge inverter with RL load. Draw the relevant output waveforms?	**K2**	**5**	**14M**

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20EE3103

III B.Tech. - I Semester Supple Examinations, April-2024

POWER GENERATION AND TRANSMISSION

(EEE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Draw a typical layout of a Hydro power plant and describe the function of different components of their plant?	K2	1	14M
		OR			
	b	i) Discuss various factors with effect the selection of site for nuclear power plant?	K3	1	7M
		ii) What are the safety measures for nuclear power plants?	K2	1	7M
2		**Unit-II**			
	a	i) What is solar power? Explain the various possible large-scale applications of solar power?	K3	2	7M
		ii) Describe with neat sketch the construction and principle operation of a turbine used for tidal power?	K2	2	7M
		OR			
	b	i) Explain the operation of a geothermal plant in an inter-connected system?	K2	2	7M
		ii) Explain why it is necessary to develop non-conventional methods of generating electrical energy?	K2	2	7M
3		**Unit-III**			
	a	Find the inductance of the following systems using the method of GMD i) Two wire system ii) Symmetrically spaced three phase line iii) Unsymmetrically spaced three transposed line?	K3	3	14M
		OR			
	b	i) Distinguish between GMD and GMR?	K3	3	7M
		ii) A two conductor single phase line operates at 50 HZ. The diameter of each conductor is 20 mm and the spacing between the conductors is 3m. Determine the capacitance of the line taking into account the effect of ground. The height of conductors above ground is 6m?	K3	3	7M
4		**Unit-IV**			
	a	i) Give the classifications of transmission lines?	K2	4	7M
		ii) Draw Π equivalent of transmission line?	K3	4	7M
		OR			
	b	i) What is the difference between nominal T and nominal Π methods?	K2	4	7M
		ii) A balanced three phase load of 30 MW is supplied at 132 KV, 50 HZ and 0.85 pf lagging by means of a transmission line. The series inductance of a single conductor is (20+j52) ohm and total phase-neutral admittance is $315*10^{-6}$ mho. Using nominal T method, determine the sending end voltage, and regulation of the line?	K3	4	7M

		Unit-V			
5	a	i) Develop an expression for the sag of transmission line conductor suspended between two supports at different levels assuming the curve taken up of the conductor to be a parabola?	**K3**	**5**	**7M**
		ii) An overhead line has a spam of 250 m. Find the weight of the conductor if the ultimate tensile strength is 5788 Kg, sag is 1.5 m and factor of safety is 2?	**K3**	**5**	**7M**
		OR			
	b	i) Explain any two methods of grading of cables with necessary diagrams?	**K2**	**5**	**7M**
		ii) Define string efficiency? What are the methods of improving string efficiency?	**K2**	**5**	**7M**

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

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20EE3107

III B.Tech. - I Semester Supple Examinations, April-2024

SIGNALS AND SYSTEMS

(EEE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Find the even and odd compoanets of the following given signals. i). $x(t) = \cos((w_0t) + (\pi/3))$ and ii). $x(t) = \sin(2t) + \sin(t)\cos(t) + \cos(2t)$.	2	1	7M
	a	Let x1(t) and *xi(t)* be periodic signals with fundamental periods T_1 and *T2* respectively. Under what conditions is the sum $x(r) = x_1(t) + x_2(t)$ periodic and what is the fundamental period of x(t) if it is periodic?	3	1	7M
		OR			
	b	i). Explain orthogonality property between two complex functions $x_1(t)$ and $x2(t)$ for a real variable t. ii). Obtain the condition under which two signals $x_1(t)$ and $x_2(t)$ are said to be orthogonal to each other. Hence, prove that $\sin(nw_0 t)$ and $\sin(mw_0t)$ are orthogonal to each other for all integral value of *m, n.*	2	1	10M
	b	Identify, whether the following discrete time signal is periodic or not? IF periodic, determine the fundamental period $\cos(n/6)\cos(n\pi/6)$	1	1	4M
2		**Unit-II**			
	a	Obtain exponential Fourier series from trigonometric Fourier series.	3	2	7M
	a	Derive any two properties of the Fourier series and list Dirichlet's conditions.	2	2	7M
		OR			
	b	(i). Obtain trigonometric Fourier series from exponential Fourier series. (ii). Discuss the cosine form of representation of Fourier series.	2	2	7+7M
3		**Unit-III**			
	a	Find the fourier transform of signum function and list the properties of fourier transforms	4	3	10M
	a	Distinguish between exponential form of Fourier *series* and Fourier transform.	1	3	4M
		OR			
	b	Find the convolution of the following signals using Fourier transform: $x_1(t) = e^{-2t}u(t)$; $x_2(t)=e^{-2t}u(t)$.	2	3	7M
	b	State and prove the differentiation in *time* domain, differentiation in frequency domain and time integration properties of Fourier transform.	1,2	3	7M
4		**Unit-IV**			
	a	The input voltage to an RC circuit is given as $x(t) = te^{-2t}u(t)$, and the impulse response of this circuit is given as $2e^{-6t}u(t)$. Determine the output y(t).	4	4	8M
	a	Explain causality and physical realizability of a system and hence give Paley-Wiener criterion.	2	4	6M

		OR			
	b	the impulse response of a continuous-time system is expressed as: $h(t) = e^{-4t} u(t)$. Find the frequency response of the system. Plot the frequency response.	**2**	**4**	**7M**
		Consider a stable LTI system characterised by the differential equation $\frac{d^2y(t)}{dt^2} + \frac{2dy(t)}{dt} + y(t) = x(t)$. Find its impulse response.	**3**	**4**	**7M**
5		**Unit-V**			
	a	A Signal having a spectrum ranging from dc to 20 kHz is to be sampled and converted into discrete form. What is the minimum number of samples per second that m taken to ensure recovery?	**2**	**5**	**7M**
		State and prove the sampling theorem.	**1,2**	**5**	**7M**
		OR			
	b	Explain the impulse sampling method.	**2**	**5**	**7M**
		State and explain the sampling theorem for band pass signals.	**2**	**5**	**7M**

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC1OE10

III B.Tech. - I Semester Supple Examinations, April-2024

DATABASE MANAGEMENT SYSTEM

(EEE,ECE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	i) Recall the differences between file system and DBMS.	K1	1	7M
		ii) Explain the architecture of DBMS with neat diagram.	K2	1	7M
		OR			
	b	i) Explain about Centralized and Client Server architecture for the database	K2	1	10M
		ii) Describe the responsibilities of a DBA.	K2	1	4M
2		**Unit-II**			
	a	i) Discuss different types of attributes representation in E/R diagram. Explain with any example.	K2	2	7M
		ii) Explain the database design with E/R Model for Super Market Management System.	K2	2	7M
		OR			
	b	i) Construct ER Diagram which describes the functionalities of online banking system.	K3	2	7M
		ii) Explain various ER Model Relationships with examples.	K2	2	7M
3		**Unit-III**			
	a	i) What is SQL query? Describe the form of SQL query.	K1	3	7M
		ii) Explain different types of joins in Relational Algebra.	K2	3	7M
		OR			
	a	i) Write SQL syntax for creating table EMP (EMPNO, FIRSTNAME, LASTNAME, SALARY, JDATE, DEPENDENT, SUPERVISOR). ii) Write SQL syntax for insert two rows in table, delete one row from table, update salary. iii) Retrieve the name of each employee who has a dependent with the same first name as the employee. iv) Retrieve the names of all employees who do not have supervisors	K3	3	14M
4		**Unit-IV**			
	a	i) What is functional dependency? Write the inference rules of functional dependencies.	K2	4	7M
		ii) Illustrate problems caused due to redundancy.	K3	4	7M
		OR			
	b	Infer the purpose of normalization. Why is it done? Explain about 1NF, 2NF and 3NF.	K2	4	14M

5		**Unit-V**			
	a	i) Explain different types of indexing techniques with neat diagram.	**K2**	**5**	**14M**
		OR			
	b	i) Explain ACID properties in detail	**K2**	**5**	**7M**
		ii) Infer the use of B+ tree index structure. Write its advantages	**K2**	**5**	**7M**

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

Subject Code: R20ME3101

III B.Tech. - I Semester Supple Examinations, April-2024

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(ME)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Explain the foundation of AI and its history. What are the major problems in AI, and how do intelligent agents address these problems?	2	1	7M
		Write the applications of AI and explain with the help of diagram?	2	1	7M
		OR			
	b	What are problem-solving agents, and how do they formulate problems?	2	1	7M
		Explain state space search for defining problem with a suitable example.	2	1	7M
2		**Unit-II**			
	a	Explain the concept of informed search and compare the performance of Greedy Search and A* Search algorithms	3	2	7M
		Describe the Breadth-first search algorithm. How does it differ from Depth-first search in terms of time complexity?	3	2	7M
		OR			
	b	Define Uniform cost search and its applications in artificial intelligence. Give an example of a problem that can be solved using Uniform cost search algorithm.	3	2	14M
3		**Unit-III**			
	a	Explain the concept of knowledge progression in AI. How do different knowledge representation schemes (KR Schemes) address the challenges of knowledge representation?	3	3	7M
		Describe the various data types available in Python. Give examples of each data type and explain how they are used in machine learning applications.	2	3	7M
		OR			
	b	Explain the control structures used in Python. How do they differ from control structures in other programming languages? Give examples of how control structures are used in machine learning applications	2	3	7M
		Describe different Data cleaning and Data reduction techniques.	2	3	7M
4		**Unit-IV**			
	a	What are the different types of machine learning? Explain the difference between supervised and unsupervised learning with suitable examples.	2	4	7M
		Describe the following terms with example (a) Classification (b) Regression	2	4	7M
		OR			
	b	What is Density Estimation?	2	4	7M
		Discuss the need and applications of machine learning in today's world. Also, explain how dimensionality reduction techniques are useful in machine learning.	2	4	7M

5		**Unit-V**			
	a	Explain the working principle of K-nearest neighbour (KNN) algorithm. Discuss its advantages and limitations	3	6	7M
		Explain the Naïve Bayes algorithm and its variations.	3	6	7M
		OR			
	b	Explain Support vector machines (SVM) with suitable examples	3	6	7M
		Compare and contrast the working principle, advantages, and limitations of random forest and decision tree algorithms	3	6	7M

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20ME3102

III B.Tech. - I Semester Supple Examinations, April-2024

HEAT POWER ENGINEERING

(ME)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	i)Describe various methods to improve efficiency of steam power plant cycle	K2	CO1	7M
		ii)A composition of petrol on mass basis was C =85.5%, and H2 = 14.5%. It burns with 20% excess air. Calculate the precentage analysis of dry products of combustion by mass and convert them to volume basis.	K4	CO1	7M
		OR			
	b	i)A steam power plant operates on an ideal reheat Rankine cycle between the pressure limits of 9 MPa and 10 kPa. The mass flow rate of steam through the cycle is 25 kg/s. Steam enters both stages of the turbine at 500°C. If the moisture content of the steam exiting the low-pressure turbine should not exceed 10%, determine (a) the reheat pressure, (b) total rate of heat input in the boiler, (c) the thermal efficiency of the cycle.	K4	CO1	10M
		ii)Define (a) stoichiometric air–fuel ratio (b) Excess air (c) and equivalence ratio.	K2	CO1	4M
2		**Unit-II**			
	a	i)Explain the construction and working of a simple vertical boiler with the help of a neat sketch.	K2	CO2	7M
		ii)A boiler is equipped with a chimney of 30 m height. The ambient temperature is 25°C. The temperature of flue gases passing through the chimney is 300°C. If the air flow is 20 kg/kg of fuel burnt, find (a) draught produced (b) the velocity of flue gases passing through chimney if 50% of the theoretical draught is lost in friction	K4	CO2	7M
		OR			
	b	i)What are the characteristics of a good boiler?	K2	CO2	4M
		ii)Find the draught produced in mm of water by a chimney of 40-m height. The mass of the flue gases is 20 kg/kg of fuel burnt in the combustion chamber. The temperature of flue gases and ambient are 270°C and 23°C, respectively. Assuming diameter of the chimney is 150 cm and 30% of the theoretical draught is lost due to friction, find the mass of flue gases discharged through the chimney per minute.	K4	CO2	10M
3		**Unit-III**			
	a	i)Steam enters a convergent–divergent nozzle at 2 MPa and 400°C with a negligible velocity and mass-flow rate of 2.5 kg/s and it exits at a pressure of 300 kPa. The flow is isentropic between the nozzle entrance and throat and overall nozzle efficiency is 93 per cent. Determine (a) throat, and (b) exit areas.	K4	CO3	14M

		OR			
	b	i)Discuss the effect of irreversibilities on nozzle efficiency with the help of a T-s diagram.	K2	CO3	7M
		ii)Derive an equation for discharge through the nozzle.	K3	CO3	7M
4		**Unit-IV**			
	a	i)Distinguish between impulse and reaction turbines.	K2	CO4	6M
		ii)In a single-stage impulse turbine, the steam jet leaves the nozzles at 20° to the plane of the wheel at a speed of 670 m/s and it enters the moving blades at an angle of 35° to the drum axis. The moving blades are symmetrical in shape. Determine the blade velocity and diagram efficiency	K4	CO4	8M
		OR			
	b	i)Why are steam turbines compounded? Explain.	K2	CO4	4M
		ii)Explain the working principle of parson'sreaction turbine with neat sketch	K4	CO4	10M
5		**Unit-V**			
	a	i)What are the different methods used to improve efficiency of a gas turbine plant? Expain any one method with a neat sketch	K2	CO5	7M
		ii)Explain the working of a turboprop engine with the help of a sketch.	K2	CO5	7M
		OR			
	b	i)In a gas turbine power plant, operating on Joule cycle, air is compressed from 1 bar and 15°C through a pressure ratio of 6. It is then heated to 727°C in the combustion chamber and expanded back to a pressure of 1 bar. Calculate the net work done, cycle efficiency and work ratio. Assume isentropic efficiencies of turbine and compressor are 90 and 85%, respectively	K4	CO5	10M
		ii)Define the following terms as applied to jet propulsion: specific thrust, specific impulse, thrust power and propulsive power.	K2	CO5	4M

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20ME3103

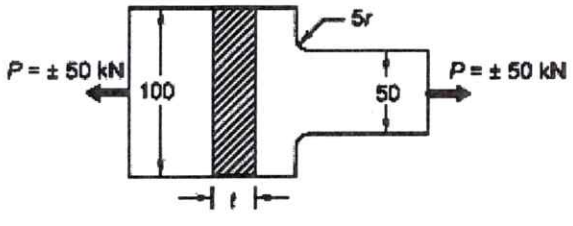
III B.Tech. - I Semester Supple Examinations, April-2024

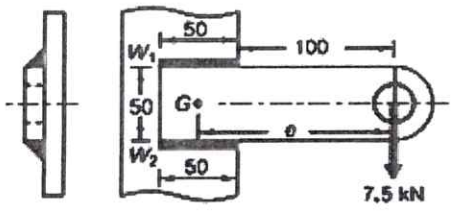
DESIGN OF MACHINE ELEMENTS-I

(ME)

Time: 3 hours **Max. Marks: 70**

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

Q. NO		QUESTION	KL	CO	MARKS
1		**Unit - I**			
	a	**i) Explain** general considerations in machine design.	**K2**	CO1	[7M]
		ii) Explain briefly the following terms (a) Poisson's ratio (b) Bulk modulus (c) Modulus of rigidity (d) Factor of safety	**K2**	CO1	[7M]
		OR			
	b	**Solve** the following problem. A mild steel shaft of 50 mm diameter is subjected to a bending moment of 2000 N-m and a torque T. If the yield point of the steel in tension is 200 MPa, Find the maximum value of this torque without causing yielding of the shaft according to 1. Maximum principal stress 2. Maximum shear stress; and 3. Maximum distortion strain energy theory of yielding.	**K3**	CO1	[14M]
2		**Unit - II**			
	a	**Solve** the following problem. A component machined from a plate made of steel 45C8 (S_{ut} = 630 N/mm^2) is shown in *Figure.1*. It is subjected to a completely reversed axial force of 50 kN. The expected reliability is 90% and the factor of safety is 2. The size factor is 0.85. Determine the plate thickness t for infinite life, if the notch sensitivity factor is 0.8.  *Figure-1.*	**K3**	CO2	[14M]
		OR			
	b	**i) Explain** Soderberg diagram with neat sketches.	**K2**	CO2	[7M]
		ii) Solve the following problem. A machine component is subjected to a flexural stress which fluctuates between + 300 MN/m^2 and – 150 MN/m^2. Determine the value of minimum ultimate strength according to 1. Modified Goodman relation; 2. Soderberg relation. Take yield strength=0.55 Ultimate strength; Endurance strength = 0.5 Ultimate strength; and factor of safety=2.	**K2**	CO2	[7M]
3		**Unit - III**			
	a	**Solve** the following problem. A double riveted double cover butt joint in plates 20 mm thick is made with	**K3**	CO3	[14M]

		25 mm diameter rivets at 100 mm pitch. The permissible stresses are: σ_t = 120 MPa; τ = 100 MPa; σ_c = 150 MPa. Find the efficiency of joint, taking the strength of the rivet in double shear as twice than that of single shear.			
		OR			
	b	**Solve** the following problem. A welded connection, as shown in *Figure.2* is subjected to an eccentric force of 7.5 kN. Determine the size of welds if the permissible shear stress for the weld is 100 N/mm^2.  *Figure-2.*	**K3**	CO3	[14M]
4		**Unit - IV**			
	a	**Solve** the following problem. Design a helical compression spring subjected to a maximum force of 1250 N. The deflection of the spring corresponding to the maximum force should be approximately 30 mm. The spring index can be taken as 6. The spring is made of patented and cold-drawn steel wire. The ultimate tensile strength and modulus of rigidity of the spring material are 1090 and 81 370 N/mm^2 respectively. The permissible shear stress for the spring wire should be taken as 50% of the ultimate tensile strength. Design the spring and calculate: (i) wire diameter; (ii) mean coil diameter; (iii) number of active coils; (iv) total number of coils; v) free length of the spring; and (vi) pitch of the coil. Draw a neat sketch of the spring showing various dimensions.	**K3**	CO4	[14M]
		OR			
	b	**Solve** the following problem. Design a sleeve and cotter joint to resist a tensile load of 60 kN. All parts of the joint are made of the same material with the following allowable stresses: Tensile Stress(σ_t)= 60 MPa; Shear Stress (τ) = 70 MPa; and Compressive Stress (σ_c)= 125 MPa.	**K3**	CO4	[14M]
5		**Unit - V**			
	a	**i) Solve** the following problem. A solid shaft of diameter d is used in power transmission. Due to modification of the existing transmission system, it is required to replace the solid shaft by a hollow shaft of the same material and equally strong in torsion. Further, the weight of the hollow shaft per meter length should be half of the solid shaft. Determine the outer diameter of the hollow shaft in terms of "d".	**K3**	CO5	[7M]
		ii) Solve the following problem. A propeller shaft is required to transmit 45 kW power at 500 rpm. It is a hollow shaft, having an inside diameter 0.6 times of outside diameter. It is made of plain carbon steel and the permissible shear stress is 84 N/mm^2. Calculate the inside and outside diameters of the shaft.	**K3**	CO5	[7M]
		OR			
	b	**Solve** the following problem. Design a muff coupling to connect two steel shafts transmitting 25 kW power at 360 rpm. The shafts and key are made of plain carbon steel 30C8 (S_{yt}= S_{yc}= 400 N/mm^2). The sleeve is made of grey cast iron FG 200 (S_{ut}=200 N/mm^2). The factor of safety for the shafts and key is 4. For the sleeve, the factor of safety is 6 based on ultimate strength. Draw a neat sketch of the coupling.	**K2**	CO5	[14M]

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

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20ME3107

III B.Tech. - I Semester Supple Examinations, April-2024

METAL CUTTING & MACHINE TOOLS

(ME)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	i) Explain with neat sketches various types of chips produced in metal cutting.	K2	CO1	7M
		ii) Differentiate between Orthogonal and Oblique cutting.	K2	CO1	7M
		OR			
	b	i) Derive equation for chip thickness ratio and shear angle.	K3	CO1	7M
		ii)What is meant by Tool Life. What are the factors affecting Tool Life. Explain in detail.	K2	CO1	7M
2		**Unit-II**			
	a	i)Explain with neat sketch any three work holding devices used in a lathe.	K2	CO2	7M
		ii)Explain with neat sketch any two taper turning methods used in a lathe.	K2	CO2	7M
		OR			
	b	i) Differentiate between Capstan and Turret Lathe.	K2	CO2	7M
		ii) Explain with neat sketch any two tool holding devices used in a lathe.	K2	CO2	7M
3		**Unit-III**			
	a	Explain with neat sketch the mechanism used in Shaping machine.	K2	CO3	7M
		What is the difference between shaping and planning machine.	K2	CO3	7M
		OR			
	b	Explain with a neat sketch Radial Drilling Machine.	K2	CO3	7M
		Explain with neat sketch the following operations i) Counter Boring ii) Counter Sinking iii) Reaming	K2	CO3	7M
4		**Unit-IV**			
	a	i)Explain the difference between up and down milling process.	K2	CO4	7M
		ii)Draw a neat sketch of Plain Milling Cutter indicating various angles.	K1	CO4	7M
		OR			
	b	i)What is meant by Indexing. Explain any two Indexing methods .	K2	CO4	7M
		ii)What is the difference between Jig and Fixture.	K2	CO4	7M
5		**Unit-V**			
	a	i) Explain various abrasive materials used in manufacturing Grinding wheel.	K2	CO5	7M
		ii)How do you specify a grinding wheel. Explain.	K2	CO5	7M
		OR			
	b	i)Explain Honing Process with neat sketch	K2	CO5	7M
		ii)Draw a neat sketch of Horizontal Broach and indicate its parts.	K2	CO5	7M

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

Subject Code: R20CC1OE07

III B.Tech. - I Semester Supple Examinations, April-2024

OPERATIONS RESEARCH

(ME)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Define Operations Research. List out the OR models with examples.	**BL2**	**1**	**7M**
		Discuss the phases of Operations Research.	**BL2**	**11**	**7M**
		OR			
	b	Solve the following LPP using Simplex method. Maximize $Z = 10x_1 + 15x_2 + 20x_3$ Subject to $2x_1 + 4x_2 + 6x_3 \leq 24$ $3x_1 + 9x_2 + 6x_3 \leq 30$ $x_1, x_2, x_3 \geq 0$	**BL3**		**14M**
2		**Unit-II**			
		Find the basic feasible solution for the following transportation problem (cell entries represent unit cost of transportation) by least cost method and optimize by MODI method.	**BL3**	**2**	**14M**

	D1	D2	D3	Supply
S1	8	5	6	120
S2	15	10	12	80
S3	3	9	10	80
Demand	150	80	50	

	OR				
b	A salesman has to visit five cities A, B, C, D, and E. The distance (x 10^2 kms) between any two cities are given in the following table. The salesman starts from A and has to come back to A after visiting all other cities in a cycle. Which route he must select so that the total distance travelled by him is minimum?	**BL3**	**2**	**14M**

	A	B	C	D	E
A	-	4	7	3	4
B	4	-	6	3	4
C	7	6	-	7	5
D	3	3	7	-	7
E	4	4	5	7	-

3		**Unit-III**			
	a	Four jobs 1, 2, 3 and 4 are to be processed on four machines A, B, C and D in the order A-B-C-D. The processing times in hours are given in the following table. Compute the minimum elapsed time. Also compute the idle times on machines.	**BL3**	**3**	**14M**

Job\Machine	**A**	**B**	**C**	**D**
1	58	14	14	48
2	30	10	18	32
3	28	12	16	14
4	64	16	12	42

OR

	b	Cars arrive at a toll gate according to Poisson distribution with mean 90 per hr. Average time for passing through the gate is 38 seconds. Drivers complain of long waiting time. Authorities are willing to decrease the passing time through the gate to 30 seconds by introducing new automatic devices. This can be justified only if under the old system the number of waiting cars exceeds 5. In addition, the percentage of the gate's idle time under the new system should not exceed 10%. Can the new device be justified?	BL3	3	14M

Unit-IV

4	a	Solve the following problem, using Replacement Model. Cost Price = 60000. When should the machine be replaced?	BL3	4	14M

Year	1	2	3	4	5
Resale value	42000	30000	20400	14400	9650
Cost of spares	4000	4270	4880	5700	6800
Cost of labour	14000	16000	18000	21000	25000

OR

	b	The following information is given. Draw the network diagram and calculate (1) Variance of each activity (2) Critical path and expected project length (3) The probability that the project will be completed in 24 weeks.	BL3	4	14M

Activity	1-2	2-3	2-4	3-5	4-6	5-6	5-7	6-7
Optimistic time(weeks)	3	3	2	4	4	0	3	2
Most likely time(weeks)	3	6	4	6	6	0	4	5
Pessimistic time(weeks)	3	9	6	8	8	0	5	8

Unit-V

5	a	Determine the optimal strategies for both persons and the value of the game for zero-sum two person games whose pay-off matrix is as follows	BL3	5	14M

		Player B	
		B_1	B_2
Player A	A_1	1	-3
	A_2	3	5
	A_3	-1	6
	A_4	4	1
	A_5	2	2
	A_6	-5	0

OR

		State the Bellman's optimality principle and explain Dynamic programming approach with the help of an example.	BL3	5	14M

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

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20EC3101

III B.Tech. - I Semester Supple Examinations, April-2024
LINEAR & DIGITAL IC APPLICATIONS
(ECE)

Time: 3 hours **Max. Marks: 70**

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

Q No		Questions	KL	CO	Marks
1		**Unit-I**			
	a	Draw the pin configuration of OPAMP IC 741. Also state all the characteristics of an ideal operational amplifier.	II	1	7M
		Explain the working of OPAMP as integrator. Also derive the expression for the output voltage of this circuit.	II	1	7M
		OR			
	b	Explain how operational amplifier works as V to I and I to V converter.	III	1	7M
		Discuss the working of operational amplifier as a triangular and a square wave generator.	III	1	7M
2		**Unit-II**			
	a	Differentiate between a single slope ADC and a dual slope ADC.	III	2	7M
		Explain the working of D/A convertor with Binary weighted Resister.	II	2	7M
		OR			
	b	State the features of IC 555 Timer. Also discuss the working of 555 IC timer as a monostable multivibrator and an astable multivibrator.	III	2	14M
3		**Unit-III**			
	a	Derive the voltage gain equations for band pass filter and band reject filter.	IV	3	7M
		Write the design steps of a second order low pass Butterworth filter.	III	3	7M
		OR			
	b	With help of neat block diagram, explain the principle of operation of Phase Locked Loop (IC-565).	II	3	7M
		Explain the working of a frequency multiplier designed using 565 PLL.	III	3	7M
4		**Unit-IV**			
	a	Develop NAND gate using CMOS logic.	III	4	7M
		Define the terms – (i) Proportion Dely (ii) Transition Time	II	4	7M
		OR			
	b	Give the comparison between TTL and ECL logic families.	II	4	7M
		Discuss the characteristics of TTL logic families.	II	4	7M
5		**Unit-V**			
	a	Design 16 x 1 multiplexer using two 8 x1 and one 2 x1 multiplexer.	IV	5	7M
		Design BCD to Decimal Decoder.	II	5	7M
		OR			
	b	Differentiate between combinational circuits and sequential circuits.	II	5	7M
		Write the excitation table for JK and RS flip flop.	III	5	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20EC3102

III B.Tech. - I Semester Supple Examinations, April-2024

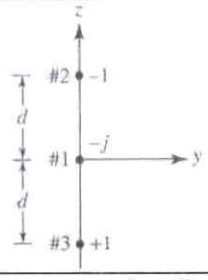
ANTENNAS AND WAVE PROPAGATION

(ECE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Show the relation between maximum directivity and effective area.	**2**	**1**	**6M**
	a	A beam antenna has half-power beam widths of 30° and 35° in a perpendicular plane intersecting at the maximum of the main beam. Compute the approximate maximum effective aperture ($\lambda/2$) using a Kraus', Tai and Pereiras' formulas. The minor lobes are very small and can be neglected.	**2, 4**	**1**	**8M**
		OR			
	b	The maximum radiation intensity of a 96% efficiency antenna is 200 mW/Unit solid angle. Compute the directivity and gain (dimensionless and in dB) when the input power is 120.66 mW and Radiated power is 120.66 mW.	**4**	**1**	**8M**
	b	List and show the different configurations of antennas.	**2**	**1**	**6M**
2		**Unit-II**			
	a	Show the relation of power density and radiation resistance, and determine the radiation resistance of an infinitesimal dipole whose overall length is $l=\lambda/50$.	**2, 3**	**2**	**6M**
	a	Explain the antenna theorem and loop antennas.	**2**	**2**	**8M**
		OR			
	b	For a finite length linear length dipole, derive the current distribution and evaluate field components including total field.	**2**	**2**	**6M**
	b	A center-fed electric dipole of length l is attached to a balanced lossless transmission line whose characteristics impedance is 50 ohms. Assuming the dipole is resonant at the given length, find the input VSWR when $l=\lambda/4$and $l=3\lambda/4$.	**3**	**2**	**8M**
3		**Unit-III**			
	a	Design an ordinary end-fire uniform linear antenna with only one maximum so that its directivity is 20 dB (consider an isotropic model). The spacing between the elements is $\lambda/4$, and the length greater than the spacing. Determine the number of elements and overall length of the array (in wavelengths).			**8M**
	a	Depict the configuration of two element array antenna and explain.			**6M**
		OR			
	b	A three-element array of isotropic sources has the phase and magnitude relationships shown here. The spacing between the elements is $d=\lambda/2$ determine array factors and all nulls.	**2**	**3**	**10M**

					
		Write a short comparison between the Broadside and end0fire array antenna's'	**1**	**3**	**4M**
4		**Unit-IV**			
	a	Show the Yagi-Uda antenna and explain its working principle.	**2**	**4**	**7M**
		List and briefly explain microwave antennas.	**2**	**4**	**7M**
		OR			
	b	Discuss these elements in antenna measurements: Radiation pattern and Absolute measurement.	**2**	**4**	**7M**
		List different antennas and write applications of each one (min 6 types)	**4**	**4**	**7M**
5		**Unit-V**			
	a	Describe the importance of tropospheric and scatter propagations in microwave communication.	**2**	**5**	**7M**
		Find the path-difference, phase-difference and field intensity over unit distance from a Tx at f = 500 MHz . Assume transmitted power is P = 25W, antennas are at a distance of 50 km and heights of antennas are ht and hr = 50 and 40 m.	**3**	**5**	**7M**
		OR			
	b	Explain the space wave propagation with reference to a dipole antenna as a transmitter. Write the expression for field pattern of vertical and horizontal dipoles.	**2**	**5**	**7M**
		Describe the troposphere and troposphere wave propagation, including their abnormalities.	**1**	**5**	**7M**

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20EC3103

III B.Tech. - I Semester Supple Examinations, April-2024

DIGITAL SIGNAL PROCESSING

(ECE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Discuss various elementary signals that are used to study different systems.	**II**	**1**	**7M**
		State various properties of Discrete Time Fourier Transform.	**II**	**1**	**7M**
		OR			
	b	Give the brief classification on various types of systems.	**II**	**1**	**7M**
		Determine if the system described by the following input-output equations are causal or noncausal. (i) $y(n) = x(n)-x(n-1)$ (ii) $y(n) = x(2n)$	**III**	**1**	**7M**
2		**Unit-II**			
	a	Find DFT of the sequence x[n] = {1, 2, 3, 4, 1, 2, 3, 4} using DIT FFT algorithm.	**IV**	**2**	**14M**
		OR			
	b	Using Decimation in Frequency algorithm, compute the FFT for the sequence x[n] = {4, 3, 2, 1,1, 2, 3, 4}	**IV**	**2**	**14M**
3		**Unit-III**			
	a	Obtain cascade and parallel form realization structures for the following $H(z) = \frac{1+\frac{1}{2}z^{-1}}{(1-z^{-1}+\frac{1}{4}z^{-2})(1-z^{-1}+\frac{1}{2}z^{-2})}$	**III**	**3**	**7M**
		Realize the following in direct form I and II $H(z) = \frac{1+2z^{-1}-2z^{-2}}{1+z^{-1}-z^{-2}}$	**III**	**3**	**7M**
		OR			
	b	With help of a suitable example, explain how a Lattice structure is converted to direct form in FIR systems.	**II**	**3**	**7M**
		Differentiate between Transversal structure and Linear phase structures.	**II**	**3**	**7M**
4		**Unit-IV**			
	a	An analog filter has a transfer function $H(s) = 1 / (s^2 + 4s + 5)$. Design a digital filter equivalent to this using impulse invariant method.	**III**	**4**	**7M**
		Determine H(z) that results when the bilinear transformation is applied to $H_a(s) = (s^2 + 4.525)/ (s^2 + 0.692s + 0.504)$.	**III**	**4**	**7M**

		OR			
	b	For the given specifications design a digital Butterworth filter: $0.9 \leq \lvert H(e^{j\omega})\rvert \leq 1$ for $0 \leq \Omega \leq 0.5\pi$ $\lvert H(e^{j\omega})\rvert \leq 0.2$ for $0.75\pi \leq \Omega \leq \pi$ Use bilinear transformation method. Assume T = 1 sec.	**IV**	**4**	**7M**
		Given the specifications of a Chebychev filter: $\alpha_p = 3$ dB, $\alpha_s = 16$ dB, fp = 1 KHz and fs = 2 KHz. Determine the order of the filter.	**II**	**4**	**7M**
5		**Unit-V**			
	a	If the desired response of the filter is as given below $H_d(e^{jw}) = 1$, for $\pi/4 \leq \lvert\omega\rvert \leq \pi$ $= 0$, for $\lvert\omega\rvert \leq \pi/4$ Determine its frequency response using Hanning window for M=11.	**IV**	**5**	**14M**
		OR			
	b	Discuss in detail all the design steps to design a Chebyshev filter using Bilinear transformation method.	**II**	**5**	**7M**
		Discuss, in what ways Kaiser Window is superior to other window functions? Write the expression of the Blackman Window.	**II**	**5**	**7M**

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

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20EC3106

III B.Tech. - I Semester Supple Examinations, April-2024

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(ECE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	A 330 Ω ± 6% resistance is connected to a power supply source operating at 141 V dc. What range of current would flow if the resistor varied over the range of ± 8% of its expected value?	**3**	**1**	**6M**
		Explain the terms: Static Error, Static Correction, Relative Error, and Percentage Relative Error.	**2**	**1**	**8M**
		OR			
	b	A wattmeter having a range 1000 W has an error of+ 1% of full-scale deflection. If the true power is 100 W, what would be the range of readings? Suppose the error is specified as percentage of true value, what would be the range of the readings?	**3**	**1**	**7M**
		The output voltage of an amplifier was measured at eight different intervals using the same digital voltmeter with the following results: 20.00, 19.80, 19.85, 20.05, 20.10, 19.90, 20.25, 19.95. Which is the most precise measurement? A voltmeter is accurate to 98% of its full-scale reading. If a voltmeter reads 200 V on 500 V range, what is the absolute error?	**4**	**1**	**7M**
2		**Unit-II**			
	a	Describe and derive that, how force measurement with load cell and strain gauges happens.	**2**	**2**	**6M**
		Explain the method of measuring displacement using LVDT. State the advantages and disadvantages of LVDT.	**2**	**2**	**8M**
		OR			
	b	A pressure of 256 kN/m^2 acting on a diaphragm produces a deflection of 0.2 mm at the centre. What pressure would produce the same deflection if the diameter is 2 times the earlier one and the thickness is ½ of the earlier one	**3**	**2**	**6M**
		Describe the operation and construction of strain gauge. State it's limitations. Explain uses of capacitive transducers.	**2**	**2**	**8M**
3		**Unit-III**			
	a	Draw and derive the balance condition for a capacitance comparison bridge. How does the basic circuit of Kelvin's bridge differ from that of a Wheatstone bridge?	**2, 4**	**3**	**8M**
		A 1000 Hz bridge has the following Constants Arm AB – R = 1 k in parallel with C = 0.25 mF Arm BC – R = 1 k in series with C = 0.25 mF Arm CD – L = 50 mH in series with R = 200 W Arm DA – unknown Find the constants of arm DA to balance the bridge. Express the result as a pure R in series with a pure C or L, and as a pure R in parallel with a pure C or L.	**3**	**3**	**6M**
		OR			
	b	Explain with a diagram how a bridge be used as an error detector. And Compare dc and ac bridges.	**2**	**3**	**8M**
		i) A Maxwell–Wien bridge consists of the following: Arm AB having resistance value of 2.0 kW in parallel with a capacitor of 1 mF Arm BC having resistance value of 400 W Arm AD having resistance value of 100 W Arm BD having resistance and inductance in series. Determine the value of the unknown resistance and unknown inductance.	**3**	**3**	**6M**

4		**Unit-IV**			
	a	Explain with a diagram the operation of a basic wave analyzer.	**1,2**	**4**	**6M**
		Describe with diagram the operation of an AF sine wave generator. State the various controls on the front panels of a sine and square wave generator. State the function of symmetry control in a pulse generator.	**2**	**4**	**8M**
		OR			
	b	Define a distortion analyzer. State the working principle of a distortion analyzer.	**1,2**	**4**	**7M**
		Explain with help of a block diagram the operation of a spectrum analyzer. State applications of a spectrum analyzer.	**2**	**4**	**7M**
5		**Unit-V**			
	a	List the advantages of using negative supply in a CRO. Explain the horizontal deflection systems with a neat block diagram.	**2**	**5**	**7M**
		Draw the basic block diagram of an oscilloscope and explain the functions of each block.	**3**	**5**	**7M**
		OR			
	b	State the standard specifications of a simple CRO. Describe the magnetic tape dot matrix display construction and write tis applications.	**2**	**5**	**7M**
		Describe with a diagram and waveforms the operation of a dual trace CRO in alternate and Chop mode. State the functions of each block.	**2**	**5**	**7M**

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

Subject Code: R20CS3105

III B.Tech. - I Semester Supple Examinations, April-2024

COMPILER DESIGN

(CSE)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		Unit-I			
	a	What is a compiler? Briefly Explain two passes of a compiler.	K2	CO1	7M
		What is input buffering? Explain i) Buffer Pairs and ii) Sentinels.	K2	CO1	7M
		OR			
	b	What are the various phases of the compiler? Explain each phase in detail.	K2	CO1	7M
		Explain the role of lexical analyzer and their issues.	K2	CO1	7M
2		Unit-II			
	a	Explain the procedure for eliminating ambiguity and eliminating left recursion from a grammar. Give an example.	K3	CO2	7M
		Compute FIRST and FOLLOW for the grammar: $E \rightarrow T\,E', E' \rightarrow +\,T\,E' / \varepsilon, T \rightarrow F\,T', T' \rightarrow *\,F\,T' / \varepsilon, F \rightarrow (E) \mid id$	K3	CO2	7M
		OR			
	b	Give Predictive parsing Algorithm and construct predictive parsing table for the following grammar. $E \rightarrow T\,E', E' \rightarrow +\,T\,E' / \varepsilon, T \rightarrow F\,T', T' \rightarrow *\,F\,T' / \varepsilon, F \rightarrow (E) \mid id$	K3	CO2	14M
3		Unit-III			
	a	Construct canonical LR(1) items for the grammar S → B B, B → a B | b	K2	CO3	7M
		Construct LALR parsing table for the above grammar.	K2	CO3	7M
		OR			
	b	Consider the grammar and construct SLR Parsing Table. S→ X X → Yb | aa Y→ a | bYa	K2	CO3	7M
		Discuss syntax directed definition by defining synthesized and inherited attributes	K2	CO3	7M
4		Unit-IV			
	a	Discuss various types of declarations for a grammar.	K3	CO4	7M
		What are the different storage allocation strategies? Explain.	K3	CO4	7M
		OR			
	b	Write the quadruples ,triples and indirect triples for the expression -(a+b)*(c+d)-(a+b+c)	K3	CO4	7M
		Describe how three address statements can be represented as records with fields for the operator and operands in compilers.	K3	CO4	7M
5		Unit-V			
	a	What are the principles associated with designing calling sequences and the layout of activation records?	K2	CO5	7M
		Explain peep-hole optimization and loop optimization.	K2	CO5	7M
		OR			
	b	How to access non-local data? Explain implication details with example.	K2	CO5	7M
		Discuss Semantics-Preserving Transformations.	K2	CO5	7M

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC3101

III B.Tech. - I Semester Supple Examinations, April-2024
OPERATING SYSTEMS
(CSE,IT,AI)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	KL	CO	Marks
		Unit-I			
1	a	Explain the different types of systems: parallel systems, distributed systems and real-time systems?	2	1	6M
		What are the various components of operating system structure and explain the simple and layered approach of operating system in detail.	2	1	8M
		OR			
	b	Explain the various types of system calls provided by an operating system.	2	1	7M
		Explain the functions of OS	2	1	7M
		Unit-II			
2	a	Explain various steps involved in change of a process state with process state neat transition diagram	2	2	7M
		Differences between different types of schedulers	2	2	7M
		OR			
	b	Demonstrate FIFO,SJF and Round Robin CPU scheduling algorithms with suitable example	2	2	14M
		Unit-III			
3	a	Write and explain the solution for Reader-Writer classical synchronization problem using monitors	2	3	7M
		What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy	2	3	7M
		OR			
	b	Discuss the Paging model of logical and physical memory.	2	3	7M
		Compare and Contrast paging and segmentation	4	3	7M
		Unit-IV			
4	a	Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the LRU,FIFO,LFU and optimal page replacement algorithms assuming two and five frames	3	4	14M
		OR			
	b	Explain deadlock avoidance using banker's algorithm with suitable example	2	4	14M
		Unit-V			
5	a	How to provide protection to a file system? Explain	2	5	7M
		Compare and contrast free space management and swap space management	2	5	7M
		OR			
	b	Explain various file access methods with suitable examples	2	5	7M
		Explain the following :i) Contiguous and ii) Linked File allocation methods	2	5	7M

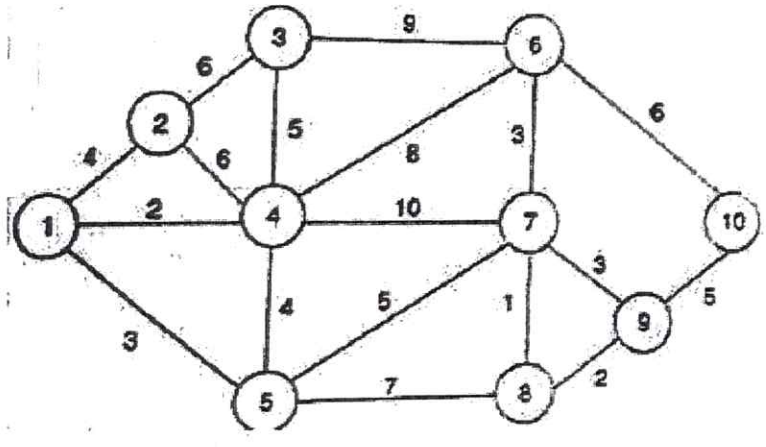
NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

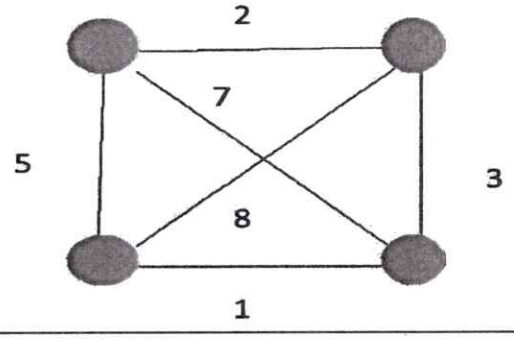
Subject Code: R20CC3103

III B.Tech. - I Semester Supple Examinations, April-2024
DESIGN AND ANALYSIS OF ALGORITHMS
(CSE,AI)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Explain the characteristics of algorithm	**2**	**1**	**7M**
		Estimate the time complexity using f(n) and g(n) functions in asymptotic notations	**3**	**1**	**7M**
		OR			
	b	Differentiate between Big oh and omega notation with example	**3**	**1**	**7M**
		Give the algorithm for matrix multiplication and find the time complexity of the algorithm using step – count method	**3**	**1**	**7M**
2		**Unit-II**			
	a	**Apply** Strassen's matrix algorithm to compute. $\begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix} \times \begin{bmatrix} 2 & 7 \\ 8 & 3 \end{bmatrix}$	**3**	**2**	**7M**
		Describe in detail about divide and conquer strategy	**2**	**2**	**7M**
		OR			
	b	**Analyze** and Write an algorithm to sort a given list of elements using merge sort .Show the operation of the algorithm, on the list 38,27,43,3,9,82,10.	**3**	**2**	**14M**
3		**Unit-III**			
	a	**Describe** minimum spanning tree using Prim's algorithm 	**3**	**3**	**7M**
		State the Job – Sequencing with deadlines problem. Find an optimal sequence to the n=5 Jobs where profits (P1,P2,P3,P4,P5) = (20,15,10,5,1)and deadlines (d1,d2,d3,d4,d5) =(2,2,1,3,3).	**3**	**3**	**7M**
		OR			
	b	State the Greedy Knapsack? Find an optimal solution to the Knapsack instance n=3, m=20, (P1, P2, P3) = (25, 24, 15) and (W1, W2, W3) = (18, 15, 10).	**3**	**3**	**7M**
		Discuss the single – source shortest paths algorithm with suitable example	**3**	**3**	**7M**

		Unit-IV			
4	a	**Consider** 4 elements a1< a2< a3< a4with q0=0.25, q1=3/16, q2=q3=q4=1/16, P1=1/4, P2=1/8,P3=P4=1/16. Construct the optimal binary search tree	**3**	**4**	**14M**
		OR			
	b	Explain the control abstraction of dynamic programming	**2**	**4**	**7M**
	b	Plan the following instance of the 0/1, knapsack problem given the knapsack capacity in W=5 using dynamic programming and explain it. Item | Weight | Value 1 | 4 | 10 2 | 3 | 20 3 | 2 | 15 4 | 5 | 25	**3**	**4**	**7M**
5		**Unit-V**			
	a	**Evaluate** the subset sum problem with set as {3, 5, 6, 7, 2}and the sum =15.Derive all the subsets.	**3**	**5**	**7M**
	a	Using Back-Tracking enumerate how can you **solve** the 8-queens problem	**3**	**5**	**7M**
		OR			
	b	**Design** Branch and Bound algorithm to solve the Travelling Salesman problem for the following graph. 	**3**	**5**	**14M**

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20IT3103

III B.Tech. - I Semester Supple Examinations, April-2024

AUTOMATA AND COMPILER DESIGN

(IT)

Time: 3 hours **Max. Marks: 70**

Note: Answer All **FIVE** Questions.

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Obtain the Kleen Closure and Positive Closure of the language {ba, bb}, where the alphabet Σ = {a, b}.	K3	CO1	**7M**
		Give a finite state diagram that accepts all the floating-point numbers.	K3	CO1	**7M**
		OR			
	b	Design a DFA that accepts the language over _ = {a, b} of all strings that contain the sub-string either aa or bb.	K3	CO1	**7M**
		Write a procedure to combine two NFA?s into a single NFA. The operations to be performed are those of concatenation, union and closure.	K3	CO1	**7M**
2		**Unit-II**			
	a	Define LMD and RMD. Construct LMD, RMD and corresponding parse trees for the following grammar for the string 00101 A–>A1B A–>0A| Ɛ B–>0B|1B| Ɛ	K3	CO2	**14M**
		OR			
	b	Give Predictive parsing Algorithm and construct predictive parsing table for the following grammar. E–> TE^1 ; $E^{1->}$ $+TE^1$ / Ɛ ; T–> FT^1 ; T^1–>* FT^1 / Ɛ ; F–> id	K3	CO2	**14M**
3		**Unit-III**			
	a	Construct SLR parsing table for the given context-free grammer S–>AA A–>aA|b	K3	CO2	**7M**
		Consider the grammer S–>S+S S–>S*S S–>id Perform Shift Reduce parsing for input string "id + id + id".	K3	CO2	**7M**
		OR			
	b	Consider the following grammar and construct CLR parsing table and check the string acceptance S -> AaAb | BbBa A -> a B -> b	K3	CO2	**14M**
4		**Unit-IV**			
	a	Let synthesized attribute, Val give the value of the binary number generated by S in the following grammar. For example, on input 101.101, S.Val = 5.625.	K2	CO4	**7M**

		S –> L • L |L L –> LB|B B –> 0 |1 Write synthesized attribute values corresponding to each of the productions to determine the S.Val.			
		What are L-attributed definitions? Explain with an example.	K2	CO4	**7M**
		OR			
	b	Write notes on the static storage allocation strategy with example and discuss its limitations?	K2	CO4	**7M**
		What is syntax directed translation? Write the semantic rules for D–>TL, T –> int|real, L–>L,id|id	K2	CO4	**7M**
5		**Unit-V**			
	a	Explain how code motion and frequency reduction used for loop optimizations?	K3	CO5	**7M**
		Construct DAG for the following basic block: d: = b+c e: = a+b b: =b*c a: = e-d.	K3	CO5	**7M**
		OR			
	b	Explain the following (a) Copy Propagation (b) Dead-Code Elimination (c) Code Motion (d) Reduction in Strength.	K3	CO5	**10M**
		Explain about Data-Flow analysis of structured flow graphs.	K3	CO5	**4M**

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

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC1OE16

III B.Tech. - I Semester Supple Examinations, April-2024

COMPUTER ORGANIZATION

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Draw 4 bit arithmetic logic shift unit and explain same unit in detail.	3	1	7M
		Explain four arithmetic micro operations.	2	1	7M
		OR			
	b	What is a shift micro-operation? Explain the different types of shift micro-operations.	2	1	7M
		Illustrate working of three state Bus-Buffers with neat diagram?	3	1	7M
2		**Unit-II**			
	a	Draw and Explain the flow chart for instruction cycle with neat Diagram.	2	2	7M
		Describe about instruction set completeness.	2	2	7M
		OR			
	b	Execute all Memory – Reference Instructions using examples.	3	2	14M
3		**Unit-III**			
	a	Illustrate the characteristics of RISC and CISC computer.	3	3	7M
		Write a program for the relatively simple CPU that can evaluate the arithmetic Expression X = (A + B) * (C + D) by a three address, two address, one address and zero address instructions. Assume that the processor has the instructions: LOAD, STORE, MUL, ADD, MOV, PUSH, POP.	4	3	7M
		OR			
	b	Explain various addressing modes with the help of an appropriate example.	2	3	14M
4		**Unit-IV**			
	a	With the help of flowchart explain booth's algorithm take one numerical example you like.	2	4	7M
		Draw the flow chart for addition and subtraction of two signed 2's complement numbers.	3	4	7M
		OR			
	b	Explain about the mapping procedures adopted in the organization of cache memory.	2	4	7M
		Write Hardware algorithm for Addition and Subtraction with Signed 2's Complement Data with your own example.	3	4	7M
5		**Unit-V**			
	a	What is the need for DMA? Explain the working of DMA. Also mention its advantages.	2	5	7M
		Illustrate Asynchronous data transfer in detail.	3	5	7M
		OR			
	b	Distinguish Daisy Chaining Priority, Parallel Priority Interrupt.	4	6	7M
		Explain about Interrupt Initiated I/O.	2	6	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20IT3104

III B.Tech. - I Semester Supple Examinations, April-2024

ADVANCED WEB TECHNOLOGIES

(IT)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Interpret different phases in Servlet life cycle. Explain.	**K2**	**CO1**	**7M**
	a	HTTP is a stateless protocol. To overcome this in Servlets we have session tracking techniques. Examine different types of session tracking techniques supported by Servlets. Give examples for any two session tracking techniques.	**K2**	**CO1**	**7M**
		OR			
	b	Model the web architecture for Servelet programming and explain.	**K2**	**CO1**	**7M**
	b	To get the parameter information from the deployment descriptor file we use two objects. Infer those two objects and briefly explain the use of each object. Given an example program with any one object.	**K2**	**CO1**	**7M**
2		**Unit-II**			
	a	Summarize anatomy of JSP page. Explain JSP processing.	**K2**	**CO2**	**7M**
	a	Interpret different types of action tags in JSP. Give examples for any two tags.	**K2**	**CO2**	**7M**
		OR			
	b	Interpret JSP life cycle. And Explain JSP scripting and directive elements with simple examples.	**K2**	**CO2**	**14M**
3		**Unit-III**			
	a	Articulate different types of implicit objects in JSP. Give examples	**K3**	**CO2**	**14M**
		OR			
	b	Present how data is shared by JSP pages by using session concept.	**K3**	**CO3**	**7M**
	b	Present with an example, the procedure for passing the control between the pages.	**K3**	**CO3**	**7M**
4		**Unit-IV**			
	a	Summarize the importance of PreparedStatement interface in JDBC. List methods in it. Also create a JDBC application for the following: "Assume that a database has a table Employee with two columns Employee ID and Name. Write a JDBC program that can query and print all the entries of a particular employee (Note: Take employee number as input)".	**K2**	**CO4**	**14M**
		OR			
	b	Make use of PreparedStatement interface to develop JDBC application to represent a precompiled query.	**K2**	**CO4**	**7M**
	b	Interpret different types of JDBC Drivers used in JDBC. Explain briefly.	**K2**	**CO4**	**7M**

		Unit-V			
5	a	Illustarte the casting of data types in PHP.	K3	CO5	7M
		Articulate the basic steps in running a PHP scripts on your computer. Also explain how PHP page execute?	K3	CO5	7M
		OR			
	b	Show the process of creating data base and tables in MySQL.	K3	CO6	7M
		Construct a PHP script to find smallest element in an array.	K3	CO5	7M

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

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20AI3105

III B.Tech. - I Semester Supple Examinations, April-2024
MACHINE LEARNING
(AI)

Time: 3 hours **Max. Marks: 70**

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

QNo		Questions	K L	CO	Marks
1		**Unit-I**			
	a	Write about goals and applications of machine learning?	**K2**	**CO1**	**7M**
		Write a short note on PAC and Case-based learning.	**K2**	**CO1**	**7M**
		OR			
	b	Define Machine learning .Write about types of Machine Learning Algorithms with examples?	**K2**	**CO1**	**7M**
		Define VC dimension. Show that an axis aligned rectangle can shatter 4 points in 2 dimension.	**K2**	**CO1**	**7M**
2		**Unit-II**			
	a	Distinguish between inductive bias and estimation bias.	**K4**	**CO2**	**7M**
		Explain the features of Bayesian learning methods.	**K2**	**CO2**	**7M**
		OR			
	b	Explain the process of tuning the model complexity with a suitable example.	**K2**	**CO2**	**7M**
		Define variance. Describe the process to deal with variance in machine learning model.	**K2**	**CO2**	**7M**
3		**Unit-III**			
	a	Compare Feature Extraction and Feature Selection techniques. Explain how dimensionality can be reduced using subset selection procedure.	**K4**	**CO3**	**7M**
		Explain the procedure for the computation of the principal components of the data.	**K2**	**CO3**	**7M**
		OR			
	b	Explain Apriori principle and FP growth algorithm with example.	**K2**	**CO3**	**7M**
		Show the process of Association learning using Eclat Algorithm.	**K2**	**CO3**	**7M**
4		**Unit-IV**			
	a	What are self-organising maps? Explain the learning process in SOM.	**K2**	**CO4**	**7M**
		Construct 2 clusters(k=2) from given data points by using K-Means clustering algorithm (3,4),(6,7),(9,8),(2,5),(3,3),(7,8),(4,5),(9,7)	**K3**	**CO4**	**7M**
		OR			
	b	Explain different types of hierarchical clustering algorithms.	**K2**	**CO4**	**7M**
		Explain expectation maximization algorithm and when we need to use it?	**K2**	**CO4**	**7M**
5		**Unit-V**			
	a	Explain the random forest algorithm with an example.	**K2**	**CO5**	**7M**
		What are the measures of best split in decision tree? Show with examples.	**K2**	**CO5**	**7M**

		OR			
	b	Compare and contrast decision tree with random forest algorithm.	**K4**	**CO5**	**7M**
		What are the benefits of pruning in decision tree induction? Explain different approaches to tree pruning?	**K2**	**CO5**	**7M**