R20

II B.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

OCT./NOV. - 2023

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

(R20) II 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)
31.10.2023	TECHNICAL AND COMMUNICATIVE ENGLISH – II (R20CC2201)	TECHNICAL AND COMMUNICATIVE ENGLISH – II (R20CC2201)	TECHNICAL AND COMMUNICATIVE ENGLISH – II (R20CC2201)	TECHNICAL AND COMMUNICATIVE ENGLISH – II (R20CC2201)	TECHNICAL AND COMMUNICATIVE ENGLISH – II (R20CC2201)	TECHNICAL AND COMMUNICATIVE ENGLISH – II (R20CC2201)	TECHNICAL AND COMMUNICATIVE ENGLISH – II (R20CC2201)
02.11.2023	ENGINEERING GEOLOGY (R20CE2202)	COMPLEX VARIABLES, PROBABILITY AND STATISTICS (R20CC2202)	COMPLEX VARIABLES, PROBABILITY AND STATISTICS (R20CC2202)	INTERNET OF THINGS (R20EC2202)	FORMAL LANGUAGES AND AUTOMATA THEORY (R20CS2202)	DESIGN ANALYSIS OF ALGORITHMS (R20IT2202)	AUTOMATA AND COMPILER DESIGN (R20AI2202)
04.11.2023	STRUCTURAL ANALYSIS (R20CE2203)	CONTROL SYSTEMS (R20EE2203)	MANUFACTURING TECHNOLOGY (R20ME2203)	ANALOG AND DIGITAL COMMUNICATIONS (R20EC2203)	DATABASE MANAGEMENT SYSTEMS (R20CC2203)	DATABASE MANAGEMENT SYSTEMS (R20CC2203)	DATA BASE MANAGEMENT SYSTEMS (R20CC2203)
07.11.2023	STRENGTH OF MATERIALS-II (R20CE2204)	ELECTRICAL MACHINES-II (R20EE2204)	APPLIED THERMODYNAMICS (R20ME2204)	ELECTRONIC CIRCUITS AND PULSE CIRCUITS (R20EC2204)	SOFTWARE ENGINEERING (R20CC2204)	SOFTWARE ENGINEERING (R20CC2204)	SOFTWARE ENGINEERING (R20CC2204)
09.11.2023	HYDRAULICS AND HYDRAULIC MACHINERY (R20CE2205)	DIGITAL ELECTRONICS (R20EE2205)	KINEMATICS OF MACHINERY (R20ME2205)	ELECTROMAGNETIC WAVES AND TRANSMISSION LINES (R20EC2205)	WEB DEVELOPMENT USING MEAN STACK (OPEN ELECTIVE –I) (R20CC1OE11)	COMPUTER NETWORKS (R20IT2205)	INTRODUCTION TO ARTIFICIAL INTELLIGENCE (R20AI2205)

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.

CHIEF CONTROLLER OF EXAMINATIONS

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

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

Sub Code: R20CC1OE11 **WEB DEVELOPMENT USING MEAN STACK**

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

Note: Answer All **FIVE** Questions.

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

Q.No		Questions	KL	CO	Marks
		Unit-I			
1	a	i)What is data binding? Which type of data binding does Angular deploy?	KL2	CO1	7
		ii)What are modules and services in Angular?	KL2	CO1	7
		OR			
	b	i)How do you share data between components in Angular	KL3	CO1	7
		ii)What are the different types of directives in Angular?	KL2	CO1	7
		Unit-II			
2	a	i)What are Template and Reactive forms	KL3	CO2	7
		ii)Write down Validator Functions in Reactive Forms to perform validation	KL3	CO2	7
		OR			
	b	I) Explain routing and navigation in angular with example	KL2	CO2	7
		ii)What is Angular CLI ? List 3 commands	KL2	CO2	7
		Unit-III			
3	a	i)How do you Load Local Module in to the application?	KL4	CO3	7
		ii)Write the steps to Create Node.js Web Server	KL3	CO3	7
		OR			
	b	Illustrate the Node.js Module Types	KL3	CO3	14
		Unit-IV			
4	a	i)List all the flags which can be used in read/write operation.	KL2	CO4	7
		ii)Write a code to append the content to an existing file.	KL3	CO4	7
		OR			
	b	Explain Common Patterns for EventEmitters with example	KL3	CO4	14
		Unit-V			
5	a	i)Demonstrate how do you connect to the local MongoDB database with example.	KL3	CO5	7
		ii)Write the procedure to implement many-to-many relations in MongoDB,	KL3	CO5	7
		OR			
	b	i)Create a MongoDB document stores employee's data. Assume relevant fields.	KL4	CO5	7
		ii)What are the methods MongoDB provides to delete one or more documents in a collection?	KL2	CO5	7

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NAKASAKAUPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

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

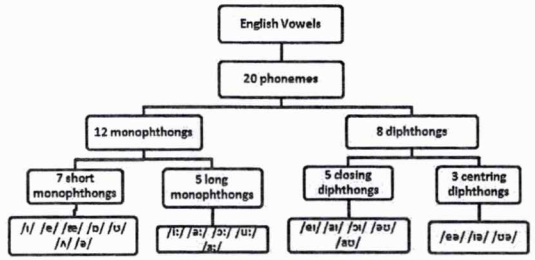
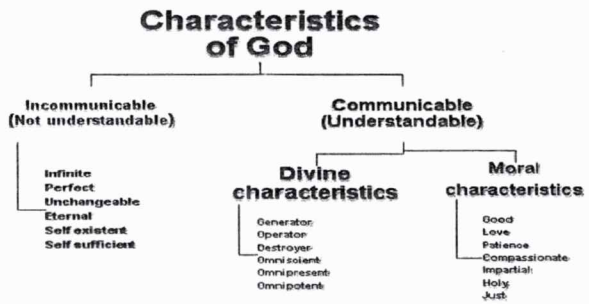
Sub Code: R20CC2201 **Technical & Communicative English-II**

Time: 3 hours Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5X14=70M)

Q.No		Questions	K L	CO	M
1		**Unit-I**			
	a	i) Justify people calling Nellie Bly "The Pretty Crazy Girl".	3	1	6M
		ii) Write a complete paragraph based on the following points made from a note. 1. Intro: computer plays dominate role in present world. 2.Advantages: i) in education ii) in business iii) in administration iv) in research 3.disadvantages i) mentally ii) physically iii) educationally iv) entertainment 4.conclussion: i) Use computer wisely	3	4	8M
		OR			
	b	i) What is the Proposal to Girdle the Earth proposed by Nellie Bly?	3	1	8M
		ii) Write a paragraph of 10 sentences on *Corona-19*, identify 12 content and 12 non content words and write them separately.	6	2	6M
2		**Unit-II**			
	a	i) "Henry Ward Beecher detested his experience at a district school" Explain.	3	1	8M
		ii) Use the following linkers in your own sentences. [1] consequently [2] when compared to [3] whereas [4] meanwhile [5] furthermore [6] on the whole	6	2	6M
		OR			
	b	i) Identify the characteristic of an ideal paragraph from the following paragraph. And explain them why so. The human body is a wonderful piece of work that nature has created. It is not beautiful like the body of a butterfly or a peacock but it is shaped practically. It can do many types of work which other animals cannot. It is not strong like the body of a tiger. But in place of physical strength it has a big and sharp brain.	6	2	8M

		By using this brain the human physique has been able to overcome many of its limitations. By sitting in an aeroplane it flies faster than a kite, by riding a motorcycle it travels faster than a leopard, and by firing a machine gun it fights much better than a tiger. In spite of all this, the human body suffers from many diseases because it has a weakness for habits such as smoking, drinking and overeating. When it is healthy the body can give great pleasure but when it is sick it can cause great pain. The wise man would always keep his body fit because a healthy mind can work only in a healthy body.			
		ii) Fill in the blanks with appropriate articles: [1] I want ……. apple from that basket. [2] …… church on the corner is progressive. [3] I borrowed …. pencil from your pile of pencils and pens. [4] Please give me …… cake that is on the counter. [5] I bought ……. umbrella to go out in the rain. [6] Albany is ……. capital of New York State.	3	3	6M
3		**Unit-III**			
	a	i) What are the imperatives of future workforce used by a company to connect its employees?	3	1	8M
		ii) Explain the following characteristics of ideal paragraphs with examples. [1] Topic sentence. [2] Unity of thought [3] Coherence	3	3	6M
		OR			
	b	i) Briefly summarize the title"The future of Work" by Jacob Morgan.	3	1	7M
		ii)Choose appropriate cohesive device words form the list and fill the following blanks. **(but ,as a result of , such as , In conclusion, Above all, whereas, Firstly)** [1] Many local citizens died …….. a bomb blast. [2] I bought a pen, ….. I lost it. [3] ……., I would like to say how much I enjoyed myself. [4] In this forest, you'll see many types of coniferous trees, …….. pine and spruce. [5] The old system was fairly complicated …….. the new system is really very simple. [6] ……., her hospitality was appreciated by everyone. [7] ……., I would like to clearly state that it is not my fault.	3	3	7M
4		**Unit-IV**			
	a	i) Write the authors views on Advancement of technology.	3	2	7M
		ii) Write the Antonyms for the following words. Productive,Native,Civilized,Timid, Fortune and Freedom	3	4	3M

		iii) Transfer the following tree diagram as a meaningful paragraph.  	3	4	4M
		OR			
	b	i) Whydoes H. G. Wells worried constantly about the future of humanity and what made him realize that there is no scope for static Utopia?	6	2	8M
	b	ii) Correct the following sentences if you find any errors. [1] He is the best of two brothers [2] He works hardly to make both ends meet. [3] I am very much sorry. [4] She did not despise none of her lovers . [5] The resource person gave a two- days guest lecture. [6] Lasers are indispensible tools for delicate eyes surgery. iii) Transfer the following tree diagram as a meaningful paragraph.  	6	2	6M
5		**Unit-V**			
	a	i) 'Individuality is more than nationality'. Explain it in the light ofthe lesson Leaves from the Mental Portfolio of a Eurasian, Sui Sin Far.	3	1	8M
		ii) Write an essay in about 250 words on the topic "How to utilize and enjoy the academic and campus life in four years of B.Tech."	6	2	6M

		OR			
	b	i) Write about the personality of narrator from the text Leaves from Mental Portfolio.	3	1	8M
	b	ii) Read the text given below and answer the questions. **Traffic Accidents** Much of the blood on the street flows essentially from uncivil behavior of drivers who refuse to respect the legal and moral rights of others. So the massacre on the road may be regarded as a social problem. Safety standards for vehicle have been raised both at the point of manufacture and through periodic road-worthiness inspections. In addition, speed limits have been lowered. Due to these measures, the accident rate has decreased. But the accident experts still worry because there has been little or no improvement in the way drivers behave. [1] According to the passage, traffic accidents may be regarded as a social problem since ----. a. The motor vehicle is a very dangerous invention. b. The accidents have more to do with hazardous conditions than hazardous drivers. c. Most of the accidents are caused by drivers who don't pay attention to the traffic rules. d. The irresponsibility that accounts for much of the problem is not confined to drivers. e. Traffic accidents can cause serious economic damage. [2] According to the passage, the number of accidents has fallen because ----. a. Significant advances have been made towards safer driving. b. Many people now know that driving is a skilled task requiring constant care and concentration. c. Drivers are warned to take extra care on the roads. d. Drivers have finally learned how to behave. e. There has been improvement in the way drivers behave. [3] It is pointed out in the passage that those who violate traffic regulations ----. a. Are the most inexperienced drivers that we have on the roads. b. Always blame the road conditions. c. Don't have prior traffic violations or crashes on their records. d. Are the biggest threat to those with whom they share the road. e. Don't know most of the traffic rules and regulations.	3	3	3M
		iii) Correct the errors if any in the following sentences. [1] I prefer coffee than tea. [2] One of my friend are coming. [3] I am feeling bad about her words. [4] He don't want to talk to me. [5] I don't speak of either French or German. [6] A girl want to sing a song.	3	3	3M

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

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

Sub Code: R20CC2202 **COMPLEX VARIABLES, PROBABILITY AND STATISTICS**

Time: 3 hours (EEE&ME) Max. Marks: 70

Note: Answer All **FIVE** Questions.

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

Q.No		Questions	KL	CO	Marks
		Unit-I			
1	a	I) Prove that every analytic function $f(z)=u+iv$ defines two families of curves $u(x,y)=k_1$ and $v(x,y)=k_2$ forming an orthogonal system.	3	1	7M
		II) Transform the laplace equation $u_{xx}+u_{yy}=0$ into polar coordinates, and show that $u(r,\theta)=e^{-\theta}\cos\theta$, $r>0$, $0<\theta<2\pi$ is harmonic. Also, **identify** the harmonic conjugate of $u(r,\theta)$ and the corresponding analytic function.	3	1	7M
		OR			
	b	I) Prove that the function $f(z)=e^{-z^{-4}}, z\neq 0$ and $f(0)=0$ is not analytic at $z=0$, although Cauchy-Riemann equations are satisfied at this point.	3	1	7M
		II) Let $f(z)=u+iv$ be an analytic function. **Construct** the $f(z)$ when $2u+3v=13(x^2-y^2)+2x+3y$.	3	1	7M
		Unit-II			
2	a	I) **Evaluate** $\int_C \frac{e^z}{z}$ if (i) 0 lies inside C and 1 lies outside C (ii) 1 lies inside C and 0 lies outside C (iii) Both lie inside C	5	2	7M
		II) **Determine** the Laurent series of $\frac{7z-2}{(z+1)z(z-2)}$ in the annulus $1<\lvert z+1\rvert<3$.	5	2	7M
		OR			
	b	I) Classify the singular point $z=0$ of the function $f(z)=\frac{e^z}{z+\sin z}$ and obtain the principal part of the Laurent series expansion of $f(z)$.	5	2	7M
		II) Evaluate $\int_0^\infty \frac{1}{1+x^6}dx$ using residue theorem.	5	2	7M
		Unit-III			
3	a	I) In a certain assembly plant, three machines B_1, B_2 and B_3 make 30%, 45% and 25% respectively, of the products. It is known from past experience that 2%,3% and 2% of the products made by each machine, respectively, are defective. Suppose that a finished product is randomly selected. What is the probability that it is defective?	3	3	7M
		II) A continuous r.v X has a probability density function (p.d.f.) given by $f(x)=kxe^{-\lambda x}$; $x>=0$ & $\lambda>0$: 0 elsewhere **Determine** the constant k, obtain the mean and variance of X.	3	3	7M
		OR			
	b	I) Two players A and B play tennis game. Their chances of winning a game are in the ratio 3:2 respectively. **Determine** A's chance of winning at least two games out of four games played.	3	3	7M

		II) In a normal distribution, 31% of the items are under 45 and 8% are over 64. **Determine** the mean and standard deviation of the distribution.	3	3	7M
		Unit-IV			
4	a	I) The pulse rate of 50 yoga practitioners decreased on the average by 20.2 beats/minute with standard deviation of 3.5. (i) If $\bar{x}=20.2$ is used as a point estimate of the true average decrease in the pulse rate, what can we assert with 95% confidence about the maximum error E. (ii) **Construct** 99% confidence intervals for the true average decrease in pulse rate.	5	4	7M
		II) If on the average , the test strips painted across heavily travelled roads in 15 different locations, disappeared after they had been crossed by 146692 cars with standard deviation 14380 cars, calculate 99% confidence intervals for the true average number of cars it takes to wear off the paint, assuming normal population.	5	4	7M
		OR			
	b	Discuss the Bayesian estimation? An insurance agent feelings about the average monthly commission of insurance policies may be described by means of normal distribution with $\mu_0=Rs.3800$ and $\sigma_0=Rs.260$ (i) What probability is the agent thus assigning to true average monthly commission being in the interval of $Rs.3500$ to $Rs.4000$. (ii) How does the probability in part (a) is affected if the mean commission is $Rs.3702$ with standard deviation $Rs.390$ for 9 months? Use $s=390$ as an estimate of σ.	5	4	14M
		Unit-V			
5	a	I) Write the procedure for testing of Hypothesis?	3	5	7M
		II) The mean weight obtained from a random sample of size 100 is 64 gms. The S.D of the weight distribution of the population is 3 gms. Test the statement that the mean weight of the population is 67 gms at 5% level of significance. Also set up 99% confidence limits of the mean weight of the population.	3	5	7M
		OR			
	b	I) The height of 6 randomly chosen sailors are in inches are 63, 65, 68, 69, 71 and 72. Those of 9 randomly chosen soldiers are 61, 62, 65, 66, 69, 70, 71, 72 and 73. Test whether the sailors are on the average taller than soldiers.	3	5	7M
		II) Two random samples of sizes 9 and 6 gave the following values of the variable. Sample 1: 15, 22, 28, 26, 18, 17, 29, 21, 24 Sample 2: 8, 12, 9, 16, 15, 10 Test the difference of the estimates of the population variances at 5% level of significance.	3	5	7M

KL: Knowledge Level CO: Course Outcome M:Marks

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

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

Sub Code: R20CC2203 **DATABASE MANAGEMENT SYSTEMS**

Time: 3 hours (CSE,IT & AI) Max. Marks: 70

Note: Answer All **FIVE** Questions.

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

Q.No		Questions	KL	CO	Marks
1	a	Explain the difference between external, logical and physical level schemas. How are these different schema layers related to the concepts of logical and physical data independence?	[K2]	CO1	[14]
		OR			
	b	i)Define DBMS? Describe the structure of DBMS with the help of a diagram.	[K2]	CO1	[7]
		ii) Differentiate between Database approach and File System	[K2]	CO1	[7]
2	a	Design a database for an airline. The database must keep track of customers and their reservations, flights and their status, seat assignments on individual flights, and the schedule and routing of future flights. Your design should include an E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints.	[K4]	CO2	[14]
		OR			
	b	i) Explain the Additional features of ER Model	[K4]	CO2	[7]
		ii)Discuss briefly about Integrity Constraint Over relations in Relational model with Example.	[K4]	CO2	[7]
3	a	i) Illustrate about Union, Intersect and Except with an example.	[K3]	CO3	[7]
		ii) Discuss about Aggregative Operators with an example.	[K3]	CO3	[7]
		OR			
	b	i)Explain about Nested Queries with an example. ii)What is a Trigger? And what are its three parts? Explain the differences between Triggers and Integrity constraints.	[K3]	CO3	[14]
4	a	Explain about FIRST Normal form and SECOND Normal form with an example.	[K2	CO4	[14]
		OR			
	b	Discuss about THIRD Normal form and BCNF with an example.	[K2]	CO4	[14]
5	a	i) Describe briefly about Transaction States with neat diagram.	[K4]	CO5	[7]
		ii) Explain about ACID properties with an example.	[K4]	CO5	[7]
		OR			
	b	Explain the differences among primary, secondary and clustering indexes? How do these differences affect the ways in which these indexes are implemented? Which of the indexes are dense and which are not?	[K4]	CO5	[14]

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

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

Sub Code: R20CC2204 **SOFTWARE ENGINEERING**

Time: 3 hours (CSE,IT & AI) Max. Marks: 70

Note: Answer All **FIVE** Questions.

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

Q.No		Questions	KL	CO	Marks
1	a	Define Software Engineering? Analyze the structure of a Software.	2	1	14
		OR			
	b	Explain the incremental model	2	1	7
		Examine Prototype model	2	1	7
2	a	Elaborate about SRS in detail	2	2	7
		Determine Requirement engineering process	2	2	7
		OR			
	b	Discuss about the conceptual model of the UML	2	2	14
3	a	Discuss about Use-case diagram and draw the diagram for hospital management system	2	3	14
		OR			
	b	Discuss about Component diagram for Online Railway Reservation system	2	3	14
4	a	Explain Non-functional requirements with suitable example	2	4	7
		Compare and Contrast analysis object model and analysis dynamic model	2	4	7
		OR			
	b	Elaborate the difference between Dynamic and Static Object Modeling.	2	4	14
5	a	Elaborate the White box testing techniques	2	5	14
		OR			
	b	Distinguish Project scheduling using PERT and GRANT charts	2	5	14

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NAKASAKAPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

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

Sub Code: R20CE2202 **ENGINEERING GEOLOGY**

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	Marks
1	a	i)What are the various branches of geology? What is the scope of geology ?	K2	1	[7M]
		ii) Define rock weathering. Explain geological work of mechanical weathering.	K2	1	[7M]
		OR			
	b	i) Write any three importance of geology in civil Engineering.	K2	1	[7M]
		ii) Explain the process of Weathering in Granite.	K2	1	[7M]
2	a	i) Write the physical properties of QUARTZ group of minerals.	K2	2	[5M]
		ii) Describe the physical properties of following common rock forming minerals: x) Feldspar, y) Quartz, Flint, z) Jasper	K2	2	[9M]
		OR			
	b	i) Describe the Structures and textures of metamorphic rocks.	K2	2	[6M]
		ii) What is texture of a rock? Discuss the various types of textures in sedimentary rocks	K2	2	[8M]
3	a	i) Classify the various types of faults and explain it diagrammatically.	K2	3	[7M]
		ii) What are the types of Joints? And their types in Igneous rocks.	K2	3	[7M]
		OR			
	b	i) What are unconformities? How are these recognized?	K2	3	[7M]
		ii) What are the parts of Folds? Give their types with sketches	K2	3	[7M]
4	a	i) What are landslides? Classify landslides and their causes. How landslides can be prevented	K2	4	[7M]
		ii) Explain the different preventive measures to be taken for construction of buildings in earthquake prone areas.	K2	4	[7M]
		OR			
	b	i) Describe the seismic wave refraction method for two layer case with horizontal interface.	K2	4	[7M]
		ii) Define focus and epicenter? What are the tectonic earthquakes, and how are they caused?	K2	4	[7M]
5	a	i) Explain the influence of geological structures for Tunneling.	K2	5	[7M]
		ii) Discuss geological considerations for a successful reservoir site.	K2	5	[7M]
		OR			
	b	i) Write about factors affecting the water-tightness of a dam reservoir	K2	5	[7M]
		ii) What is tunnel? Explain its types, what are their advantages.	K2	5	[7M]

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NAKASAKAUPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

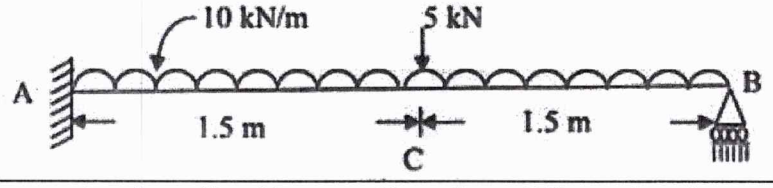
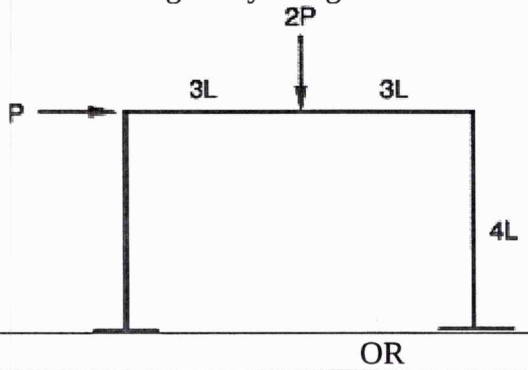
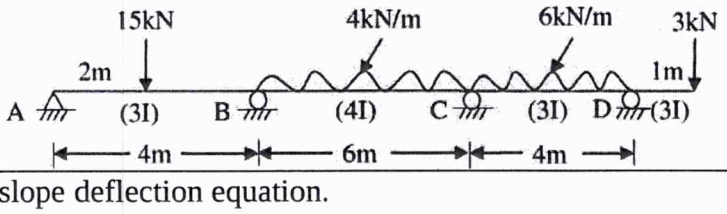
II B.Tech II Semester Supple. Examinations, October-2023

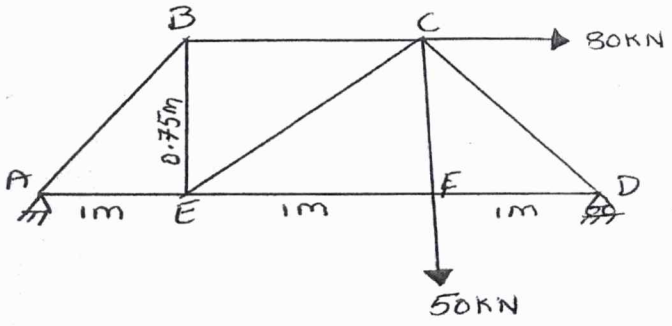
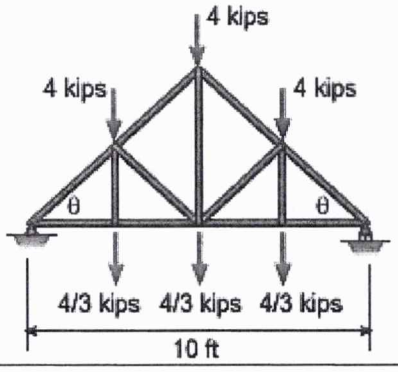
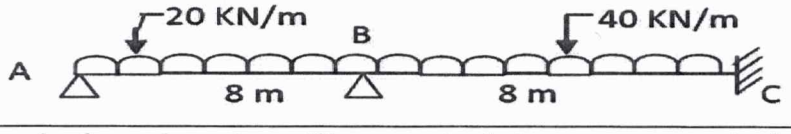
Sub Code: R20CE2203 **STRUCTURAL ANALYSIS**

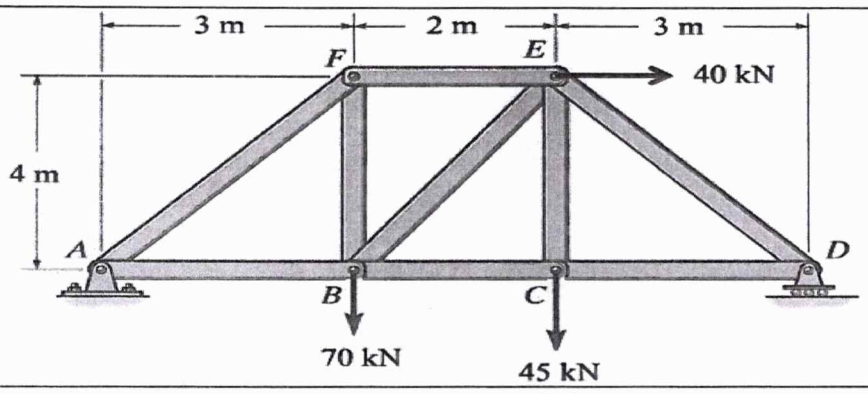
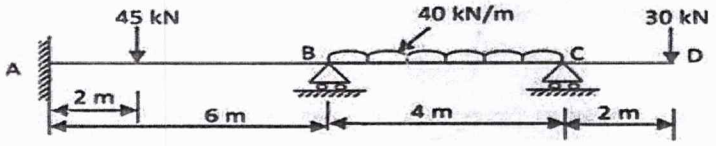
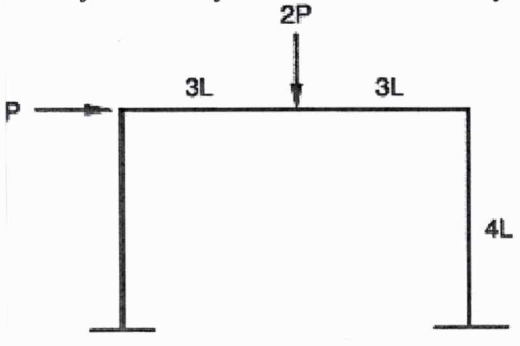
Time: 3 hours (CE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

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

Q.No		Questions	KL	CO	Marks
1	a	A Propped cantilever of length 8m carries a UDL of 4kN/m length over the whole length. If E = 2 x 10^5 N/ mm^2 and I = 10^8 mm^4, then (i) find the prop reaction ii) Draw SFD and BMD	K2	CO3	7M
		A fixed beam AB of length 5m carries a point load of 40KN, 100KN and 40KN at a distance of 2m, 2.5m and 3m from the left end A. Calculate the end moments, support reactions, draw the S.F. and B.M.	K4	CO3	7M
		OR			
	b	Analyse the propped cantilever beam loaded as shown in the Figure Draw the S.F.D and B.M.D. Calculate deflection also. Assume EI constant throughout. 	K5	CO3	9M
		Derive the equation for a fixed beam with ends at different levels.	K2	CO3	5M
2	a	Analyze a beam ABCD, 16m long is continuous over three spans: AB=6m, BC=5m and CD=5m, the supports being at the same level. There is a UDL of 20KN/m over BC. On AB, there is a point load of 80 KN at 2m from A and on CD, there is a point load of 60KN at 3m from D, Support B sinks by 5mm by using slope deflection method	K2	CO4	7M
		Analyze the frame as shown in figure by using moment distribution method 	K4	CO4	7M
		OR			
	b	Analyze the continuous beam as shown in figure by using moment distribution method 	K4	CO4	9M
		Derive the slope deflection equation.	K2	CO4	5M
3	a	Find the force acting in all members of the truss shown in Figure by using method of joints.	K2	CO4	14M

					
		OR			
	b	Find the force acting in all members of the truss shown in Figure by using method of sections. 	K2	CO4	14M
4	a	Two point loads of 500 kN and 300kN spaced at 6m apart cross a girder of 36m span from left to right with 400 kN loading. Construct the maximum shearing force and bending moment diagrams stating the absolute maximum values	K2	CO5	8M
		Draw ILD for shear and moment at the center of simply supported beam. If the span of beam is 7.5m and carries a UDL of 10Kn/m over the left hand of its span, find the moment and shear at mid span of the beam.	K1	CO5	6M
		OR			
	b	A System of five loads 75kN, 150kN, 150kN, 75kN and 50kN crosses a beam of 15m span with75kN leading the distance between the loads are 2.4m, 3.0m, 2.4m and 1.8m respectively. Find Maximum Bending Moment at the center of the span. Also find the absolute Maximum Bending Moment on the beam	K2	CO5	8M
		A uniformly distributed load of 25kN/m and 20m long crosses a girder of span 12m. Calculate the Maximum Shear force and Bending Moment at 0m, 3m, 6m, 9m from the left end support and construct Diagrams	K2	CO5	6M
5	a	Analyse the beam shown in figure using flexibility matrix method if the support B' sinks by 50 mm. E = $25X10^3$ MPa, I = $140X10^3$ cm^4. 	K2	CO4	6M
		Analyse the frame by using stiffness method. Assume any required data.	K4	CO4	8M

					
		OR			
		Analyse the continuous beam in given below, by Stiffness method. Draw the bending moment diagram. Take AB =2I,BC=CD=I 	K2	CO4	6M
	b	Analyse the portal frame by flexibility method. Assume any required data. 	K4	CO4	8M

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NAKKAKURTHI
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

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

Sub Code: R20CE2204 **STRENGTH OF MATERIALS-II**

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	Marks
1	a	In a material subjected to strain, the resultant stress across a certain plane is 60MPa tensile, inclined at 30^0 to its normal inducing clockwise shear on the plane. The normal stress across the plane at right angles to this one is 40MPa, tensile. Find (i) The principal stresses and locate their planes. (ii) The maximum shear stress and specify its plane	3	1	7
		Explain Mohr's Theory?	2	1	7
		OR			
	b	Mention the different theories of failure. Explain about any one.	2	1	7
		The principal stresses at a point across two perpendicular planes are 80 MN/ m^2 and 40 MN/m^2 (T). Find the normal, tangential stresses and the resultant stress and its obliquity on a plane at 30^0 with the major principal plane.	3	1	7
2	a	Derive the equation $T/I = \tau/R=C\theta/l$	2	2	7
		A hallow shaft is to transmit 325 kW at 120 rpm. If the shear stress is not to exceed 70 N/mm^2 and the internal diameter is 0.6 of the external diameter, find the internal and external diameters by assuming the maximum torque is 1.4 times the average torque.	3	2	7
		OR			
	b	A close-coiled helical compression spring is made of 10 mm steel wire closely coiled to a mean diameter of 100 mm with 20 coils. A weight of 100N is dropped on to the spring. If the maximum instantaneous compression is 60 mm, calculate the height of the drop. Take N = 0.85X105N/mm^2	3	2	7
		Derive the maximum shear stress induced in the wire of a close-coiled helical spring.	2	2	7
3	a	Derive the equation for long columns subjected to eccentric loading.	2	3	14
		OR			
	b	A steel tube having 100mm outer diameter, 80mm inner diameter and 3.8m long is used as a strut with both ends hinged. The load is parallel to the axis of the strut but is eccentric. Find the maximum value of eccentricity so that crippling load on strut is 60 percent of the Euler's crippling load	3	3	14
4	a	Distinguish between direct stress and bending stress by means of a diagram, with suitable example.	2	4	7
		Derive the Bending equation from first principle.	2	4	7
		OR			
	b	A masonry dam of rectangular cross section 8 m high and 4 m wide has water upto the top on its one side. If the density of the masonry is 21.25 kN/m^3 . Find the resultant force and the point at which it cuts the base of the dam.	3	4	14
5	a	How will you find the resultant stress in unsymmetrical bending?	2	5	7
		Obtain the principal moment of inertia for an unequal angle section 200mm x 150mm x10mm. Name the reasons for unsymmetrical bending.	3	5	7
		OR			
	b	A cantilever of length 1m carries a point load of 2000 N at the free-end. The crosssection of the cantilever is an unequal angle of dimensions 100mm by 60 mm and 10mm thick. The small leg of the angle (i.e., 60 mm) is horizontal. The load passes through the centroid of the cross-section. Determine: (i)Position of neutral axis and (ii) The magnitude of maximum stress up, at the fixed section of the cantilever.	3	5	14

NEC NARASARAOPETA ENGINEERING COLLEGE
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II B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CE2205 **HYDRAULICS AND HYDRAULIC MACHINERY**

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	Marks
1	a	1. Derive an expression for the discharge through a channel by chezy's formula.	K3	CO1	7M
		2. Find the most economical cross section of a rectangular channel to carry 0.5 m^3 /sec of water when channel slope is 1 in 1000. Take C=50	K3	CO1	7M
		OR			
	b	1. Derive an expression for critical depth for an open channel.		CO1	7M
		2. A trapezoidal channel has side slopes of 1 horizontal to 2 vertical and the slope of the bed is 1 in 1000. The area of the section is 45 m^2.Determine the dimension of the section if it is most economical. Also determine the discharge of the most economical section if C=60.	K4	CO1	7M
2	a	1. Explain the terms: (i) rapid varying flow (ii) gradually varying flow.	K1	CO2	7M
		2. Define hydraulic jump. Explain various types hydraulic jump. Derive the head loss in hydraulic jump.	K1	CO2	7M
		OR			
	b	1. Explain the terms: (i) rapid varying flow (ii) gradually varying flow.	K2	CO2	7M
		2.Derive the dynamic equation for gradually varied flow	K2	CO2	7M
3	a	1.A 40m/s velocity jet of water strikes without shock a series of vanes moving at 10m/s. The jet is inclined at an angle of 200 to the direction of motion of vanes. The relative velocity of jet at outlet is 0.9 times of the value of the inlet and the absolute velocity of water at exit is to be normal to the motion of vanes. Determine (i) Vane angles at entrance and exit (ii) Work done on vanes.	K3	CO3	7M
		2. Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.	K2	CO3	7M
		OR			
	b	1.A Jet of water of 80 mm diameter with a velocity of 25 m/sec strikes a series of flat plates arranged around the periphery of a wheel such that each plate appears successively before the Jet. If the plates are moving at a velocity of 6 m/sec, find the force exerted by the Jet on the plate, work done per second and efficiency.	K3	CO3	14M
4	a	1. A pelton wheel is having a mean bucket diameter of 1.2 m and is running at 1200rpm. The net head on the pelton wheel is 800m. If the side clearance angle is 18° and discharge through nozzle is 0.25m^3/s, find the power available at the nozzle and hydraulic efficiency of the turbine.	K4	CO4	7M
		2. What is specific speed? State its significance in the study of hydraulic turbine.	K1	CO4	7M
		OR			
	b	1. A Kaplan turbine develops 25000 kW power at an average head of 50 meter. Assuming a speed ratio of 2, flow ratio of 0.6, diameter of the boss equal to 0.4 times the diameter of the runner and an overall efficiency of 89%, calculate the diameter, speed and specific speed of specific speed of the turbine.	K4	CO4	14M
5	a	1. Define cavitation, what are the effects of cavitation? Give the necessary precautions against cavitation	K2	CO5	7M
		2. A double acting reciprocating pump, running at 50 r.p.m. is discharging 900 litres of water per minute. The pump has stroke of 400 mm. The diameter of piston is 250 mm. The delivery and suction head are 25 m and 4 m respectively. Find the slip of the pump and power required to drive the pump.	K3	CO5	7M
		OR			
	b	1. Draw the ideal indicator diagram of a reciprocating pump. Obtain the expression for work done from it.	K2	C05	7M
		2. Explain the main parts of a reciprocating pump with a neat sketch.	K2	C05	7M

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NAKASAKAUPETA
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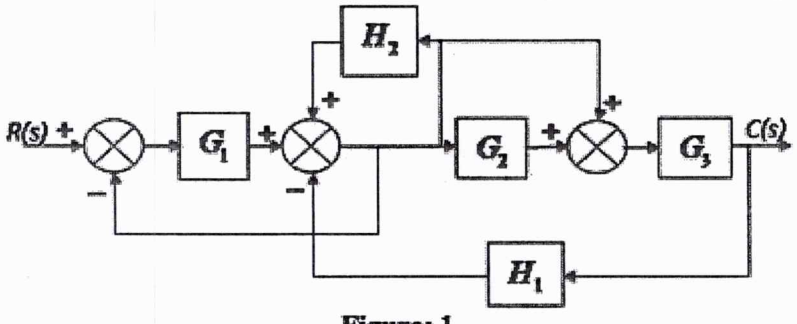
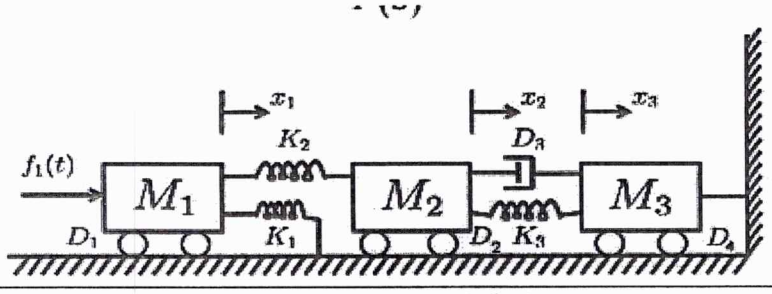
II B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20EE2203 **CONTROL SYSTEMS**

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	Marks
		Unit-1			
1	a	i) Determine the transfer function for the block diagram shown in Figure 1.  **Figure: 1**	K2	1	7M
		ii) Contrast differences between open loop and closed loop control systems.	K1	1	7M
		(OR)			
	b	i) Differentiate between a. Linear and Nonlinear Systems b. Continuous and Discrete data systems	K1	1	7M
		ii) Develop the differential equations governing the mechanical system as shown in below figure. Also find the transfer function $\frac{x_1(S)}{F(S)}$. 	K3	1	7M
		Unit-2			
2	a	i) A unity feedback system has a forward path transfer function $G(S)=\frac{8}{S(S+2)}$ Find the value of damping ratio, undamped natural frequency of the system, percentage over shoot, peak time and settling time.	K2	2	7M
		ii) Explain how damping ratio affects the time response of a second order system?	K1	2	7M
		(OR)			
	b	i) A unity feedback system is characterized by the open loop transfer function $G(s)=\frac{1}{s(1+0.6s)(1+0.3s)}$ Determine the steady state error for unit step input.	K3	2	7M
		ii) Determine the steady- state error for unit step, unit ramp and unit acceleration inputs for the following system. $G(S)=\frac{1000(S+1)}{(S+1)(S+50)}$	K2	2	7M

		Unit-3			
3	a	i) Apply Routh's criterion to check the stability of the characteristic equation $s^6+9s^5+20s^4+12s^3+8s^2+16s+16=0$	K1	3	14M
		(OR)			
	b	i) Sketch the complete root locus for a system for which the open loop transfer function is $G(s)=\frac{k}{s(s^2+2s+2)}$. Comment on Stability	K2	3	14M
		Unit-4			
4	a	i) The open loop transfer function of a unity feedback system is $G(S)=\frac{1}{s(1+s)(1+2s)}$.Sketch the Polar plot and determine the Gain margin and Phase margin.	K2	4	7M
		ii) Construct Nyquist plot for a feedback control system whose open loop transfer function is given by $G(s)H(s)=\frac{4}{s(1-s)}$. Comment on the stability for open loop and closed loop transfer function.	K2	4	7M
		(OR)			
	b	i) Sketch the bode-plot for the following transfer function and determine the phase margin and gain margin of the system. $G(s)=\frac{10}{s(1+0.5s)(1+0.1s)}$	K2	4	14M
		Unit-5			
5	a	i) The state variable formulation of a system is given by $[\dot{x}]=\begin{bmatrix}-3 & 2\\ -1 & 0\end{bmatrix}[x]+\begin{bmatrix}0\\ 1\end{bmatrix}$ u and $y=[1 \quad 0][x]$. Find Transfer function of the system and State transaction matrix .	K2	5	7M
		ii) Define and explain the following a) State variable b) State transition matrix c) Controllability d) Observability	K1	5	7M
		(OR)			
	b	i) Obtain the state space model from the given transfer function: G(s) = $s/(s^3+14s^2+56s+160)$	K2	5	7M
		ii)Discuss the concept of controllability and observability with an example	K1	5	7M

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

Sub Code: R20EE2204 **ELECTRICAL MACHINES-II**

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	Marks
		Unit-1			
1	a	i) Describe the principle of operation of three phase induction motor. Explain why the rotor is forced to rotate in the direction of rotating magnetic field.	K1	CO1	7M
		ii) The power input to the rotor of 440V, 50 Hz, 6 pole, 3-phase, and induction motor is 80 KW. The rotor electromotive force is observed to make 100 complete alterations per minute. Calculate (i) the slip (ii) the rotor speed (iii) rotor copper losses per phase.	K2	CO1	7M
		OR			
	b	i) List the differences between squirrel cage rotor and slip ring rotor?	K1	CO1	7M
		ii) Explain the cogging and crawling operation of induction motor with neat diagram.	K2	CO1	7M
		Unit-2			
2	a	i) Explain the speed control of induction motor using V/f constant method.	K2	CO2	7M
		ii) Illustrate briefly about Dynamic braking and Regenerative braking.	K2	CO2	7M
		OR			
	b	i) Explain briefly Direct Online Starting and Resistance Starting methods of 3 phase induction motor.	K2	CO2	7M
		ii) Explain the speed control of induction motor using frequency control and pole changing method.	K3	CO2	7M
		Unit-3			
3	a	i) Illustrate the various starting methods of single phase induction motor.	K2	CO3	7M
		ii) Using double field revolving field theory explain the torque–slip characteristics of a single phase induction motor and prove that it cannot produce starting torque?	K2	CO3	7M
		OR			
	b	i) Explain the constructional features and principle of operation of a capacitor start induction motor. Draw the torque speed characteristics and list out its merits over resistance start split phase motor	K1	CO3	7M
		ii) Develop an equivalent circuit for single phase induction motor and explain how the performance can be predetermined.	K3	CO3	7M
		Unit-4			
4	a	i) In a 1500 KVA, 3300 V, 50 Hz, three – phase , star – connected synchronous generator, a field current of 50 A produces a short- circuit current of 250 A and open – circuit voltage of 1100 V line to line. Determine the voltage regulation at full load and at 0.8 power factor lagging. Consider the armature resistance to be 0.3 ohms.	K2	CO4	7M
		ii) Derive the emf equation of the synchronous generator.	K3	CO4	7M
		OR			
	b	i) What is armature reaction? Explain the effect of armature reaction on the terminal voltage of an alternator at ZPF lag and ZPF lead with the help of necessary phasor diagram?	K2	CO4	7M

		ii) The stator of a 3-phase, 16 pole alternator has 144 slots and there are 4 conductors per slot connected in two layers and the conductors of each phase are connected in series. If the speed of the alternator is 375 rpm, calculate the emf induced per phase. Resultant flux in the air-gap is 0.05 wb per pole sinusoidally distributed. Assume the coil span as 150^0 electrical.	K2	CO4	7M
	Unit-5				
5	a	i) Explain the different methods of starting of synchronous motors	K1	CO5	7M
		ii) A 2500 V, three phase star – connected synchronous motor has a resistance of 0.35Ω per phase and synchronous reactance of 2.2Ω per phase. The motor is operating at 0.75 power factor leading with a line current of 250 A. determine the excitation voltage per phase.	K2	CO5	7M
	OR				
	b	i) Explain in detail about various techniques to reduce hunting in synchronous motor.	K2	CO5	7M
		ii) Explain briefly the Principle of operation of synchronous motor.	K2	CO5	7M

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NEC ENGINEERING COLLEGE
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II B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20EE2205 **DIGITAL ELECTRONICS**

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	Marks
1	a	i) Perform excess-3 subtraction of the following numbers: a) $(3)_{10}$-$(6)_{10}$ b) $(6)_{10}$-$(3)_{10}$	K3	CO1	[7M]
		ii) (a) Convert Hexadecimal Number $(7A7.B2)_{16}$ to binary. (b) Convert Hexadecimal Number $(6AAA.C1)_{16}$ to decimal.	K3	CO1	[7M]
		OR			
	b	i) Perform BCD addition on the following numbers: a) 1001+0001 b) 00010001+01011101	K3	CO1	[7M]
		ii) (a) Subtract 11011-1001 using 2's complement. (b) Convert the following Binary numbers to Gray numbers: 10110, 01010	K3	CO1	[7M]
2	a	(i) Simplify the following Boolean function F, using the Quine Mccluskey method and verify the result using K-map $F(A, B,C,D) = \Sigma (0,2,3,5,7,9,11,13,14)$	K3	CO2	[7M]
		(ii) Realize NOT, OR, AND gates using universal gates.	K2	CO2	[7M]
		OR			
	b	(i) Minimize the following logic function using K-maps and realize using NAND and NOR gates. $F(A, B,C,D) = \Sigma (1,3,5,8,9,11,15)+ d(2,13)$	K3	CO2	[7M]
		(i) Draw the multi-level two-input NAND circuit for the following expression: F=(AB'+CD')E+BC(A+B).	K2	CO2	[7M]
3	a	(i) Implement the following Boolean function using 8 x 1 Multiplexers. $F(A, B, C, D) = \Sigma (1,3,4,11,12,13,14,15)$	K3	CO3	[7M]
		(ii) Explain the concept of carry look-ahead adder with a neat logic diagram.	K2	CO3	[7M]
		OR			
	b	(i) Design a 4-bit magnitude comparator with 3 outputs: A>B, A=B, A<B	K3	CO3	[7M]
		i) Define Encoder. Construct an 8x3 encoder using logic gates and a truth table.	K2	CO3	[7M]
4	a	i) Draw and explain the 4-bit SISO, PISO, and PIPO shift register with its timing diagram.	K3	CO4	[7M]
		(ii) Explain the operation of the master-slave Flip flop and show how the race around condition is eliminated.	K2	CO4	[7M]
		OR			
	b	(i) Design and explain the working of a Synchronous MOD 3 Counter.	K2	CO4	[7M]
		(ii) Convert D flip flop to T flip flop. (iii) Write the difference between the combinational circuit and the sequential circuit	K2, K3	CO4	[7M]
5	a	(i) Implement the following Boolean functions using PLA: $F_1(X, Y, Z) = \sum m (1,2,4, 6)$, $F_2(X, Y, Z) = \sum m (0,1,6, 7)$ and $F_3(X, Y, Z) = \sum m (2, 6)$	K3	CO5	[7M]
		(ii) Write short notes on Field Programmable Gate Arrays (FPGA) with suitable diagrams	K2	CO5	[7M]
		OR			
	b	(i) Implement the following Boolean functions using the PAL: $W (A, B, C, D) = \Sigma m(2, 12, 13)$ $X (A, B, C, D) = \Sigma m(7, 8, 9, 10, 11, 12, 13, 14, 15)$	K3	CO5	[7M]
		(ii) How a combinational logic function is implemented in PAL and PLA? Explain with an example for each.	K2	CO5	[7M]

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

Sub Code: R20ME2203 **MANUFACTURING TECHNOLOGY**

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	Marks
1	a	Explain the steps involved in the casting process and also mention applications	2	1	7
		Explain the sand molding process with neat sketch.	2	1	7
		OR			
	b	Explain the principle of investment casting with necessary sketches.	2	1	7
		List out the defects in casting process. Explain any five with neat sketch.	2	1	7
2	a	Classify the welding process and mention the types of welds and weld joints.	2	2	7
		Explain the oxy-acetylene gas welding process with neat sketch.	2	2	7
		OR			
	b	State the principle of arc welding and explain the AC arc welding process.	3	2	7
		Explain the welding defects and their causes and remedies.	3	2	7
3	a	Explain the principle of resistance welding and also explain spot welding process with neat sketch.	2	3	7
		Explain the electron beam welding process with neat diagram.	2	3	7
		OR			
	b	Explain submerged arc welding process with neat sketch.	3	3	7
		Explain the MIG welding process with neat sketch.	3	3	7
4	a	Distinguish between hot and cold working process.	3	4	7
		Describe the sheet metal working process.	2	4	7
		OR			
	b	Explain the forging defects and remedies.	2	4	7
		Explain the hot and cold rolling process.	2	4	7
5	a	Explain the Forward Extrusion process with neat sketch.	2	5	7
		Explain the Backward Extrusion process with neat sketch.	2	5	7
		OR			
	b	Explain the tube drawing process with neat sketch.	2	5	7
		Explain the impact extrusion process with neat diagram.	2	5	7

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

Sub Code: R20ME2204 **APPLIED THERMODYNAMICS**

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	Marks
1	a	Define Volumetric Efficiency and explain its significance in the performance of an IC engine. How is it calculated?	K2	1	7M
		Explain the working principle of the Air-cooling system and the Water-cooling system in an IC engine. What are the advantages and disadvantages of each system?	K2	1	7M
		OR			
	b	A spark-ignition engine operates on an air-standard Otto cycle. The compression ratio is 8:1, and the maximum cycle temperature is 2200 K. Determine the cycle efficiency and the mean effective pressure.	K4	1	7M
		Explain the working principle of the Wankel engine and the principles of supercharging and turbocharging. What are the advantages of using a turbocharger in an IC engine?	K2	1	7M
2	a	Discuss the importance of the Delay Period in the combustion process of a C.I Engine. What are the factors that affect the delay period?	K2	2	7M
		Explain the importance of Fuel Requirements and Fuel Rating in S.I Engines and C.I Engines. What are the anti-knock additives used in S.I Engines?	K2	2	7M
		OR			
	b	Explain the different types of Combustion Chambers used in S.I Engines, their advantages, and disadvantages. Give suitable examples.	K2	2	7M
		Calculate the brake thermal efficiency of a four-stroke gasoline engine with a brake power of 60 kW and a fuel consumption rate of 0.25 kg/kWh.	K3	2	7M
3	a	Define Indicated Power (IP) and Brake Power (BP). How is Mechanical Efficiency calculated? Explain the method to calculate Mean Effective Pressure (MEP).	K2	3	7M
		Discuss the methods used to measure Fuel Consumption, Air Intake, and Exhaust Gas Composition in an IC engine.	K2	3	7M
		OR			
	b	A four-cylinder, four-stroke diesel engine has a bore of 120 mm and a stroke of 140 mm. The clearance volume is 400 cc and the compression ratio is 16:1. The engine develops a brake power of 50 kW at a speed of 1500 rpm. The mean effective pressure is 8 bar and the fuel consumption are 0.22 kg/kWh. Determine the indicated power, frictional power, mechanical efficiency, and specific fuel consumption of the engine.	K4	3	14M
4	a	Define the term Slip Factor in a Rotary Compressor. Discuss the working principle of a Lobe-type Rotary Compressor.	K3	4	7M
		Explain the different types of Positive Displacement Compressors. Discuss the working principle of a Reciprocating Compressor.	K3	4	7M
		OR			
	b	A centrifugal compressor has a suction diameter of 20 cm and a delivery diameter of 15 cm. The impeller rotates at a speed of 6000 rpm and the discharge pressure is 1.2 times the suction pressure. The temperature rise across the compressor is 60°C and the adiabatic efficiency is 80%. Determine the mass flow rate of air through the compressor and the power required to drive it. Also, draw the velocity triangle and determine the blade angles at the inlet and outlet.	K4	4	14M

5	a	Explain the working principle of an axial flow compressor and derive the expressions for the degree of reaction and work done factor. Also, explain the significance of isentropic and polytropic efficiencies in the performance evaluation of an axial flow compressor.	K3	5	7M
		Discuss the working principle and mechanical details of a Roots blower. Derive the expressions for the delivery pressure and volumetric efficiency of the blower. Also, explain the significance of clearance volume and backflow in the performance evaluation of a Roots blower.	K3	5	7M
		OR			
	b	How is the degree of reaction and work done factor determined in axial flow compressors?	K2	5	7M
		A Roots blower has a rotor diameter of 200 mm and a length of 150 mm. The rotor has 2 lobes, and the clearance between the rotor and the casing is 0.4 mm. The blower operates at a speed of 1500 rpm and has an inlet pressure of 1 bar and an inlet temperature of 30°C. If the volumetric efficiency of the blower is 80%, determine the flow rate and power input of the blower.	K4	5	7M

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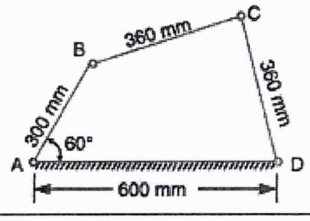
II B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20ME2205 **KINEMATICS OF MACHINERY**

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	Marks
1	a	i. Demonstrate Grubler's criterion for determining degree of freedom for mechanisms. Using Grubler's criterion for plane mechanism, prove that the minimum number of binary links in a constrained mechanism with simple hinges is four	**K3**	**01**	**7M**
		ii. Categorize the four-bar mechanism based on its possible motion, when the lengths of the links are: l_1 = 30 cm, l_2 = 12.5 cm, l_3 = 30 cm, and l_4 = 10 cm.	**K3**	**01**	**7M**
		OR			
	b	**i. Analyze** the various inversions of Four Bar Mechanism with sketches	**K4**	**01**	**7M**
		ii. Elaborate the Whit worth quick return motion mechanism and Oldham's coupling	**K2**	**01**	**7M**
2	a	i) **Construct** Chebicheff mechanism and pantograph, explain their working	**K2**	**02**	**7M**
		ii) **Categorize and Distinguish** between exact and approximate straight-line mechanisms	**K2**	**02**	**7M**
		OR			
	b	What is the condition for correct steering? Sketch and show the two main types of steering gears and discuss their relative advantages.	**K3**	**02**	**14M**
3		i. Explain a. Coriolis component b. Kennedy's theorem	**K2**	**03**	**7M**
	a	ii. In a pin jointed four bar mechanism, as shown in Fig, AB = 300 mm, BC = CD = 360 mm, and AD = 600 mm. The angle BAD = 60°. The crank AB rotates uniformly at 100 r.p.m. find the angular velocity of the link BC. 	**K3**	**03**	**7M**
		OR			
	b	i. Demonstrate and prove Three centres in line theorem. Distinguish between centrode and axode	**K2**	**03**	**7M**
		ii. Illustrate types of Instantaneous Centres with suitable example.	**K2**	**03**	**7M**
4	a	i. Explain different types of cams and follower mechanisms	**K3**	**04**	**7M**
		ii. Construct the profile of cam when the line of stroke of the valve rod passes through the axis of cam shaft. Determine the maximum acceleration of the valve rod when the cam shaft rotates at 100 rpm. The displacement of the valve, while being raised and lowered is to take place with simple harmonic motion.	**K3**	**04**	**7M**
		OR			
	b	A cam rotating clockwise at a uniform speed of 200 r.p.m. is required to move an offset roller follower with a uniform and equal acceleration and retardation on both the outward and return strokes. The angle of ascent, the angle of dwell (between ascent and descent) and the angle of descent is 120°, 60°and 90° respectively. The follower dwells for the rest of cam rotation. The	**K4**	**04**	**14M**

		least radius of the cam is 50 mm, the lift of the follower is 25 mm and the diameter of the roller is 10mm. The line of stroke of the follower is offset by 20 mm from the axis of the cam. Draw the cam profile and find the maximum velocity and acceleration of the follower during the outstroke.			
5	a	i. Demonstrate the Law of gearing and obtain condition for constant velocity ratio for transmission of motion.	**K3**	**05**	**7M**
		ii. A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 20° pressure angle, 12 mm module and 10 mm addendum. Find the length of path of contact, arc of contact and the contact ratio	**K3**	**05**	**7M**
		OR			
	b	i. Explain briefly the differences among simple, compound, and epicyclic gear trains. What are the special advantages of epicyclic gear trains?	**K2**	**05**	**7M**
		ii. In an epicyclic gear train, an arm carries two gears A and B having 45 and 60 teeth respectively. If the arm rotates at 180 r.p.m. in the anticlockwise direction about the centre of the gear A which is fixed, **Determine** the speed of gear B. If the gear A instead of being fixed, makes 300 r.p.m. in the clockwise direction, what will be the speed of gear B?	**K3**	**05**	**7M**

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

Sub Code: R20EC2202 **INTERNET OF THINGS**

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	Marks
1	a	List out different levels of characteristics of IOT and explain	K3	1	7M
		What are the different protocols used in IOT and explain them	K2	1	7M
		OR			
	b	Explain the cloud computing enabling technology in IOT along with one example	K1	1	7M
		List out different applications of IOT in detail	K1	1	7M
2	a	Explain the following terms in detail (i)Process Specification (ii) Domain Model Specification,	K2	2	14M
		OR			
	b	Explain the concept of Functional View Specification of IOT in detail	K4	2	7M
		Write short notes on IOT Level Specification in detail	K4	2	7M
3	a	Explain the Software Defined Networking importance in IOT along with one example	K5	3	7M
		Write short notes on Network Function Virtualization in detail	K5	3	7M
		OR			
	b	List out few Difference between IOT and Machine to Machine communications	K2	3	7M
		Explain the importance of Machine to Machine communications in IOT	K2	3	7M
4	a	Explain the following terms in detail (i) Sensors (ii) Actuators	K1	4	8M
		List out different applications of Arduino in detail	K1	4	6M
		OR			
	b	Explain the programming language concept of Raspberry PI	K4	4	7M
		Examine the difference between Raspberry Pi and beagle bone black board?	K4	4	7M
5	a	Analyze the Home Automation and Explain the importance of different sensors used in Home Automation in detail	K3	5	7M
		List out different devices used in Agriculture Applications along with diagram	K3	5	7M
		OR			
	b	How to incorporate the different sensor and activators are used to develop the Smart City applications.	K2	5	7M
		Explain the importance of IOT in present generations	K2	5	7M

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

Sub Code: R20EC2203 **ANALOG AND DIGITAL 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	Marks
1	a	Explain the principle of operation of Envelope detector used for AM detection, with necessary equations.	K2	CO1	[7M]
		Derive the equation for FM wave. Define modulation index, maximum deviation and band width of a FM signal.	K2	CO1	[7M]
		OR			
	b	Draw the circuit diagram explain the operation of square law modulator for AM	K2	CO1	[8M]
		Compare AM,PM,FM	K4	CO1	[6M]
2	a	Discuss about the noise performance of an FM receiver	K2	CO2	[8M]
		Analyze the effect of feedback on performance of AM Transmitter.	K4	CO2	[6M]
		OR			
	b	Draw the block diagram of Superhetrodyne receiver and explain the function of each block.	K2	CO2	[8M]
		Draw the block Diagram of TRF Receiver and explain its operation	K2	CO2	[6M]
3	a	Explain, how a PPM signal can be generated from PWM signal?	K2	CO3	[7M]
		Discuss the various data communication codes and explain its significance	K2	CO3	[7M]
		OR			
	b	Draw the block diagram of generation of PCM and explain the various operation performed in transmitter and receiver	K2	CO3	[8M]
		Compare PAM, PWM and PPM pulse modulation techniques	K4	CO3	[6M]
4	a	Draw and explain the modulation and detection of 8-PSK.	K2	CO4	[7M]
		Draw the ASK,FSK,BPSK waveforms for the bit stream of 10110001	K3	CO4	[7M]
		OR			
	b	Compare 8-ary PSK, 8-ary FSK, and 16-ary QASK in context to error probability and transmission BW.	K4	CO4	[7M]
		Draw the neat sketch and explain the modulation and detection of FSK.	K2	CO4	[7M]
5	a	An analog signal band limited to 10 KHz quantize at 8 levels of PCM System with probability of 1/4, 1/5, 1/5, 1/5, 1/10, 1/20,1/20, and 1/20 respectively. Find the entropy and rate of information.	K3	CO5	[7M]
		What are the properties of Entropy and with suitable example, explain the entropy of binary memory less source.	K2	CO5	[7M]
		OR			
	b	Explain the sequential decoding of convolutional codes with one example	K2	CO5	[7M]
		A source is transmitting six messages with probability 0.30, 0.25, 0.15, 0.12, 0.10and 0.08 respectively. i) Find the binary Huffman code. ii) Determine its average word length, efficiency and redundancy.	K3	CO5	[7M]

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

Sub Code: R20EC2204 **ELECTRONIC CIRCUITS AND PULSE CIRCUITS**

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	Marks
1	a	Derive the overall current gain and overall input impedance of a Darlington pair Amplifier.	K3	CO1	[7M]
		Derive the expression for voltage gain of a common source FET amplifier	K3	CO1	[7M]
		OR			
	b	Derive and draw the frequency response and analysis of two stage RC coupled Amplifier	K3	CO1	[9M]
		Comparison of Transistor amplifier configurations	K3	CO1	[5M]
2	a	Derive the condition for frequency of oscillation in an RC phase shift oscillator	K3	CO2	[7M]
		Analyze the current –shunt feedback amplifier and derive voltage gain, input resistance and output resistance.	K4	CO2	[7M]
		OR			
	b	Derive an expression for frequency of oscillation of Colpitts oscillator using transistor	K3	CO2	[7M]
		Analyze the Voltage –series feedback amplifier and derive voltage gain, input resistance and output resistance.	K4	CO2	[7M]
3	a	Draw the circuit diagram of complementary symmetry class B push pull amplifier and explain its working	K3	CO3	[9M]
		Comparison of Class C and Class D power amplifiers	K4	CO3	[5M]
		OR			
	b	Develop an expression for maximum conversion efficiency for a Transformer coupled Class A power amplifier and list the advantages over series fed direct couples class A Power Amplifier.	K4	CO3	[14M]
4	a	Derive the gain response of a RC high pass Circuit when sinusoidal signal as Input.	K3	CO4	[7M]
		Analyze the function of Emitter coupled clipper with waveforms.	K4	CO4	[7M]
		OR			
	b	Draw the basic circuit diagram of positive peak clamper circuit and explain its operation	K3	CO4	[7M]
		Develop an expression for the RC network as a Integrator.	K3	CO4	[7M]
5	a	Sketch the output waveform of a Schmitt trigger circuit for sine wave input of 12V peak to peak if UTP =5V and LTP= 3V.	K4	CO5	[7M]
		Analyze the principle of operation of Monostable multivibrators with neat waveforms	K4	CO5	[7M]
		OR			
	b	Analyze the operation of Astable multivibrator with neat waveforms	K4	CO5	[7M]
		Analyze how an Astable Multivibrator works as a voltage to frequency converter	K4	CO5	[7M]

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

Sub Code: R20EC2205 **ELECTROMAGNETIC WAVES AND TRANSMISSION LINES**

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	Marks
1	a	Discuss the Maxwell's equations for electrostatic fields.	2	1	[7M]
		Determine the energy if the point Charges -1nC, 5nC, and 2nC are located at (0,0,0), (0,0,1) and (1,0,0), respectively.	3	1	[7M]
		OR			
	b	Define Biot-Savart's law. Explain? How it is useful for deriving H?	2	1	[7M]
		Derive equation of continuity for static magnetic fields.	2	1	[7M]
2	a	Explain Maxwell's equation in integral and point form for general time varying electric and magnetic fields.	2	2	[14M]
		OR			
	b	State and explain the boundary conditions of the electric and magnetic fields.	2	2	[7M]
		What is inconsistency in Ampere's circuit law and how to overcome it?	2	2	[7M]
3	a	What is uniform Plane wave? Explain the characteristics of plane Wave?	2	3	[7M]
		Explain skin depth and derive an expression for depth of penetration for good conductor.	2	3	[7M]
		OR			
	b	State and prove Poynting theorem.	2	3	[7M]
		Write a short note on Brewster angle, critical angle and Total Internal Reflection.	2	3	[7M]
4	a	Derive the transmission line equations for V and I, in terms of the source parameters.	3	4	[7M]
		Calculate the input impedance for a short – circuited transmission line having Z0=50Ω and γ =j6/m, provided the length of the line is λ/8.	3	4	[7M]
		OR			
	b	Derive the expression for propagation constant of infinite transmission line.	3	4	[7M]
		Calculate the phase velocity for a lossless transmission line operating at 3GHz has L=4 μH/m and Zo=50Ω.	3	4	[7M]
5	a	Define reflection coefficient and derive the expression for the input impedance in terms of reflection coefficient.	2	5	[7M]
		Calculate reflection coefficient and voltage standing wave ratio for A low loss transmission line of 200 ohms characteristic impedance is connected to a load of 600 ohms.	3	5	[7M]
		OR			
	b	Write the characteristics of λ/2 and λ/4 lossless transmission line elements.	2	5	[7M]
		Calculate reflection coefficient and VSWR for 50-ohm transmission line is terminated with: (i) open circuited load (ii) short circuited load	3	5	[7M]

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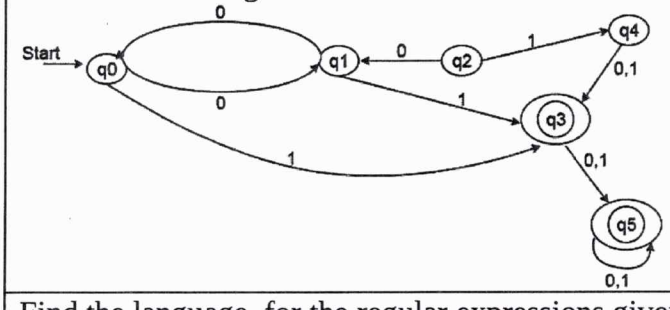
II B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20CS2202 **FORMAL LANGUAGES AND AUTOMATA THEORY**

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

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

Q.No		Questions	KL	CO	Marks
1	a	What is finite state machine? Outline Advantages, disadvantages and applications of finite state machine.	K2	CO1	7M
		Compare different types of generative grammar.	K2	CO1	7M
		OR			
	b	Explain the mathematical representation of finite automata and string operations.	K2	CO1	7M
		What is Recursive Language? Describe the relationship between grammars and languages.	K2	CO1	7M
2	a	Design a DFA that accepts set of all string that contain 0's or 1's end in 00 over the alphabet set {0, 1}.	K3	CO3	7M
		Design an NFA with ε-moves to accept all the strings with any number of *a*'s followed by any number of *b*'s followed by any number of *c*'s.	K3	CO3	7M
		OR			
	b	Design a DFA that accepts set of all string that contain odd number of 1's over the alphabet set {0, 1}.	K3	CO3	7M
		Construct a Moore machine to compute the number of substrings of the form *bab*, that occur in an arbitrary input string, over the alphabet {*a*, *b*} and output alphabet {0, 1}.	K4	CO2	7M
3	a	Reduce the DFA given below: 	K4	CO2	7M
		Find the language, for the regular expressions given below: i) R = a*(a+b) ii) R = (a+b)*(a+bb) iii) R = a*bc*+ac	K2	CO1	7M
		OR			
	b	How 2DFA operates? Explain with suitable example.	K2	CO1	7M
		Construct a regular expression corresponding to the DFA, represented by the given table. q_1 is both the initial and the final state.	K2	CO1	7M

Q\Σ	Present inputs	
	0	1
q_1	q_1	q_2
q_2	q_3	q_2
q_3	q_1	q_2

4	a	Obtain a CFG for the language of palindrome over the alphabet Σ = {a, b, c}.	K3	CO3	7M
		Convert the given grammar to CNF. S → AB|CA B → BC|AB A → a C → aB|b	K3	CO3	7M

		OR			
	b	Design a PDA that accepts the language $L = \{WW^R \mid W \in (0+1)^*\}$ and verify the string acceptance by empty stack.	K4	CO2	7M
		Bring the grammar G with V = {S, A, B}, T = {a, b} and productions p $S \rightarrow A$ $A \rightarrow aBa \mid a$ $B \rightarrow bAb \mid b$ into GNF.	K3	CO3	7M
5	a	Design a TM that accepts the language of all strings, over the alphabet Σ = {a, b}, whose second letter is *b*.	K4	CO2	7M
		What is decidability? Explain in brief about any two undecidable problems.	K3	CO4	7M
		OR			
	b	Design a TM that copies a given string over {a, b}. Find the computation of TM for the string *abb*.	K4	CO2	7M
		Explain in detail about NP Complete and NP hard problems.	K3	CO4	7M

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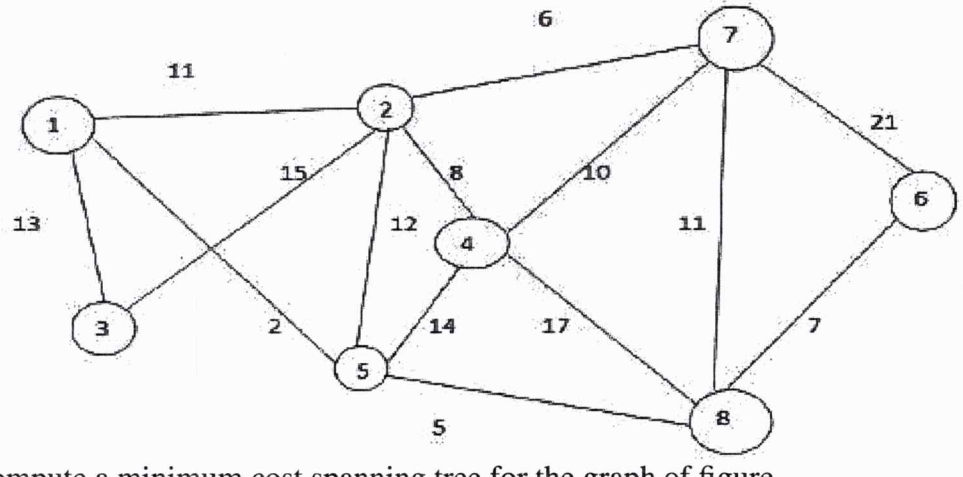
II B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20IT2202 **DESIGN ANALYSIS OF ALGORITHMS**

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	Marks
1	a	Explain the the characteristics of an algorithm	2	1	7
		Using step count find the time complexity of linear search	2	1	7
		OR			
	b	Explain the role of instance characteristics in finding the time and space complexities with an example	2	1	7
		Differentiate between Big oh and omega notation with example	2	1	7
2	a	Explain the general procedure of divide and conquer method.	2	2	7
		Apply quick sort algorithm to sort the list. E, X, A, M, P, L, E in alphabetical order	3	2	7
		OR			
	b	Sort the list of the elements 10,5,7,6,1,4,8,3,2,9 using merge sort algorithm and derive its time complexity	3	2	14
3	a	Explain the Dijkstra's single source shortest path algorithm	2	3	7
		What is the solution generated by function Job Sequencing algorithm when n=6, (P1…p6) = (3, 5, 20, 18, 1, 6), and (d1..d6) = (1, 3, 4, 3, 2, 1).	3	3	7
		OR			
	b	 Compute a minimum cost spanning tree for the graph of figure using prim's algorithm.	3	3	14
4	a	Explain the methodology of Dynamic programming. List the applications of Dynamic programming	2	4	7
		Solve the following instance of 0/1 Knapsack problem using Dynamic Programming n = 3; (W1, W2, W3) = (3, 5, 7); (P1, P2, P3) = (3, 7, 12); M = 4.	3	4	7
		OR			
	b	Draw an Optimal Binary Search Tree for n=4 identifiers (a1,a2,a3,a4) = (do,if,read, while) P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1	3	4	14
5	a	Explain the Graph – coloring problem. And draw the state space tree for m= 3colors n=4 vertices graph	3	5	7
		Describe an algorithm to solve 8-queen problem and Show the state space tree	3	5	7

		OR			
	b	Generate FIFO branch and bound solution for the given knapsack problem. m = 15, n = 3. (P_1 P_2 P_3) = (10, 6, 8) (w_1 w_2 w_3) = (10, 12, 3)	3	6	14

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NEC ENGINEERING COLLEGE
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II B.Tech II Semester Supple. Examinations, October-2023

Sub Code: R20IT2205 **COMPUTER NETWORKS**

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	Marks
1	a	Differentiate between OSI and TCP /IP reference models	2	1	7
		Explain the distinct characteristics of local area networks	2	1	7
		OR			
	b	Explain Novell Networks and Arpanet	2	1	7
		Compare the WAN, LAN and MAN topologies	2	1	7
2	a	Explain character stuffing and bit stuffing for framing with example	2	2	7
		Explain the following error detection techniques i) LRC ii) CRC	2	2	7
		OR			
	b	Consider a 32 bit block of data 11100111 11011101 00111001 10101001 that has to be transmitted. If Longitudinal Redundancy Check is used what is the transmitted bit stream?	2	2	7
		Explain detail about IEEE 802.3 MAC sub-layer	2	2	7
3	a	What are the draw backs of stop and wait protocol? How can they overcome by sliding window protocol?	2	3	7
		Explain briefly about the Persistent and Non-persistent CSMA protocols.	2	3	7
		OR			
	b	Explain the simplex protocol for noisy channel	2	3	7
		What is pure ALOHA and slotted ALOHA? Mention the advantages of slotted ALOHA	2	3	7
4	a	Differentiate between Virtual Circuit Versus Datagram Subnets	2	4	7
		What is the format of IPv4 header? Describe the significance of each field.	2	4	7
		OR			
	b	Explain distance vector routing and link state routing with example	2	4	14
5	a	Explain in detail three way handshaking for connection establishment in TCP	2	5	7
		Explain the structure of TCP Header format.	2	5	7
		OR			
	b	Explain the functions of SMTP	2	5	7
		Explain detail about Domain Name System	2	5	7

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(AUTONOMOUS)

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

Sub Code: R20AI2202 **AUTOMATA AND COMPILER DESIGN**

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

Note: Answer All **FIVE** Questions.

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

Q.No		Questions	KL	CO	Marks
1	a	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
		Convert the following Regular expression into NFA- ε, $(a+b)^*(aa+bb)(a+b)^*$	K3	CO1	7M
		OR			
	b	Explain the role of Lexical analysis phase. And identify the process of input buffering technique with example.	K3	CO1	7M
		Discuss about equivalence of NFA and DFA with an examples.	K3	CO1	7M
2	a	Explain the procedure for eliminating ambiguity and eliminating left recursion from a grammar. Give an example	K2	CO2	7M
		Compute FIRST and FOLLOW for the grammar: $E \rightarrow TE', E' \rightarrow +TE'/\varepsilon, T \rightarrow FT', T' \rightarrow *FT'/\varepsilon, F \rightarrow (E) \mid id$	K2	CO2	7M
		OR			
	b	Construct LL(1) parser for the following grammar $E \rightarrow TE', E' \rightarrow +TE'/\varepsilon, T \rightarrow FT', T' \rightarrow *FT'/\varepsilon, F \rightarrow (E) \mid id$	K3	CO2	14M
3	a	Derive the string 00101 using LMD and RMD using the following grammar S->A1B A->0A| ε B->0B| 1B| ε	K3	CO2	7M
		Explain shift reduce parser with an example.	K3	CO2	7M
		OR			
	b	List the differences between LR and LL Parsers. Give Various types of LR Parsers	K3	CO3	7M
		Construct SLR Parsing table for the grammar $E \rightarrow E+T \mid T,\ T \rightarrow T*F \mid F,\ F \rightarrow (E) \mid id$ by giving LR(0) items.	K3	CO3	7M
4	a	What is dependency graph? Construct dependency graph for the expression a-4+c using syntax directed definition of $E \rightarrow TE^1$, $E^1 \rightarrow +TE^1/-TE^1/Є$, $T \rightarrow$ (E)/id/num	K2	CO4	8M
		Differentiate inherited and synthesized attributes with an example.	K2	CO4	7M
		OR			
	b	Discuss syntax directed definition by defining synthesized and inherited attributes. Construct a SDD of a simple desk calculator.	K2	CO4	7M
		What are the different storage allocation strategies? Explain run time storage allocation by activation trees.	K2	CO4	7M
5	a	Explain Principle sources of Optimization	K3	CO5	7M
		Write short notes on basic blocks by giving structure preserving transformation.	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

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NEC ENGINEERING COLLEGE
(AUTONOMOUS)

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

Sub Code: R20AI2205 **INTRODUCTION TO ARTIFICIAL INTELLIGENCE**

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

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

Q.No		Questions	KL	CO	Marks
		Unit-I			
1	a	Explain various development phases of AI. Describe the importance of knowledge based systems, neural networks, scientific methods, intelligent agents and working with huge data sets.	K2	CO1	6
		What is Problem solving? Demonstrate the solution for searching with suitable example.	K2	CO1	6
		OR			
	b	Discuss any four successful applications of AI.	K2	CO1	6
		What are the Elements of a Production System? List the Advantages of using a Production System in AI?	K2	CO1	6
		Unit-II			
2	a	How the Hill Climbing Algorithm is the most important AI method? Explain.	K4	CO2	6
		What is instance and ISA relationship in predicate logic? Explain first-order predicate logic representing instance and is a relationships?	K4	CO2	6
		OR			
	b	What is the Constraint Satisfaction Problem? Explain 3 methods to economically beneficial to something like a parameter	K4	CO2	6
		Define Heuristic Search. List out the advantages	K4	CO2	6
		Unit-III			
3	a	What is the difference between procedural and declarative knowledge? Explain four main approaches to knowledge representation ?	K2	CO3	6
		The main problem with semantic networks and frames is that they lack formality; there is no specific guideline on how to use the representations. The main problem with semantic networks and frames is that they lack formality; there is no specific guideline on how to use the representation. Illustrate and justify.	K2	CO3	6
		OR			
	b	Explain the two directions forward and backward reasoning to find a path between initial and goal states.	K2	CO3	6
		Define Knowledge. Describe **SOAR** and **PRODIGY** in detail.	K2	CO3	6
		Unit-IV			
4	a	What is learning rote learning in learning by taking advice? Give an example of learning by taking advice.	K3	CO4	6
		What is Q-learning and Markov decision process? Explain	K3	CO4	6
		OR			
	b	Explain about learning by Chunking.	K3	CO4	6
		What is temporal difference learning? Explain the algorithm with an example.	K3	CO4	6
		Unit-V			
5	a	What are the 7 stages of natural language processing? Explain	K3	CO5	6
		Illustrate pragmatic processing and discourse in AI?	K3	CO5	6
		OR			
	b	Write a short note on Spell in Checking in Natural Language Processing.	K3	CO5	6
		Illustrate parallelism and distributed reasoning systems.	K3	CO5	6