LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram-521 230 :: Krishna Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

B.Tech.(II Semester) (R20) Regular Examinations, September / October 2021

TIME TABLE

Time : 10.00 AM to 01.00 PM **A.Y. 2020-21**

DATE	AI & DS	ASE	CE	CSE	ECE	EEE	IT	ME
27-09-2021 (Monday)	20FE02 - Professional Communication-II	20FE02 - Professional Communication-II	20FE02 - Professional Communication -II	20FE02 - Professional Communication-II	20FE02 - Professional Communication-II	20FE02 - Professional Communication-II	20FE02 - Professional Communication-II	20FE02 - Professional Communication-II
29-09-2021 (Wednesday)	20FE04 - Linear Algebra and Transformation Techniques	20FE04 - Linear Algebra and Transformation Techniques	20FE04 - Linear Algebra and Transformation Techniques	20FE04 - Linear Algebra and Transformation Techniques	20FE04 - Linear Algebra and Transformation Techniques	20FE04 - Linear Algebra and Transformation Techniques	20FE04 - Linear Algebra and Transformation Techniques	20FE04 - Linear Algebra and Transformation Techniques
01-10-2021 (Friday)	20FE07 - Applied Physics	20FE08 - Engineering Physics	20FE08 - Engineering Physics	20FE06 - Engineering Chemistry	20FE06 - Engineering Chemistry	20FE05 - Applied Chemistry	20FE07 - Applied Physics	20FE08 - Engineering Physics
04-10-2021 (Monday)	20CS04 - Discrete Mathematical Structures	20CS01 - Programming for Problem Solving using C	20CS01 - Programming for Problem Solving using C	20CS05 - Python Programming	20CS01 - Programming for Problem Solving Using C	20CS01 - Programming for Problem Solving using C	20CS05 - Python Programming	20CS01 - Programming for Problem Solving using C
06-10-2021 (Wednesday)	20CS03 - Data Structures	20AE01 - Elements of Aerospace Engineering	20CE03 - Applied Mechanics	20CS03 - Data Structures	20EC02 - Digital Logic Circuits	20EE04 - Fundamentals of Electrical Engineering	20CS03 - Data Structures	20ME02 - Engineering Mechanics
08-10-2021 (Friday)	20MC01 - Constitution of India	20MC01 - Constitution of India	20MC01 - Constitution of India	20MC01 - Constitution of India	20MC01 - Constitution of India	20MC01 - Constitution of India	20MC01 - Constitution of India	20MC01 - Constitution of India

Note: Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.

Date: 17-09-2021

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs 2. Transport in-charge & Librarian
3. Canteen, Security & Hostels 4. All Notice Boards

11 OCT 2021

H.T.No										

R20

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (II Semester) Regular Examinations

20FE02-PROFESSIONAL COMMUNICATION-II
(Common to All)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Why was Wells concerned about the future of humanity?	7M	CO1	L1
(b)	Fill in the blanks with proper form (Comparative or Superlative) of adjectives. (i) Africa is the ____ of all the five continents. (hot) (ii) My vehicle is ____ than yours. (expensive) (iii) She is ____ than her sister. (tall) (iv) This portrait is the ____ of the two. (good) (v) Rabin Singh is the ____ runner. (fast) (vi) Your accent is ____ than mine. (bad) (vii) Lead is ____ than any other metal. (heavy)	7M	CO1	L2
	(OR)			
2(a)	Write a paragraph on your prediction for humankind a hundred years from now.	7M	CO1	L1
(b)	Rewrite the following sentences as directed (i) Very few companies are as reputed as google. (Comparative) (ii) Teachers are more respectable than politicians. (Positive) (iii) The Nile is the longest river. (Superlative) (iv) It was the most hilarious show. (Positive) (v) Gold is one of the most precious metals. (Comparative) (vi) No other country is so powerful as America. (Superlative) (vii) Srinu is not cleverer than Hari. (Positive)	7M	CO1	L2
3(a)	Is awareness about cultural diversity essential? Why/why not?	7M	CO2	L1
(b)	(i) Change the following sentences from the Active voice to Passive voice: (a) He had delivered the letters (b) The company will hire new workers. (c) I will introduce you. (ii) Write appropriate meaning for the following phrasal verbs: (a) Take after (b) call on (c) backup (d) Put off.	7M	CO2	L2
	(OR)			
4(a)	What can you infer about Sui Sin Far's personality based on your reading of the text? How did her experiences impact her?	7M	CO2	L1
(b)	Write an appropriate meaning for the following idiomatic expressions with an example each: (i) Carry the can (ii) Dutch uncle (iii) Eagle eyes (iv) Chase rainbows (v) Couch potato (vi) Eleventh hour (vii) Sixes and sevens.	7M	CO2	L2
5(a)	What were the three steps Bhabha thought necessary for the Indian Nuclear Programme? Provide details.	7M	CO3	L1

(b)	Assume you work for a construction firm and are in charge of a five-storied apartment that will be completed in three years. Since the second year is over, prepare a report to be submitted to the Managing Director of the company.	7M	CO5	L3
	(OR)			
6(a)	How did Bhabha's education abroad and collaboration with European scientists help in India's nuclear power ambition?	7M	CO3	L1
(b)	Correct the following sentences (i) As we were working hard, the time speed away (ii) As it got colder, my fingers go numb (iii) He sold his car because it is old (iv) I'm sure you will have a enjoyable day (v) Wisdom of Vedas has come through revelation (vi) Kalidas is rightly called Shakespeare of India (vii) Will you give me few apples from your basket.	7M	CO4	L2
7(a)	What led Bose to believe more in the underlying unity in the natural world between living and non-living?	7M	CO3	L1
(b)	Write the 'Antonyms for the following words: (i) Ignorance (ii) Vengeance (iii) Awkward (iv) Abundant (v) Surplus (vi) Ridiculous (vii) Sorrow.	7M	CO4	L2
	(OR)			
8(a)	When and why was Bose invited to Paris? What Swami Vivekananda's praise words?	7M	CO3	L1
(b)	Write a dialogue/conversation between a teacher and student on the significance of higher studies.	7M	CO4	L2
9(a)	How did Ray spend his time after his return from England and before he could get a job in India?	7M	CO3	L1
(b)	Complete the analogous pair: (i) Odometer: Mileage : : Compass:_____ (ii) Marathon: race : : Hibernation: _____ (iii) Optimist: Cheerful; Pessimist:_____ (iv) Pen: poet : : Needle:_____ (v) Embarrassed: Humiliated : : Frightened:_____ (vi) Artist: painting : : Senator:_____ (vii) Thermometer: Temperature : : Seismograph: _____	7M	CO4	L2
	(OR)			
10(a)	Explain how Ray helped his fellow people during the infamous famine of Bengal in 1922.	7M	CO5	L2
(b)	Imagine you recently completed your engineering and are seeking for the position of a software developer in a reputed firm. Write to the Managing Director of the firm a resume with covering letter.	7M	CO5	L3

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29 SEP 2021

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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B.Tech. (II Semester) Regular Examinations

20FE04-LINEAR ALGEBRA AND TRANSFORMATION TECHNIQUES
(Common to All)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Reduce the matrix A = $\begin{bmatrix} -1 & -3 & 3 & -1 \\ 1 & 1 & -1 & 0 \\ 2 & -5 & 2 & -3 \\ -1 & 1 & 0 & 1 \end{bmatrix}$ to Echelon form and find its rank.	7M	CO1	L3
(b)	Test whether the following system of equations are consistent or not. If so, solve them completely $x + y + 2z = 4$, $2x - y + 3z = 9$, $3x - y - z = 2$.	7M	CO1	L3
	(OR)			
2(a)	Converting the matrix A = $\begin{bmatrix} 1 & 2 & 1 & 2 \\ 1 & 3 & 2 & 2 \\ 2 & 4 & 3 & 4 \\ 3 & 7 & 5 & 6 \end{bmatrix}$ into Normal form, find its rank.	7M	CO1	L3
(b)	Solve the homogeneous system $x+3y-2z = 0$; $2x-y+4z = 0$ and $x-11y+14z = 0$.	7M	CO1	L3
3(a)	Verify that the sum of eigen values is equal to trace of A for the matrix A = $\begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ and hence find the corresponding eigen vectors.	7M	CO2	L3
(b)	If λ is an Eigen value of a non-singular matrix A, then show that $\frac{1}{\lambda}$ is an Eigen value of the matrix A^{-1}.	7M	CO2	L3
	(OR)			
4.	State Cayley -Hamilton theorem and verify it for the matrix A = $\begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$ and hence find A^{-1}.	14M	CO2	L3
5(a)	State first shifting theorem and apply it to find $L\{e^{2t}sin2tcos3t\}$.	7M	CO3	L3

(b)	Find the Laplace transform of $te^{-t}cost.$	7M	CO3	L3
	(OR)			
6(a)	Calculate $L\{e^{2t}(t^3+t^2+t+2)\}$.	7M	CO3	L3
(b)	Evaluate the integral $\int_0^{\infty}\frac{\sin t}{t}\,dt$ using Laplace Transform.	7M	CO3	L3
7(a)	Derive inverse Laplace transform of $\frac{3s+2}{s^2-s-2}$ by converting it into partial fractions.	7M	CO4	L3
(b)	Using convolution theorem evaluate $L^{-1}\left[\frac{1}{(s^2+1)(s^2+4)}\right]$.	7M	CO4	L3
	(OR)			
8(a)	Evaluate the inverse Laplace transform of $\frac{1}{s(s^2+a^2)}$.	7M	CO4	L3
(b)	By applying Laplace Transforms, solve $\frac{d^2y}{dt^2}-4\frac{dy}{dt}-12y=e^{3t}$, given that $y(0)=1,\ y'(0)=-2$.	7M	CO4	L3
9(a)	Calculate $Z\{\cos n\theta\}$ and applying damping rule find $Z\{a^{-n}\cos n\theta\}$.	7M	CO5	L3
(b)	Find the inverse Z-transform of $\frac{2z}{(z-1)(z+1)}$.	7M	CO5	L3
	(OR)			
10(a)	If $U(z)=\frac{2z^2+5z+14}{(z-1)^4}$, find the values of u_2 and u_3.	7M	CO5	L3
(b)	Using Z - Transform solve the difference equation $u_{n+2}-5u_{n+1}+6u_n=5^n, u_0=u_1=0$.	7M	CO5	L3

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8 OCT 2021

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B.Tech. (II Semester) Regular Examinations

20MC01-CONSTITUTION OF INDIA
(Common to All)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Mention the salient features of Indian Constitution.	7M	CO1	L1
(b)	Outline the idea of Socialism and Secularism.	7M	CO1	L2
	(OR)			
2(a)	Discuss about right to freedom of religion in Constitution of India.	7M	CO1	L2
(b)	Restate the fundamental duties of Indian citizens.	7M	CO1	L2
3(a)	Summarize the powers and functioning of Prime Minister in central government.	7M	CO2	L2
(b)	Draw the schematic representation in hierarchy of courts in India.	7M	CO2	L2
	(OR)			
4(a)	Describe the structure of the Indian union government.	7M	CO2	L2
(b)	Outline the executive and judicial powers of Indian President.	7M	CO2	L1
5(a)	Describe the structure of the state government.	7M	CO3	L2
(b)	Mention about Legislative Council and Legislative Assembly in state.	7M	CO3	L1
	(OR)			
6(a)	Summarize the roles and responsibilities of the state governments.	7M	CO3	L2
(b)	Describe the role of the Governor in state government.	7M	CO3	L2
7(a)	Write about the importance of local government in contemporary society.	7M	CO4	L2
(b)	Interpret the affairs of local government to reach the needs of citizens.	7M	CO4	L2
	(OR)			
8(a)	Classify the functioning categories of municipal corporations.	7M	CO4	L2
(b)	Illustrate the Panchayati Raj system of local self-government.	7M	CO4	L2
9(a)	Summarize the establishment of commission for scheduled castes and scheduled tribes.	7M	CO5	L2
(b)	Describe the functions of national commission for schedule caste.	7M	CO5	L2
	(OR)			
10(a)	Illustrate the administrative structure of election commission of India.	7M	CO5	L2
(b)	What are the administrative powers of election commission?	7M	CO5	L1

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1 OCT 2021

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B.Tech. (II Semester) Regular Examinations

20FE07-APPLIED PHYSICS

(AI&DS and IT)

Time : 3 hours Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	What is interference? Derive the conditions for bright and dark interference fringes in a thin film by reflection of light.	7M	CO1	L3
(b)	In a Newton's ring set up, diameter of 20th dark ring is found to be 7.25mm. The space between spherical surface and the flat slab is then filled with water (μ= 1.33). Calculate the diameter of the 16th dark ring in new set up.	7M	CO1	L3
	(OR)			
2(a)	Illustrate Fraunhofer single slit diffraction and derive conditions for principle maxima, secondary maxima and minima.	7M	CO1	L2
(b)	What is diffraction grating? How many lines per cm are there in a grating which gives an angle of diffraction of 30° in first order spectrum of light of wavelength 6 X 10^{-5} cm?	7M	CO1	L3
3(a)	With neat diagram explain the concept of stimulated absorption, spontaneous emission and stimulated emission and population inversion in LASERs.	7M	CO2	L1
(b)	Demonstrate working and construction of ***Nd: YAG*** LASRS with neat diagrams and necessary energy level diagrams.	7M	CO2	L2
	(OR)			
4(a)	What is the principle of Optical fibre and explain it? Describe the construction of Optical fibre.	7M	CO2	L1
(b)	Derive the expressions for the numerical aperture and acceptance angle of optical fibre.	7M	CO2	L3
5(a)	State the properties of matter waves. Describe the Davisson and Germer experiment and what conclusions were drawn from the experiment.	7M	CO3	L2
(b)	Show that the energies of a particle in a potential box are quantized.	7M	CO3	L3
	(OR)			
6(a)	Write the merits and demerits of classical free electron theory.	7M	CO3	L1
(b)	What is Fermi-Dirac distribution function? Explain the temperature dependence of Fermi-Dirac distribution function with neat diagram.	7M	CO3	L2
7(a)	Derive the equations for drift current and diffusion current in a semiconductor.	7M	CO4	L3
(b)	The electron and hole mobilities of Si sample are 0.135 and 0.048 m^2/Vs respectively. Determine the conductivity of intrinsic Si at 300 K. The sample is then doped with 10^{23} phosphorus atom/m^3. Determine the equilibrium hole concentration and conductivity. Given n_i = 1.5 X $10^{16} m^{-3}$.	7M	CO4	L3
	(OR)			
8(a)	Explain the conductivity of intrinsic semiconductor with relevant expressions.	7M	CO4	L2
(b)	State Hall effect with a neat diagram and derive the expression for Hall coefficient.	7M	CO4	L3
9(a)	Classify the Diamagnetic, paramagnetic and ferromagnetic material.	7M	CO5	L1
(b)	Distinguish soft and hard magnetic materials with 5 applications each.	7M	CO5	L2
	(OR)			
10(a)	What is polarization and list the type of polarization? Explicate the phenomenon of electrical polarization.	7M	CO5	L2
(b)	The relative permittivity of sulphur is 4. Calculate its electronic polarisability. Given that cubic suphur has a density of 2.08 x 10^3 kg/m^3 and its atomic weight is 32.	7M	CO5	L3

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4 OCT 2021

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (II Semester) Regular Examinations

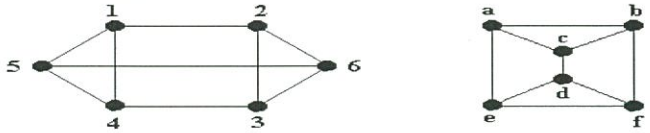
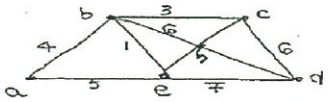
20CS04-DISCRETE MATHEMATICAL STRUCTURES

(AI&DS)

Time : 3 hours Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Show that $\neg(P\wedge Q)\rightarrow(\neg P\vee(\neg P\vee Q))\Leftrightarrow(\neg P\vee Q)$ (using laws).	7M	CO1	L3
(b)	Construct the principal disjunctive normal form for the compound proposition $(P\wedge Q)\ V(\neg P\wedge R)\ V\ (\neg P\ V\neg Q)$.	7M	CO1	L3
	(OR)			
2(a)	Show that compound propositions are logically equivalent $(P\rightarrow Q)\ \Lambda[\neg Q\ \Lambda\ (R\ V\ \neg Q)]\Leftrightarrow\neg(Q\ V\ P)$.	7M	CO1	L3
(b)	Show that RVS is logically valid from the following premises. $C\vee D$, $(C\vee D)\rightarrow\neg H$, $\neg H\rightarrow(A\wedge\neg B)$ and $(A\wedge\neg B)\rightarrow R\vee S$.	7M	CO1	L3
3(a)	Solve the following (i) A^1 (ii) $A^1\ U\ B^1$ (iii) $(A\cap B)^1$ (iv) $A\Delta B$. The given sets are $U=\{1,2,3,4,5,6,7,8,9\}$, $A=\{1,2,4,6,8\}$ and $B=\{2,4,5,9\}$.	7M	CO2	L3
(b)	Consider the functions f and g defined by $\mathbf{f(x)=x^2}$ and $\mathbf{g(x)=x^3+1}$, for all $x\in R$. Identify g o f, f o g, f^2 and g^2.	7M	CO2	L3
	(OR)			
4(a)	The Set A= {1, 2, 3, 4}, let R and S be the relations on A defined by R= {(1,2) (1,3) (2,4),(4,4)} and S= {(1,1),(1,2),(1,3),(2,3),(2,4)}. Find: (i) ROS (ii) SOR (iii) R-S(iv)S-R	7M	CO2	L3
(b)	Given set A={1,2,3,4} and R={(1,1),(1,2),(2,2),(2,4),(1,3),(3,3),(3,4),(1,4),(4,4)}. Show that R is a partial order on A and also Construct the Hasse diagram for R.	7M	CO2	L3
5(a)	Define complete bipartite graph. Draw the complete bipartite graph $K_{2,3}$.	7M	CO3	L2
(b)	Show that the following graphs are Isomorphic. 	7M	CO3	L3
	(OR)			
6(a)	Using Prim's algorithm find a minimal spanning tree for the weighted graph given below: 	7M	CO3	L4
(b)	Illustrate the following terms with an example. (i) Graph coloring (ii) Chromatic Number.	7M	CO3	L2
7(a)	Show that set of all non zero real numbers is a group with respect to multiplication.	7M	CO4	L3
(b)	In a group (G, *) , Prove that $(a * b)^{-1} = b^{-1} * a^{-1}$ for all $a,b\in G$.	7M	CO4	L3
	(OR)			
8(a)	Determine the number of distinguishable permutations of the letters in the words: (i) STRUCTURES (ii) ENGINEERING.	7M	CO4	L3
(b)	List the number of integers 1 and 250 which are divisible by 2 or 3or 5.	7M	CO4	L3
9(a)	Solve the Recurrence Relation $\mathbf{a_n+4a_{n-1}+4a_{n-2}=8}$ for $n\geq2$, with $a_0=1$, $a_1=2$.	7M	CO5	L3
(b)	A sequence is defined by the recurrence relation $\mathbf{a_{n+1}=-3a_n+7}$ with $a_0=2$. Choose the value of a_2.	7M	CO5	L3
	(OR)			
10(a)	Construct the generating function for the following sequences: (i) 1,1,0,1,1,1,..... (ii) 1,-2,3,-4,....	7M	CO5	L3
(b)	Solve the Recurrence Relation $\mathbf{a_n=3a_{n-1}-2a_{n-2}}$ for $n\geq2$ with $a_1=5$, $a_2=3$.	7M	CO5	L3

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H.T.No										

6 OCT 2021

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B.Tech. (II Semester) Regular Examinations

20CS03-DATA STRUCTURES
(AI&DS, CSE and IT)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Write an algorithm with Linear time complexity.	7M	CO1	L2
(b)	Write an algorithm with Linear space complexity.	7M	CO1	L2
	(OR)			
2.	Explain the need for Linked List over Array and discuss its advantages and disadvantages over array.	14M	CO1	L2
3.	Illustrate the various operations on DEQUE with an example for each.	14M	CO2	L2
	(OR)			
4.	Illustrate the Infix to Postfix conversion using Stack with an example.	14M	CO2	L3
5.	Explain Bubble Sort and Insertion Sort with an example for each.	14M	CO3	L2
	(OR)			
6.	Explain Quick Sort with an example.	14M	CO3	L2
7.	Explain the various Tree traversal techniques with an example for each.	14M	CO4	L2
	(OR)			
8.	Explain the various cases of Insert operation in an AVL Tree with an example for each.	14M	CO4	L2
9.	Explain the Graph data structure and describe the various representations of Graph with an example for each.	14M	CO5	L2
	(OR)			
10.	State the applications of Depth First Search and Breadth First Search.	14M	CO5	L2

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H.T.No.										

1 OCT 2021

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B.Tech. (II Semester) Regular Examinations

20FE08-ENGINEERING PHYSICS
(ASE,CE&ME)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1.	What are the different types of elastic modulii? Derive the necessary mathematical relations for them.	14M	CO1	L1
	(OR)			
2(a)	State and explain the Hooke's law of elasticity. What are various factors affecting elasticity of a material?	7M	CO1	L1
(b)	A copper wire, 2 cm long and 6.25 x 10^{-5} m^2 in cross-section, is found to stretch 3 x 10-3 m under a tension of 1x10^3 N. What is the Young's modulus of the material of the wire?	7M	CO1	L3
3(a)	Summarize the working principle of laser.	7M	CO2	L1
(b)	Demonstrate the construction and working of He-Ne gas laser.	7M	CO2	L2
	(OR)			
4(a)	The refractive indices of light guiding core and cladding of an optical fiber are 1.556 and 1.548. Compute the acceptance angle and numerical aperture of the optical fiber.	7M	CO2	L3
(b)	Classify the optical fibers basing on the refractive index profile and modes of propagation.	7M	CO2	L2
5.	Derive the Sabine's formula for reverberation time.	14M	CO3	L3
	(OR)			
6(a)	What are Ultrasonic waves? What are the possible applications of Ultrasonic waves?	7M	CO3	L1
(b)	Outline the production of ultrasonic waves by magneto-striction method.	7M	CO3	L2
7(a)	Distinguish dia, para, and ferro magnetic materials.	7M	CO4	L4
(b)	Describe the occurrence of hysteresis curve in Ferro magnetism.	7M	CO4	L2
	(OR)			
8(a)	Applying the expression for internal electrical field, derive the Clausius-Mosotti relation.	7M	CO4	L3
(b)	Explain about the electronic polarization in dielectric materials.	7M	CO4	L2
9(a)	Summarize the important features and uses of superconductivity.	7M	CO5	L2
(b)	What is Meissner effect? Show that superconductors exhibit perfect diamagnetism.	7M	CO5	L1
	(OR)			
10(a)	Illustrate with a neat sketch how the nanoparticles are prepared employing the bottom-up methods, namely, Sol-Gel and Chemical Vapour Deposition.	7M	CO5	L2
(b)	Enumerate the possible applications of nanoparticles.	7M	CO5	L2

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H.T.No. | | | | | | | | | | |

4 OCT 2021

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (II Semester) Regular Examinations

20CS01-PROGRAMMING FOR PROBLEM SOLVING USING C

(ASE,CE,ECE,EEE&ME)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Define Algorithm. Write algorithm to print grade of student for given marks. (assume suitable conditions).	7M	CO1	L2
(b)	What is a data type? Explain about various data types in detail with suitable examples.	7M	CO1	L1
	(OR)			
2(a)	Construct C program to read a character and print name of colour by using switch-case construct.	7M	CO1	L3
(b)	Write a C program to print roots of Quadratic equation.	7M	CO1	L3
3(a)	Demonstrate C program to perform addition of two matrices.	7M	CO2	L3
(b)	Write C program to sort the elements of an integer array.	7M	CO2	L3
	(OR)			
4(a)	List and explain any five string handling functions with example statements.	7M	CO2	L1
(b)	How do we create Two-dimensional array and access the elements? Give example.	7M	CO2	L2
5(a)	Develop a C program to find the factorial of a given number using recursion.	7M	CO3	L3
(b)	Write a C program to swap two numbers using functions that use call by reference method for parameters.	7M	CO3	L3
	(OR)			
6(a)	Describe command line arguments with example program.	7M	CO3	L2
(b)	Explain about static and extern storage classes in C.	7M	CO3	L2
7(a)	How structure and union are declared and initialized?	7M	CO4	L1
(b)	Construct a C program to create a structure for student with fields (Rollno, Name, CGPA). Read one student data and display it.	7M	CO4	L3
	(OR)			
8(a)	Discuss about array of structures with example.	7M	CO4	L2
(b)	Demonstrate C program to implement self referential structure.	7M	CO4	L3
9(a)	What are the file I/O functions in C?	7M	CO5	L1
(b)	Develop a C program to read data from console, write it to a file and read data from file and display on monitor.	7M	CO5	L3
	(OR)			
10(a)	Construct a C program to copy contents of one file to another file.	7M	CO5	L3
(b)	Distinguish between Text mode and Binary mode operations of files.	7M	CO5	L2

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.
B.Tech. (II Semester) Regular Examinations

20AE01-ELEMENTS OF AEROSPACE ENGINEERING
(ASE)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	How are aeroplanes classified based on configurations?	7M	CO1	L1
(b)	Explain why biplanes were replaced by monoplane aircrafts.	7M	CO1	L2
	(OR)			
2(a)	Explain the temperature variation with altitude of standard atmosphere and classify the atmospheric layers.	7M	CO1	L2
(b)	Derive the hydrostatic equation with the help of neat sketch in detail.	7M	CO1	L3
3.	Describe in detail about the different types of drag that are induced on an airfoil. List out the advantages and disadvantages of winglets.	14M	CO2	L2
	(OR)			
4(a)	Discuss the effect of Reynolds number on lift and drag curves. Explain with neat sketches.	7M	CO2	L2
(b)	(i) Define Aerodynamic center (ii) Differentiate between Anhedral and Dihedral angle.	7M	CO2	L2
5(a)	Discuss the principle of operation of a turbo prop engine. Elaborate the advantages of turboprop engine.	7M	CO3	L2
(b)	Discuss the effect of altitude on the thrust of a jet engine. Draw a schematic sketch of a supersonic inlet of a turbojet engine and discuss.	7M	CO3	L2
	(OR)			
6(a)	What are the differences between Turboprop and turbo fan engines with diagrams?	7M	CO3	L1
(b)	Discuss about the liquid rocket engine with a neat sketch.	7M	CO3	L2
7.	Explain with neat sketch the components of an airplane and their functions.	14M	CO1	L2
	(OR)			
8(a)	Mention the applications of metallic alloys for aircraft composite.	7M	CO1	L1
(b)	Explain the difference in construction of monocoque and semi monocoque fuselage construction with help of diagrams.	7M	CO1	L2
9.	Discuss the environmental considerations which govern the design of the Spacecraft. How are these different from that of Aircraft?	14M	CO4	L2
	(OR)			
10(a)	Explain in detail about the concept of space mission objectives.	7M	CO4	L2
(b)	State Kepler's laws.	7M	CO4	L1

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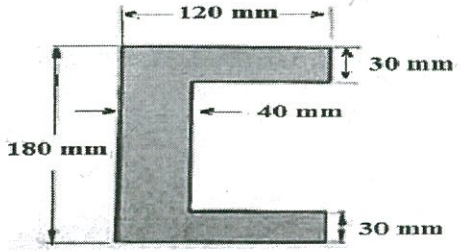
10(a)	Find the moment of inertia of the channel section shown in figure 	7M	CO5	L3
(b)	Find the mass moment of inertia of a solid sphere of radius 'r' with respect to a diameter.	7M	CO5	L3

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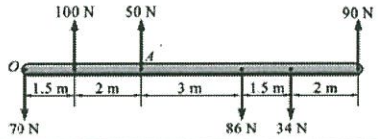
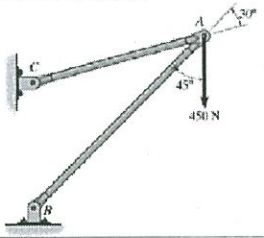
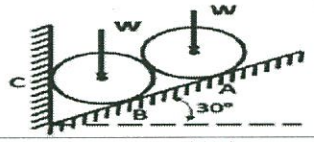
LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

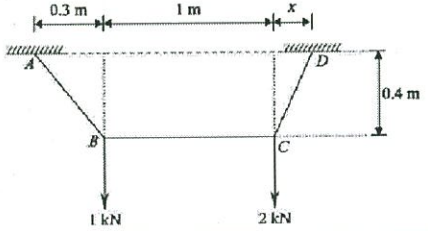
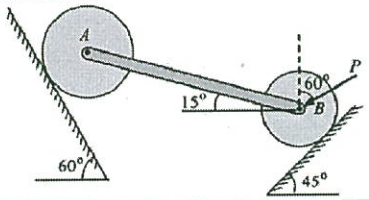
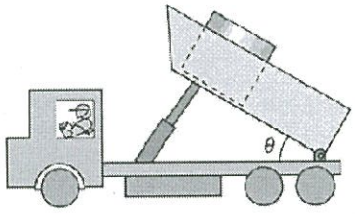
B.Tech. (II Semester) Regular Examinations

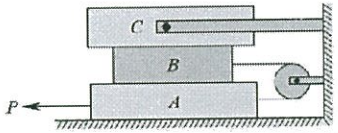
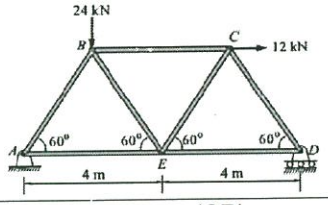
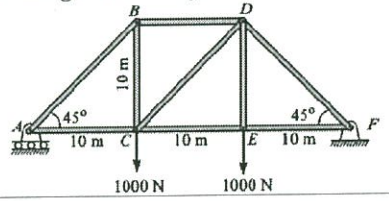
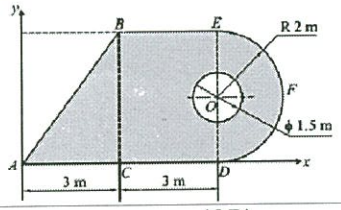
20CE03-APPLIED MECHANICS
(CE)

Time : 3 hours Max. Marks :70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Find the resultant of following force system and also find the equivalent force and couple at point A of the force system shown in Figure. 	7M	CO1	L3
(b)	The force F = 450 N acts on the frame. Determine the magnitude of force components acting along members AB and AC, and of each component. 	7M	CO1	L3
	(OR)			
2(a)	State and prove the Parallelogram law of forces.	7M	CO1	L2
(b)	The following forces act at a point: (i) 20 N inclined at 30° towards North of East, (ii) 25 N towards North, (iii) 30 N towards North West, and (iv) 35 N inclined at 40° towards South of West. Find the magnitude and direction of the resultant force.	7M	CO1	L3
3(a)	Define equilibrant. Describe the types of equilibrium.	7M	CO2	L2
(b)	Two identical rollers each of weight Q = 445 N are supported by an inclined plane and a vertical wall as shown in the figure. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C. 	7M	CO2	L3
	(OR)			

4(a)	A cable ABCD supports two loads 1 kN and 2 kN at points B and C respectively like shown in figure. Determine the tension in each portion of the cable if the portion BC remains horizontal. Also, determine the distance x for which equilibrium can be maintained. 	7M	CO2	L3
(b)	Two cylinders, having weight W_A = 2000 N and W_B = 1000 N are resting on smooth inclined planes having inclination 60° and 45° with the horizontal respectively, as shown in Figure. They are connected by a weightless bar AB with hinge connections. The bar AB makes 15° with the horizontal. Find the magnitude of the force P required to hold the system in equilibrium. 	7M	CO2	L3
5(a)	Define angle of friction, angle of repose and cone of friction.	7M	CO3	L1
(b)	The driver of a truck decides to unload a heavy box of 800 kg mass by tilting the rear bed as shown in Figure. Determine what should be the minimum angle θ of the inclination at which the box begins to slide. The coefficient of friction between the box and the base is 0.35. Also, determine the force acting on it causing it to slide. 	7M	CO3	L3
	(OR)			

6.	Block B of 75 kg mass is placed over a block A of 100 kg mass resting on a rough horizontal plane as shown in Figure. The two blocks are connected by a string. A third block C of 50 kg mass is placed over the block B and it is hinged by a horizontal rod. Determine the horizontal force P required to pull the block A to the left, taking coefficient of static friction for all contact surfaces to be 0.25. 	14M	CO3	L3
7.	Determine the forces in the members of the truss as shown in Figure. 	14M	CO4	L3
	(OR)			
8.	A simple plane truss is shown in Figure. Two 1000 N loads are shown acting on pins C and E. Determine the force in all the members using method of joints. 	14M	CO4	L2
9.	Three plates ABC and BCDE and DEF are welded together as shown in Figure. Circle of diameter 1.5 m is cut from the composite plate. Determine the centroid of the remaining area. 	14M	CO5	L3
	(OR)			

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

B.Tech. (II Semester) Regular Examinations

20FE06-ENGINEERING CHEMISTRY
(CSE&ECE)

Time : 3 hours Max. Marks :70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	How a fuel cell is constructed? Explain working mechanism of it.	7M	CO1	L2
(b)	Describe the construction and working of lead-acid battery.	7M	CO1	L2
	(OR)			
2(a)	Calculate the concentration of Cd^{+2} ions in the given electro chemical cell. Zn/Zn^{+2} (0.1M) // Cd^{+2} (M1)/Cd Given $E^0_{Zn^{+2}/Zn}$ = - 0.76 V; $E^0_{Cd^{+2}/Cd}$ = - 0.40 V; E_{cell} = 0.3305 V	7M	CO1	L3
(b)	List out the applications of electrochemical series.	7M	CO1	L2
3(a)	How does dry corrosion occur? Explain oxidative corrosion.	7M	CO2	L2
(b)	When does concentration cell corrosion occur? Explain corrosion of metal rod partially immersed in water.	7M	CO2	L2
	(OR)			
4(a)	State the principle of cathodic protection. How the sacrificial anodic protection controls corrosion?	7M	CO2	L2
(b)	Explain effect of environment on rate of corrosion.	7M	CO2	L2
5(a)	Describe gas phase synthesis for the preparation of nano-materials.	7M	CO3	L2
(b)	How catenanes and rotaxanes are characterized? Give their structural aspects.	7M	CO3	L2
	(OR)			
6(a)	Outline the materials used in making CPU and PCBs.	7M	CO3	L1
(b)	List out the applications of nanomaterials.	7M	CO3	L1
7(a)	How to prepare PMMA? Outline the applications based on its properties.	7M	CO4	L2
(b)	Illustrate addition and condensation polymerizations.	7M	CO4	L1
	(OR)			
8(a)	How to identify liquid crystalline state? What are the structural aspects to form liquid crystal state?	7M	CO4	L2
(b)	List out the applications of liquid crystals.	7M	CO4	L2
9(a)	Describe conductometric titration of weak acid and strong base.	7M	CO5	L2
(b)	State the principle of colorimetry. Explain determination of ferric ion using KCNS by colorimetry.	7M	CO5	L2
	(OR)			
10(a)	Write the principle of potentiometry. How to estimate the end point of the titration of strong acid vs strong base using potentiometry.	7M	CO5	L2
(b)	Describe conductometric titration of HCl vs NaOH.	7M	CO5	L2

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (II Semester) Regular Examinations

20CS05-PYTHON PROGRAMMING

(CSE&IT)

Time : 3 hours Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	List the salient features of python programming language.	7M	CO1	L1
(b)	What are the different iterative control statements supports in python. Explain any 3 with a suitable example program and flow chart.	7M	CO1	L2
	(OR)			
2(a)	Define the following with the necessary examples. (i) if statement (ii) if-else-if statement (iii) nested –if statement.	7M	CO1	L2
(b)	List out with the syntax of various unconditional statements used in Python programming.	7M	CO1	L1
3(a)	For a given list num=[45,22,14,65,97,72], write a python program to replace all the integers divisible by 3 with "ppp" and all integers divisible by 5 with "qqq" and replace all the integers divisible by both 3 and 5 with "pppqqq" and display the output.	7M	CO2	L3
(b)	Write code snippets in Python to perform the accessing elements of a tuple, modifying elements of a tuple, and deleting elements of a tuple.	7M	CO2	L1
	(OR)			
4(a)	Compare and contrast the difference between List and Set with example programs.	7M	CO2	L2
(b)	Discuss Length of string Indexing in strings counting substrings of a string.	7M	CO2	L2
5(a)	Write a python program to create a function called collatz() which reads as parameter named number. If the number is even it should print and return number//2 and if the number is odd then it should print and return 3*number+1. The function should keep calling on that number until the function returns a value 1.	7M	CO3	L3
(b)	What are the different methods supports in python List. Illustrate all the methods with an example.	7M	CO3	L2
	(OR)			
6(a)	With necessary examples briefly explain how to define a function and call a function.	7M	CO3	L2
(b)	Describe the role of Python interpreter in functions. Explain possible ways of passing arguments to a function.	7M	CO3	L2
7(a)	Interpret python program that uses date time module within a class, takes a birthday as input and prints the age and the number of days, hours, minutes and second.	7M	CO4	L2
(b)	What are the key properties of a file? Explain in detail file reading/ writing process wit an example of python program.	7M	CO4	L1
	(OR)			
8(a)	List out what are the different Meta characters in regular expression symbol and its meaning.	7M	CO4	L1
(b)	Interpret python program to create a folder PYTHON and under the hierarchy 3 files file1,file2 and file3.write the content in file1 as "ABC" and in file2 as "UNIVERSITY" and file3 content should be by opening and merge of file1 and file2. Check out the necessary condition before write file3.	7M	CO4	L3
9(a)	Illustrate the use of creating a class, constructor, the self variable with the necessary examples.	7M	CO5	L3
(b)	List and explain various object oriented programming concepts available in Python programming.	7M	CO5	L2
	(OR)			
10(a)	Explain init method with an example python program.	7M	CO5	L3
(b)	Define polymorphism. Demonstrate polymorphism with suitable example.	7M	CO5	L3

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (II Semester) Regular Examinations

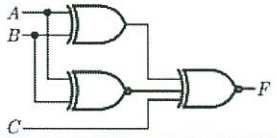
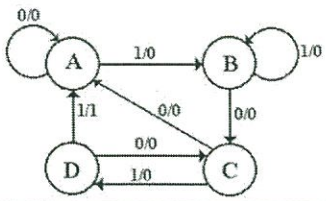
20EC02-DIGITAL LOGIC CIRCUITS

(ECE)

Time : 3 hours Max. Marks : 70

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Solve the following to Decimal and then to Octal (i) $(4234)_{16}$ (ii) $(10010011)_2$.	7M	CO1	L3
(b)	Solve Hexadecimal equivalent of given decimal number $(615.25)_{10}$	7M	CO1	L3
	(OR)			
2(a)	Convert the given binary 111101 to Gray code and to binary.	7M	CO1	L3
(b)	Perform BCD operation on the given Decimal numbers 393 + 225.	7M	CO1	L3
3(a)	What are the Universal gates, and prove with two examples?	7M	CO2	L2
(b)	Make use of K-map to get minimal SoP expression for the Boolean function F= ∑m (0,5,7,8,9,10,11,14,15).	7M	CO3	L3
	(OR)			
4(a)	Convert the given expression into its standard form (i) F(A,B,C) = AB'+BC+CA' (ii) $F(X,Y,Z) = (X+\overline{Z})\ (\overline{X}+Y)$	7M	CO2	L3
(b)	Minimize the following Boolean function using K-map F = πM(0,3,4,7,8,10,12,14)+d(2,6).	7M	CO3	L3
5(a)	Develop the function F = ∑m(1,3,4,11,12,13,14,15) using Multiplexer.	7M	CO3	L3
(b)	Interpret the Boolean expression for F. 	7M	CO2	L2
	(OR)			
6(a)	Summarize the operation of 4 bit Ripple carry Adder with a diagram.	7M	CO2	L2
(b)	Compare Combinational and Sequential logic circuits.	7M	CO2	L2
7(a)	Derive the characteristic equation for SR flip-flop, T flip-flop from characteristics tables.	7M	CO3	L2
(b)	Model a Mod-8 synchronous up counter using J-K flip flops.	7M	CO4	L3
	(OR)			
8(a)	Compare Characteristic and Excitation table.	7M	CO2	L2
(b)	Apply knowledge of Excitation table to get JK Flip flop from SR flip-flop.	7M	CO3	L3
9(a)	Utilize the given state table and obtain the state diagram **PS / NS,Z:** A: X=0 F,0 X=1 B,1; B: G,0 A,1; C: B,0 C,1; D: C,0 B,1; E: D,0 A,1; F: E,1 F,1; G: E,1 G,1	7M	CO3	L3
(b)	What are the building blocks of ASM chart? and describe its role.	7M	CO2	L2
	(OR)			
10(a)	Apply the knowledge of state transition to get State table, ASM chart for the given State diagram 	7M	CO3	L3
(b)	Analyze the State diagram and ASM chart for rising edge enabled D flip flop.	7M	CO4	L4

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (II Semester) Regular Examinations

20FE05-APPLIED CHEMISTRY
(EEE)

Time : 3 hours Max. Marks : 70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Describe boiler corrosion with priming and foaming.	7M	CO1	L1
(b)	Calculate the temporary and permanent hardness of water sample containing $Mg(HCO_3)_2$= 7.3mg/L, $Ca(HCO_3)_2$= 16.2mg/L, $MgCl_2$= 9.5mg/L, $CaSO_4$=13.6mg/L.	7M	CO1	L3
	(OR)			
2(a)	Summarize ion-exchange process with its advantages and disadvantages	7M	CO1	L2
(b)	Outline the water softening process. Explain desalination of brackish water.	7M	CO1	L2
3(a)	Define GCV and NCV of a fuel.	7M	CO2	L1
(b)	How to prepare petrol using Fischer Tropsch's process.	7M	CO2	L2
	(OR)			
4(a)	What is photo-voltaic cell? Explain its advantages and disadvantages.	7M	CO2	L2
(b)	Classify the fuels with its merits and demerits.	7M	CO2	L1
5(a)	Describe the types of electrodes. Give details of calomel electrode.	7M	CO3	L1
(b)	What is electrochemical series? Illustrate its importance in electrochemistry.	7M	CO3	L1
	(OR)			
6(a)	Discuss the anodic and cathodic equation of lead acid storage battery during discharging process.	7M	CO3	L2
(b)	Describe the construction and working of fuel cell with its advantages.	7M	CO3	L2
7(a)	Define corrosion. What are the consequences of corrosion?	7M	CO4	L1
(b)	What is Pilling bedworth rule?	7M	CO4	L1
	(OR)			
8(a)	Discuss the factors influencing corrosion.	7M	CO4	L2
(b)	Define electroplating and metal cladding.	7M	CO4	L1
9(a)	Describe the characteristics of good lubricants.	7M	CO5	L1
(b)	Summarize the synthesis of nanomaterials by Gas-Phase method.	7M	CO5	L2
	(OR)			
10(a)	Outline the important characteristics of composites.	7M	CO5	L2
(b)	Differentiate thermoplasts and thermosets.	7M	CO5	L2

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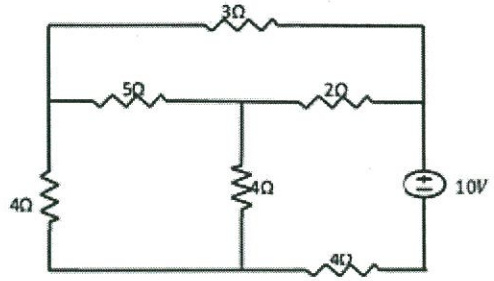
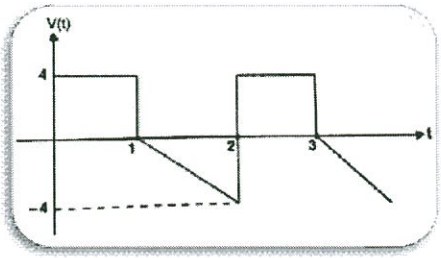
LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

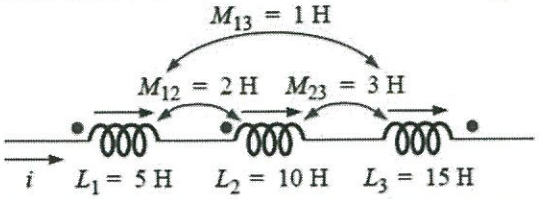
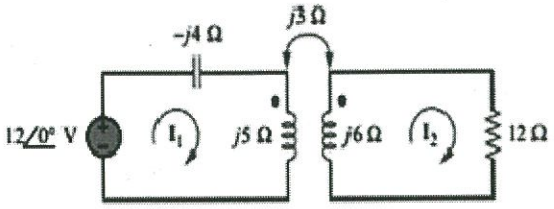
B.Tech. (II Semester) Regular Examinations

20EE04-FUNDAMENTALS OF ELECTRICAL ENGINEERING
(EEE)

Time : 3 hours Max. Marks :70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Differentiate between (i) Dependent and Independent Source (ii) Ideal and Practical Sources.	7M	CO1	L2
(b)	A DC circuit comprise of two resistors; resistor A of value 25ohm and resistor B of unknow value connected in parallel, together with a third resistor C of value 5 ohm connected in series with the parallel branch. Find the voltage to be applied across the whole circuit and value of the resistor B if the potential difference across C is 90V, and total power consumed is 4320W.	7M	CO1	L3
	(OR)			
2(a)	Discuss the method used to determine loop currents for multiple loop network with ideal current source between any two meshes.	7M	CO1	L2
(b)	Apply mesh analysis and calculate the current flowing through 3 ohms element for the network shown in figure. 	7M	CO1	L3
3(a)	Define the terms peak, peak to peak, average, RMS values, peak factor and form factor of sine wave.	7M	CO2	L1
(b)	Find the Average Value, RMS Value, form Factor and Peak Factor value of the waveform shown in figure below? 	7M	CO2	L3
	(OR)			
4(a)	Explain the concept of active, reactive, apparent power and draw power triangle.	7M	CO2	L2
(b)	In an ac circuit two parallel impedances are connected in series with Z1 across AB terminals, where AB terminals are fed by 150V 0 degrees. Compute total impedance, power factor, source current and voltage drop across Z2 Z1= (2 + j)ohms, Z2= (4 + 5j)ohms, Z3= (1 + 5j)ohms.	7M	CO2	L3

5(a)	Explain the concept of DOT convention and state right hand thumb rule for coupled coils.	7M	CO3	L2
(b)	Find the total inductance of series coil shown in figure below. 	7M	CO3	L3
	(OR)			
6(a)	Explain the clear difference between self-inductance and mutual inductance and write various expressions for self and mutual inductance?	7M	CO3	L2
(b)	Calculate the phasor currents I1 and I2 in the circuit of figure below. 	7M	CO3	L
7(a)	Explain the construction and working principle of repulsion type MI instrument.	7M	CO4	L2
(b)	A moving-coil instrument gives a full scale deflection. When the current is 40 mA and its resistance is 25. Calculate the value of the shunt to be connected in parallel with the meter to enable it to be used as an ammeter for measuring currents up to 50 A.	7M	CO4	L3
	(OR)			
8(a)	Explain the construction and working of PMMC instrument. Derive the equation for deflection if the instrument is spring controlled.	7M	CO4	L2
(b)	A PMMC instrument has a coil dimensions 15mm*12mm. the flux density in the air gap is 1.8 mWb/m*m and the spring constant 0.14micro N-m/rad. Identify the number of turns required to produce an angular deflection of 90degrees when a current of 5mA is flowing through the coil.	7M	CO4	L3
9(a)	Interpret the expression for bridge sensitivity for Wheatstone bridge with equal arms. Find also the expression for current through the galvanometer.	7M	CO5	L2
(b)	A Kelvin's double bridge is balanced with the following constants. Outer ratio = 100 ohms and 1000 ohms, Inner ratio arms = 99.92 ohms and 1000.6 ohms, resistance of link = 0.1 ohms, Standard resistance = 0.00377 ohms, calculate the value of unknown resistance.	7M	CO5	L3
	(OR)			
10(a)	What is Wein's bridge? Interpret the expression for frequency and draw the phasor diagram.	7M	CO5	L2
(b)	The four arms of the Maxwell's capacitance bridge at balances are: Arm ab: Unknown inductance L1 having inherent resistance R1, Arm bc : A non-inductive resistance of 1000 ohms,Arm cd : A capacitor of 0.05 uF in parallel with a resistance of 1000 ohms, Arm da : A resistance of 1000 ohms. Determine the values of R1 and L1. Draw the phasor diagram of the bridge.	7M	CO5	L3

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H.T.No										

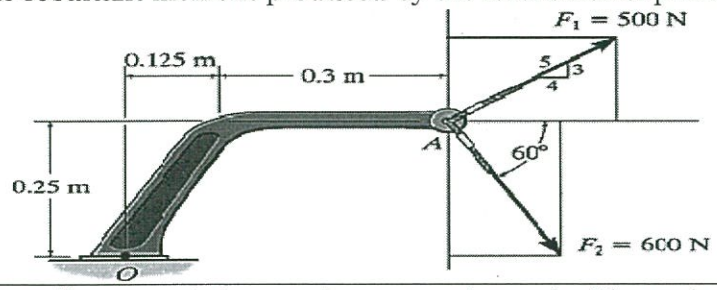
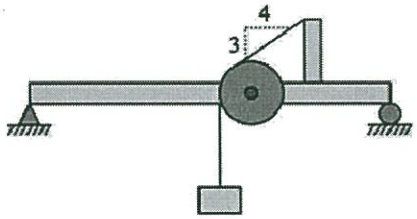
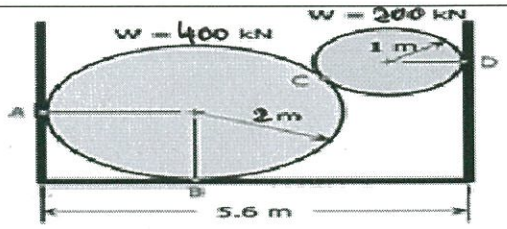
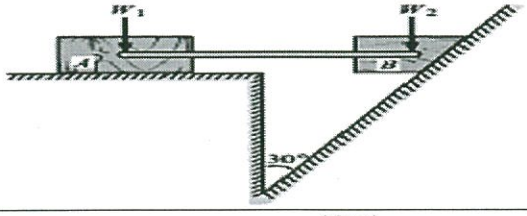
6 OCT 2021

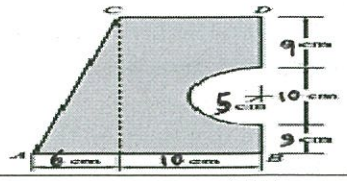
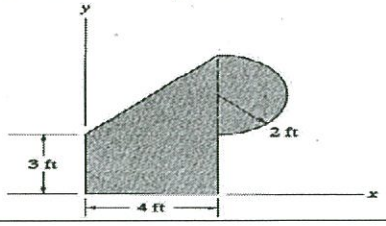
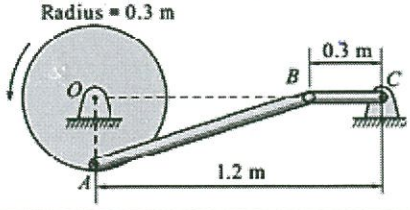
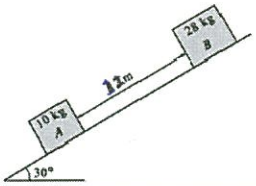
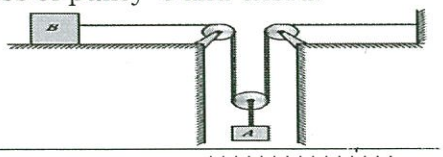
R20

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.
B.Tech. (II Semester) Regular Examinations
20ME02-ENGINEERING MECHANICS
(ME)

Time : 3 hours Max. Marks :70

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	Determine the resultant moment produced by the forces about point O. 	7M	CO1	L3
(b)	A frictionless pulley mounted on a beam as shown in Figure is subjected to forces: its own weight of 200 N and tensions of 500 N in the rope on either side. Replace the system of forces by an equivalent force. 	7M	CO1	L3
	(OR)			
2(a)	The resultant of forces P and Q acting at an angle 'θ' is equal to $(2n+1)\sqrt{P^2+Q^2}$ and when they act at angle (90-θ) the resultant is $(2n-1)\sqrt{P^2+Q^2}$. Show that $\tan\theta = \frac{(n-1)}{(n+1)}$.	7M	CO1	L3
(b)	By applying the conditions of equilibrium, evaluate the supporting reactions at all contact points of the system as shown in figure. 	7M	CO1	L3
3.	Two blocks W_1 and W_2 which are connected by a horizontal bar AB are supported on rough planes as shown in figure. The coefficient of friction for block A is 0.4 and the angle of friction for block B is 20°. Evaluate the smallest weight W_1 of the block A for which the equilibrium can exist, if W_2= 2250N. 	14M	CO2	L3
	(OR)			
4(a)	Define Friction and State the laws of friction.	7M	CO2	L1
(b)	Describe the following terms (i) Dynamic friction (ii) Coefficient of friction (iii) Angle of friction.	7M	CO2	L2

5.	A plane lamina is hung freely from point D in Figure. Locate the centroid of the following complex figure. 	14M	CO2	L3
	(OR)			
6(a)	Find the centroid of cone having base radius Rand height H. The cone is having axis of symmetry, so centroid must lie on the axis.	7M	CO3	L2
(b)	Identify the centroid coordinates of the plane area shown in figure. 	7M	CO3	L3
7(a)	A ball is thrown vertically upwards at 30 m/s from the top of a tower 100 m high. Five seconds later another ball is thrown upwards from the base of the tower along the same vertical line at 50 m/s. Find when and where both balls will meet and their instantaneous velocity then.	7M	CO4	
(b)	A motorist is travelling at 90kmph, when he observes a traffic light 250m ahead of him turns red. The traffic light is timed to stay red for 12sec. If the motorist wishes to pass the pass without stopping, just as it turns green. Evaluate (i) the required uniform deceleration of the motor and (ii) the speed of the motor as it passes the traffic light.	7M	CO4	L4
	(OR)			
8(a)	Two cars A and B start from rest from point O at the same instant and travel towards right along a straight road as shown in Figure. Car A moves with an acceleration of 4 m/s^2 and car B moves with an acceleration of 6 m/s^2. Find relative position, velocity and acceleration of car B w.r.t. car A 5 sec from the start.	7M	CO4	L3
(b)	In the device shown in Figure, Find the velocity of point B and angular velocity of both the rods. The wheel is rotating at 2 rad/s anticlockwise. 	7M	CO4	L3
9.	Two blocks A (mass 10 kg), B (mass 28 kg) are separated by 12 m, as shown in Figure. If the blocks start moving, find the time 't' when the blocks collide. Assume m = 0.25 for block A and plane and m = 0.10 for block B and plane. 	14M	CO5	L3
	(OR)			
10.	At a given instant the 50 N block A is moving downward with a speed of 1.8 m/s like shown in figure. Determine its speed 2s later. Block B has a weight 20 N, and the coefficient of kinetic friction between it and the horizontal plane is $\mu_k = 0.2$. Neglect the mass of pulley 's and chord. 	14M	CO5	L3

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