LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

A.Y. 2019-20 **B.Tech.(II Semester) (R14) Supplementary Examinations, November 2020** **Regulations: R14**
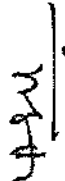
TIME TABLE

TIME : 02.00 PM to 5.00 PM

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
02-11-2020 (Monday)	S240 - English – II	S240 - English – II	S240 - English – II	S240 - English – II	S240 - English – II	S240 - English – II	S240 - English – II	S240 - English – II
03-11-2020 (Tuesday)	S133 - Applied Mathematics - II	S133 - Applied Mathematics - II	S133 - Applied Mathematics - II	S299 - Mathematics-II	S133 - Applied Mathematics - II	S133 - Applied Mathematics - II	S133 - Applied Mathematics - II	S133 - Applied Mathematics - II
04-11-2020 (Wednesday)	S238 - Engineering Physics	S238 - Engineering Physics	S238 - Engineering Physics	S232 - Engineering Chemistry	S232 - Engineering Chemistry	S232 - Engineering Chemistry	S238 - Engineering Physics	S238 - Engineering Physics
05-11-2020 (Thursday)	S145 - Basic Electronics Engineering	S150 - Building Materials and Construction	S178 - Data Structures	S212 - Electrical Circuits and Networks-II	S178 - Data Structures	S178 - Data Structures	S178 - Data Structures	S147 - Basic Mechanical Engineering
06-11-2020 (Friday)	S282 - Introduction to Engineering Mechanics	S135 - Applied Mechanics	S191 - Digital Logic Design	S224 - Electronic Devices and Circuits	S209 - Electrical Circuits – I	S224 - Electronic Devices and Circuits	S224 - Electronic Devices and Circuits	S237 - Engineering Mechanics

NOTE:
(i) Any omissions or clashes in this time table may please be informed to the Controller of Examinations immediately.
(ii) Even if government/JNTUK/College declares holiday on any of the above dates, the examinations shall be conducted as notified only.
(iii) For any clarification in respect of the above examinations, please contact the Controller of Examinations.

Date: 12-10-2020

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. All H.o.Ds for N.A.,
2. All Notice Boards

H.T.No [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]   R14

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

S133-APPLIED MATHEMATICS-II
(AE,CE,CSE,EEE,EIE,IT&ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Find $L\left[(\sin t - \cos t)^2\right]$	1M
(b)	If $f(x) = \|x\|$ in $(-\pi, \pi)$ then find the value of b_n.	1M
(c)	Define Fourier transform of $f(x)$	1M
(d)	What is $Z\{a^n\}$?	1M
(e)	Evaluate $\int_0^2 \int_0^3 y\,dy\,dx$.	1M
(f)	Find $L^{-1}(\cot^{-1}s)$	2M
(g)	Find b_n if $f(x) = \sin x$ in $(-\pi, \pi)$.	2M
(h)	Find the finite Fourier cosine transform of the function f(x) = 1 in (0, π).	2M
(i)	Find $Z^{-1}\left\{\frac{1}{((z-a)^3}\right\}$	2M
(j)	Evaluate $\int_0^1 \int_0^x e^x\,dy\,dx$	2M

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Using Laplace transform, solve $\frac{d^2x}{dt^2} - 2\frac{dx}{dt} + x = e^t$, given that $x(0) = 2$, $x'(0) = -1$.	8M
(b)	Find (i) $L\{e^{4t}\sin 2t\cos t\}$ (ii) $L\{e^{-t}\cosh t\}$.	7M
3(a)	Find Fourier series to represent $x - x^2$ from $x = -\pi$ to $x = \pi$.	7M
(b)	Express $f(x) = x$ as half-range Fourier sine series in $0 < x < 2$.	8M
4(a)	Find Fourier sine and cosine transform of e^{-ax}.	7M
(b)	Find the Fourier transform of $f(x) = \begin{cases} \frac{1}{2a} & for\ \|x\| \le a \\ 0 & for\ \|x\| > a \end{cases}$	8M
5(a)	Show that $Z(n^p) = -z\frac{d}{dz}[Z(n^{p-1})]$, p being a positive integer and hence deduce $Z\{n^2\}$.	7M
(b)	Find the inverse Z-transform of $\frac{z}{(z-1)(z-2)}$	8M
6(a)	Find the area of a plate in the form of a quadrant of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	7M
(b)	Evaluate $\int_0^{2\pi}\int_0^b\int_{-h}^h (z^2 + r^2\sin\theta)dz\,dr\,d\theta$	8M
7(a)	Solve $y'' + 3y' + 2y = e^{-t}$, $y(0) = 0$, $y'(0) = 1$ using Laplace Transformations.	7M
(b)	Show that $\int_0^\infty te^{-2t}\cos t\,dt = \frac{3}{25}$	8M
8(a)	Solve $y_{n+1} + \frac{1}{4}y_n = \left[\frac{1}{4}\right]^n$ given that $y_0 = 0$, $y_1 = 1$ using Z-transforms.	7M
(b)	Find Z(cos nt) and Z(sin nt).	8M

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B.Tech. (II Semester) Supplementary Examinations

S238-ENGINEERING PHYSICS
(ASE , CE, CSE, IT & ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Can you write the equation for principal maxima in a diffraction grating?	1M
(b)	Write the equation for Bragg's law.	1M
(c)	What is the doping percentage of chromium in Ruby crystal?	1M
(d)	Can you name the material which do not have permanent magnetic dipoles?	1M
(e)	How does the penetration depth varies with temperature?	1M
(f)	What is superposition principle?	2M
(g)	Calculate the wavelength associated with an electron having energy 2000ev.	2M
(h)	Which type of fibers is more suitable for long distance communication?	2M
(i)	Distinguish between antiferro and ferri magnetic materials.	2M
(j)	Define penetration depth.	2M

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Distinguish between interference and diffraction.	7M
(b)	Explain Fraunhofer diffraction due to single slit draw intensity distribution curves and also derive conditions for principle maxima, secondary maxima and minima.	8M
3(a)	Derive time independent Schrodinger wave equation for a free particle.	8M
(b)	Explain the physical significance of wave function.	7M
4(a)	Can you illustrate structure of different types of Optical fibers with ray paths?	8M
(b)	Calculate the Numerical Aperture and Acceptance angle for an optical fiber with core and cladding refractive indices being 1.48 and 1.45 respectively.	7M
5(a)	What are Ferro magnetic materials? Explain their properties.	8M
(b)	Distinguish between Soft and Hard magnetic materials.	7M
6(a)	Can you write a brief outline about BCS theory of super conductivity?	8M
(b)	List out any five applications of super conductors .	7M
7(a)	Explain total internal reflection with diagrams and list out the necessary conditions to produce the total internal reflection.	8M
(b)	Calculate angle of acceptance of a given optical fiber. If the refractive indices of core and cladding are 1.563 and 1.498 respectively.	7M
8(a)	How do you explain the distinguishing features of ferro, antiferro and ferri magnetic materials?	8M
(b)	Find the relative permeability of a ferro magnetic material if field of strength 440A/m produces a magnetization of 6600A/m in it.	7M

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B.Tech. (II Semester) Supplementary Examinations

S145-BASIC ELECTRONICS ENGINEERING
(ASE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	What are the p-type and n-type impurities?	1M
(b)	Draw V-I characteristics of SCR.	1M
(c)	Write DC characteristics of OP-AMP.	1M
(d)	What is counter type ADC?	1M
(e)	What is meant by a microcontroller?	1M
(f)	What is meant by Zener breakdown?	2M
(g)	Draw the shunt negative clipper with neat wave forms.	2M
(h)	Draw the non inverting summing amplifier.	2M
(i)	Mention the drawbacks of weighted resistor DAC.	2M
(j)	What is a logic gate? Give an example.	2M

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Prove that the conductivity of a semiconductor is given by $\sigma = q(P\mu_p + n\mu_n)$ where the symbols have usual meaning.	8M
(b)	Explain the effect of doping on depletion region.	7M
3(a)	Illustrate the concept of Bridge Rectifier and explain the operation with neat circuit and wave forms.	8M
(b)	Derive the expressions for average value, RMS value , Ripple factor and efficiency for a Bridge Wave Rectifier.	7M
4(a)	Draw the block diagram of operational amplifier and explain each block in detail.	7M
(b)	Discuss the terms open loop voltage gain, slew rate and bias current.	8M
5(a)	Discuss the working of flash comparator ADC with relevant diagrams.	7M
(b)	Appraise the need for analog to digital conversion. Classify various ADCs.	8M
6(a)	Illustrate the general structure, logic circuit and truth table of a decoder.	8M
(b)	Illustrate the general structure, logic circuit and truth table of a encoder.	7M
7(a)	Explain the common emitter amplifier with a neat diagram.	8M
(b)	Discuss how a Zener diode can be used as a voltage regulator.	7M
8(a)	Describe the operation of IC 555 as Astable multivibrator with a neat functional block diagram.	8M
(b)	Explain the general structure of analog to digital converter with necessary expressions.	7M

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B.Tech. II Semester Regular/Supplementary Examinations

S282–INTRODUCTION TO ENGINEERING MECHANICS
(AE)

Time : 3 hours   Max. Marks : 75

PART-A
(Answer all questions)

1(a)	What do you mean by a free body diagram?	[1M]
(b)	Define the term angle of repose.	[1M]
(c)	Define radius of gyration.	[1M]
(d)	Define mass moment of inertia.	[1M]
(e)	What is the difference between distance and displacement?	[1M]
(f)	Define coplanar like parallel force system, represent with a diagram.	[1M]
(g)	A body of weight 100N is placed on a rough horizontal plane. Determine the co-efficient of friction if a horizontal force of 60N just causes the body to slide over horizontal plane.	[2M]
(h)	Calculate the moment of inertia of a triangular area of base 40 mm and height 60 mm about an axis passing through the base.	[2M]
(i)	Discus the importance of mass moment of inertia in rotating bodies.	[2M]
(j)	A projectile is projected at an angle of 60⁰ with the horizontal. The horizontal range of the projectile is 5 km. Calculate the velocity of projection.	[2M]

PART-B
(Answer any FOUR questions)

2(a) State parallelogram law of forces and derive the equation for resultant for the two forces acting at an angle of '𝜃' with each other.   [7M]

(b) Two smooth circular cylinders, eat of weight W = 445 N and radius r = 152 mm, are connected at their centers by a string AB of length l = 406 mm and rest upon a horizontal plane, supporting above them a third cylinder of weight Q = 890 N and radius r = 152 mm (Fig.). Find the forces S in the string and the pressures produced on the floor at the points of contact D and E.   [8M]

S282–INTRODUCTION TO ENGINEERING MECHANICS

7(a) Find the magnitude of two concurrent forces which confirm to the following data (i) angle between forces is 75⁰. (ii) Angle between resultant and one force is 45⁰. (iii) Magnitude of resultant is 200N.   [7M]
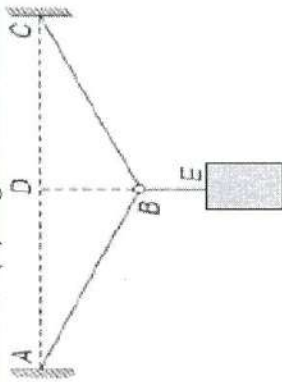
(b) A body is suspended from a small ring B supported by two ropes AB and BC. The ends A and C are fixed on the same level. Assuming wires to be perfectly flexible and neglecting their weights, find the force produced in each if the weight is 70 N, the length of each wire is 3 m and the sag DB is 1.25 m.   [8M]

8 Determine the MMOI of the system as shown in the figure with respect to the centroidal Y-axis. The material is CI with density 7210 kg/m³. Find the MMOI of the system if the cavity of the cone is filled with aluminum of density 2560 kg/m³ and cavity of the rod is filled with brass of density 8500 kg/m³.   [15M]
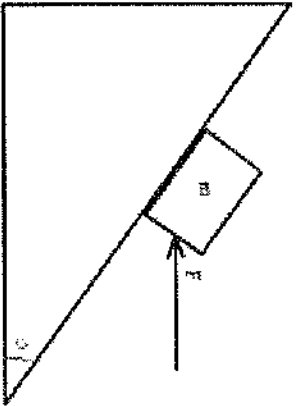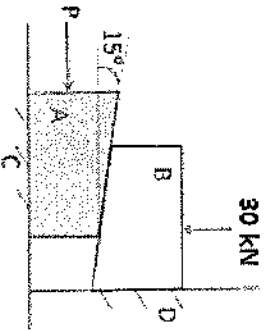
D 0.9 m
D 0.6 m
0.8m
1.5m
0.15 m
0.2m

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3(a) Referring to the figure below, find the minimum force required to keep the body slipping down.
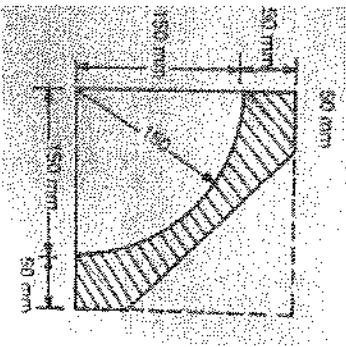

[7M]

(b) Determine the force P needed to lift the load of 30 kN as shown in Fig. The coefficient of static friction between A and C and B and D is 0.3 and that between A and B is 0.4.

30 KN

[8M]

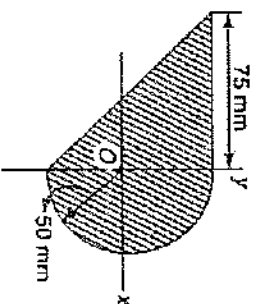4(a) Determine the centriod of the area shown in the figure.

[7M]

(b) Find the moment of inertia of the plane is shown in the figure about the y-axis.

[8M]

5(a) Determine the mass moment of inertia of a right circular cone with respect to its axis of symmetry. The radius of its base is R and the distance of its vertex from the base is H.

[7M]

(b) A brass cone with base area diameter 400 mm, 500 m high is placed on a vertical aluminium cylinder of height 600mm having base diameter of 400 mm. Density of brass 85 KN/m³ and aluminium density is 25.6 KN/m³. Determine the MMOI of composite body about vertical geometrical axis؛
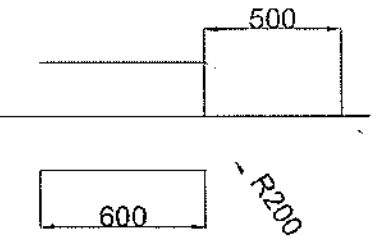
[8M]

6(a) A small steel ball is shot vertically upwards from the top of a building 50 m above the street with an initial velocity of 25 m/s.

  i.   In what time it will reach the maximum height?
  ii.   How high above the building the ball will rise?
  iii. Compute the velocity with which it will strike the ground.

[8M]

(b) Two projectiles are projected to hit a target. The first one undershoots the target by 5 m when it is projected at 24 degrees and the second one overshoots the target by 22 m when it is projected at 50 degrees. Determine the correct angle of projection to hit the target.

[7M]

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B.Tech. (II Semester) Supplementary Examinations

S178-DATA STRUCTURES
(CSE, EEE, EIE&IT)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	What are the advantages of doubly linked list over singly linked list?	1M
(b)	Write the postfix expression for the given infix expression(A+B)*(C+D).	1M
(c)	What is sorting?	1M
(d)	What are the different tree traversals?	1M
(e)	What is open addressing hashing?	1M
(f)	Differentiate between the arrays and lists.	2M
(g)	What are the different types of Dequeue?	2M
(h)	What is the technique followed in Merge sort?	2M
(i)	Write an example for balanced binary search tree.	2M
(j)	Define a cycle in a graph.	2M

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Design an algorithm to reverse a linked list.	7M
(b)	Write the advantages and disadvantages of Linked list.	8M
3(a)	Write the algorithm for converting infix expression to postfix expression.	7M
(b)	Write the applications of stack.	8M
4(a)	Sort the following elements using Quick sort 13,81,92,43,31,65,57,56,75,9	7M
(b)	Create a heap sort for the following list of elements 5,8,20,9 12,45,34,23,78,89,67,93	8M
5(a)	Explain how to find a minimum and maximum element in BST.	7M
(b)	Write tree traversals with an example.	8M
6(a)	Explain about Kruskal's algorithm with an example.	8M
(b)	Write the algorithm for BFS and analyze its complexity.	7M
7(a)	Construct AVL tree for the list {25,30,35,40,45,50,55,60,65,70,75}.	7M
(b)	Classify the types of trees. Explain with example.	8M
8(a)	What are the general rules for runtime calculations?	7M
(b)	Implement list using arrays.	8M

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B.Tech. (I Semester) Supplementary Examinations

S232-ENGINEERING CHEMISTRY
(ECE, EEE & EIE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	What are ion exchangers that are used in water softening?	1M
(b)	What is meant by flue gas?	1M
(c)	What is meant by differential aeration corrosion?	1M
(d)	What is meant by rubber?	1M
(e)	What is meant by transition temperature?	1M
(f)	What is meant by priming and foaming in boilers?	2M
(g)	What are advantages of catalytic cracking over thermal cracking to make petrol?	2M
(h)	Mention conditions required for stress corrosion to occur.	2M
(i)	Write any two examples for conducting polymers.	2M
(j)	How lyotropic liquid crystals are formed?	2M

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Differentiate hard and soft water.	8M
(b)	Write the equations for scale and sludge formation in boilers.	7M
3(a)	How to carry out analysis of coal for the presence of moisture, volatile matter, ash and fixed carbon?	7M
(b)	Discuss the significance of proximate analysis of coal.	8M
4(a)	How nature of environment influences corrosion?	8M
(b)	Explain galvanic corrosion with an example.	7M
5(a)	Write about preparation, properties and engineering applications of PVC.	8M
(b)	What are the drawbacks of natural rubber? How they are improved during vulcanization?	7M
6(a)	How the polymeric liquid crystals are formed?	7M
(b)	Discuss molecular ordering in lyotropic liquid crystals.	8M
7(a)	Write short notes on conducting polymers with suitable examples.	7M
(b)	What is meant by copolymerization? Write about preparation, properties and engineering applications of styrene butadiene rubber.	8M
8(a)	Discuss the concept of alternate reagents and transformations in green chemistry.	7M
(b)	Discuss about the ecofriendly materials and their applications as part green chemistry.	8M

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B.Tech. (II Semester) Supplementary Examinations

S212-ELECTRICAL CIRCUITS AND NETWORKS-II
(ECE)

Time : 3 hours   Max. Marks : 75
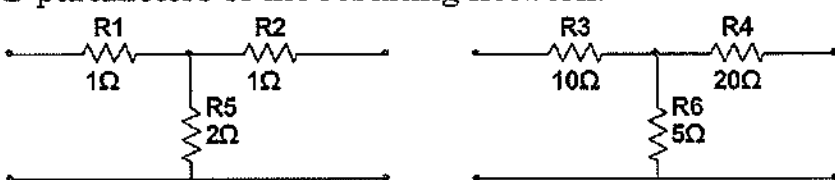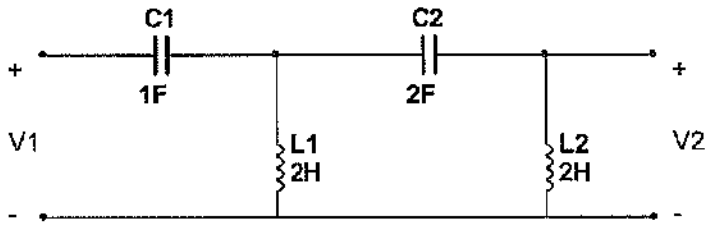
PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	State condition for a two port network to be reciprocal in terms of ABCD parameters.	1M
(b)	State any one property of RC driving point immittance function.	1M
(c)	Define band stop filter and draw its characteristics.	1M
(d)	Draw the circuit diagram of symmetrical lattice attenuator.	1M
(e)	What is the fundamental difference between DC generator and AC generator?	1M
(f)	Define driving point impedance and admittance function of a two port network.	2M
(g)	Draw the general circuit diagram for Cauer-I,II form of LC network.	2M
(h)	Write the equation for attenuation constant, for a low pass filter in stop band.	2M
(i)	Write the design values of symmetrical bridged-T attenuator.	2M
(j)	Why series motor cannot be started on no-load?	2M

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Obtain the y parameters for the network shown below.	7M
(b)	Obtain the ABCD parameters of the circuit shown below	8M

3(a)	Construct the Routh's array, test whether given polynomial $H(s) = 2S^4 + 5S^3 + 6S^2 + 2S + 1$ is Hurwitz or not.	7M
(b)	Test whether the following function is a positive real function or not. $$F(s) = \frac{S^2 + 1}{S^3 + 4S}$$	8M

4(a)	Discuss about composite filters with block diagram and draw its attenuation characteristics.	7M
(b)	Design the T and π sections of a prototype high pass filter having cut-off frequency of 20Khz and design impedance of 450 Ω. Also find its characteristics impedance and phase constant at 25KHz.	8M

5(a)	Design a symmetrical bridged T-attenuator with a design impedance of 300Ω and attenuation of (i) 20dB (ii) 40dB.	7M
(b)	Draw the symmetrical bridged-T attenuator circuit and derive the design equations of the bridged-T attenuator.	8M

6(a)	Give the differences between induction motor and a transformer.	7M
(b)	Explain the classification of DC generators based on its excitation.	8M

7(a)	Two networks shown in figure are connected in series. Obtain the Z-parameters of the resulting network.	7M
(b)	Determine the impedance parameters for the network shown in figure.	8M

8(a)	Determine the foster-II form of realization of the RC impedance function. $$Z(s) = \frac{(S + 1)(S + 3)}{S(S + 2)(S + 4)}$$	7M
(b)	Determine the function is positive real function or not. $$\frac{S(S + 3)(S + 5)}{(S + 1)(S + 4)}$$	8M

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B.Tech. (II Semester) Supplementary Examinations

S224-ELECTRONIC DEVICES AND CIRCUITS   ঀ.ᐧᐧ ঀ

Time : 3 hours   (ECE, EIE & IT)   Max. Marks : 75

PART-A
(Compulsory question)

Q.No	Questions	Marks
1(a)	Give examples of Donor impurities.	1M
(b)	Define barrier potential.	1M
(c)	How transistor is connected to operate in saturation region.	1M
(d)	Give name of one FET biasing method.	1M
(e)	Draw the block diagram of a DC power supply.	1M
(f)	State Mass Action Law.	2M
(g)	State the law of junction.	2M
(h)	Write short notes on Early effect.	2M
(i)	What do you mean by thermal runaway.	2M
(j)	What is the value of ripple factor with π-section filter?	2M

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a)	Differentiate metals, insulators and semiconductors using energy band Diagrams.	8M
(b)	Derive equation for conductivity of an intrinsic semiconductor.	7M
3(a)	Write short notes on diode resistance and derive equation for it.	7M
(b)	Derive the equation for diffusion capacitance.	8M
4(a)	Draw the construction diagram, principle of operation, characteristics and applications of UJT.	8M
(b)	Sketch the input and output characteristics of Common base and common emitter configuration	7M
5(a)	Discuss the Collector to base bias for BJT and derive its operating point.	8M
(b)	Calculate coordinates of operating point for fixed bias circuit if V_{cc}=9V, R_b=300kΩ, R_c=2kΩ, β=50. Assume V_{BE} = 0.6 V.	7M
6(a)	Derive equations for (i) Average current (ii) RMS current (iii) Ripple factor (iv) Efficiency for Half wave rectifier.	8M
(b)	Discuss Half wave rectifier and draw its input and output waveforms.	7M
7(a)	Explain how thermal run away problem is overcome in Collector to base bias by using mathematical equations.	7M
(b)	Obtain the stability factor S for collector to base bias and Voltage divider bias.	8M
8(a)	Explain N-channel FET construction and working. And also explain its working under pinch off region. Draw its drain and transfer characteristics.	8M
(b)	Discuss working and operation of BJT under Common Emitter configuration.	7M

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B.Tech. (II Semester) Regular/Supplementary Examinations

S209-ELECTRICAL CIRCUITS-I
(EEE)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a)	When 'Supermesh' analysis is used.	[1M]
(b)	State 'dot rule' for coupled circuits	[1M]
(c)	Draw the frequency response of RLC series circuit.	[1M]
(d)	State Thevenin's theorem.	[1M]
(e)	What is a tie-set?	[1M]
(f)	State and explain Kirchhoff's laws.	[2M]
(g)	Write the expressions for equivalent inductance between two coupled coils connected in series aiding and parallel opposing.	[2M]
(h)	Draw power triangle and identify real, reactive and apparent powers.	[2M]
(i)	Give the applications for maximum power transfer theorem.	[2M]
(j)	Differentiate between graph and oriented graph.	[2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a) Determine the current in 1Ω resistor by nodal analysis method for the circuit shown in the figure.
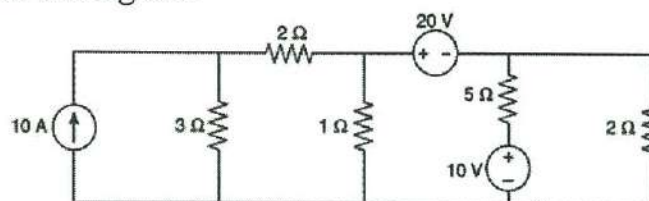
[7M]

(b) Find V_{AD} in the circuit shown in the figure.
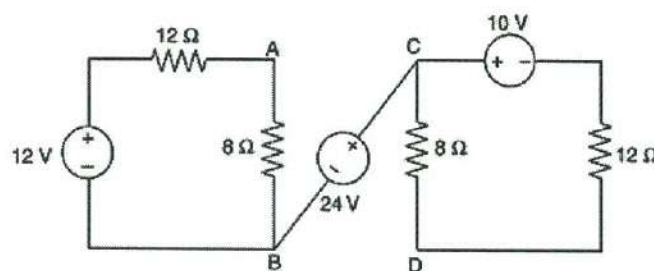
[8M]

3(a) Explain the analogy between electrical and magnetic circuits. [7M]

(b) Two magnetically coupled coils are connected in series and their total effective inductance is found to be 4.4mH. When one coil is reversed in connection, the combined inductance drops to 1.6mH. Here all the flux due to the first coil links with the second coil but only 40% of the flux due to the second coil links with the first coil. Find the self-inductance of each coil and the mutual inductance between the coils. [8M]

4(a) A coil of resistance 100Ω and inductance $100\mu H$ is connected in series with 100 pF capacitor. The circuit is connected to 20V variable frequency supply. Calculate (i) resonant frequency (ii) Q-factor of the circuit (iii) current at resonance. [7M]

(b)   A coil of resistance 15Ω and inductance 0.05H is connected in parallel with non-inductive resistor of 20Ω. Find (i) current in each branch (ii) the total current supplied (iii) the phase angle of the combination, when a voltage of 200V at 50Hz is applied.   [8M]

5(a)   In the figure load Z_L has a fixed resistance of 5Ω and variable reactance X. Determine the value of X to receive maximum power.
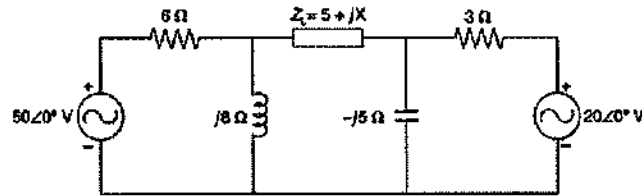
[7M]

(b)   Determine the current through Z_L in the circuit shown using Thevenin's theorem.
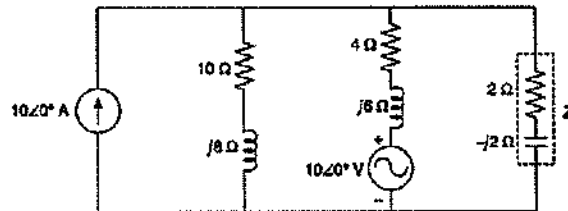
[8M]

6(a)   Define a tree and explain its properties.   [7M]
(b)   Draw the dual network for the given network shown in the figure.
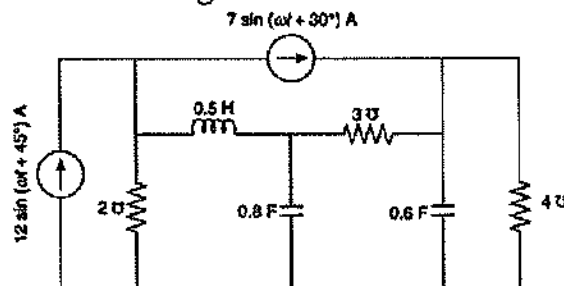
[8M]

7   Determine the node voltages V_1, V_2, V_3 in the circuit shown in the figure.
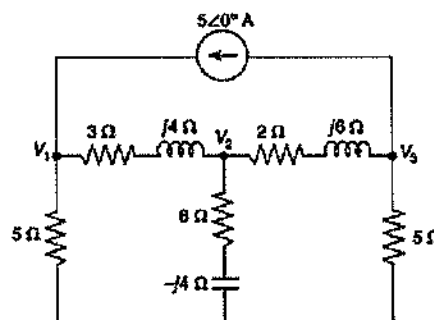
[15M]

8   Find the current flowing in the 5Ω resistor of the circuit shown in the figure, by using Thevenin's and Norton's Theorem's.
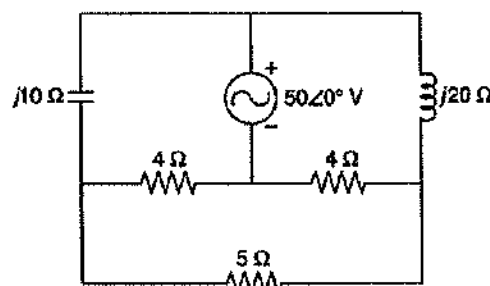
[15M]

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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~~/Supplementary Examinations

S147-BASIC MECHANICAL ENGINEERING
(ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Answer all questions)

1(a)	List out different types of patterns used in casting process.	[1M]
(b)	Locate the Centroid of a quarter circle of radius 'r'.	[1M]
(c)	What is an isolated system?	[1M]
(d)	Define fuel.	[1M]
(e)	What is the function of a spark plug?	[1M]
(f)	Classify different welding processes.	[2M]
(g)	Define sensible heat.	[2M]
(h)	Find out area moment of inertia of a rectangle of length 60mm and width 30mm about its centroidal axes.	[2M]
(i)	What is meant by higher calorific value?	[2M]
(j)	Define an impulse turbine.	[2M]

PART-B
(Answer any FOUR questions)

2(a)	Briefly explain the essential properties of molding sand.	[7M]
(b)	Illustrate the radial drilling machine.	[8M]
3(a)	Locate the Centroid X_c of a circular sector of radius 'R' with an included angle of 2α.	[7M]
(b)	Determine the mass moment of inertia of a circular plate of radius 'R' and thickness 't' about its centroidal axis.	[8M]
4(a)	Elucidate the following terms i) Heat engine ii) Heat pump iii) Refrigerator.	[7M]
(b)	What is wind energy? Explain the working principle of a simple wind energy power plant.	[8M]
5(a)	Elucidate the function of a lubricant and classify lubricants.	[7M]
(b)	Discuss the essential properties required for a good fuel.	[8M]
6(a)	Discuss the pros and cons of open cycle and closed cycle gas turbine power plant.	[7M]
(b)	Briefly explain the working principle of a 2-stroke diesel engine.	[8M]
7(a)	Elucidate the differences between impulse and reaction turbines.	[7M]
(b)	A body consists of a right circular solid cone of height 40 mm and radius 30 mm placed on a solid hemi sphere of radius 30 mm of the same material. Find out the centre of gravity of the body.	[8M]
8(a)	What is meant by thermodynamic equilibrium?	[7M]
(b)	Compare solid, liquid and gaseous lubricants.	[8M]

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H.T.No | | | | | | | | | | **R14**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

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

B.Tech. (II Semester) ~~Regular~~/Supplementary Examinations

S237-ENGINEERING MECHANICS
(ME)

Time : 3 hours   Max. Marks : 75

PART-A
(Compulsory question)

1(a) Discriminate between like and unlike force system.   [1M]

(b) A cart has to pull harder during the start of the motion than later. Explain.   [1M]

(c) A body moves from rest attains a velocity of 5 m/s after travelling for 10 sec. What is the acceleration of the body during its motion?   [1M]

(d) Define Kinetics.   [1M]

(e) State the equations of motion for a curvilinear translatory motion based on work energy principle?   [1M]

(f) Compute the resultant of two forces P=40N and Q=50N acting at an angle 'θ' = 60^0 between them.   [2M]

(g) Describe the cone of friction.   [2M]

(h) When a body is falling from rest, reaches ground by travelling 10m. Estimate the velocity of the body when it just strikes the ground?   [2M]

(i) Which principle converts a kinetic problem into an equivalent static problem? How does it differentiate from Newton's second law of motion?   [2M]

(j) Is 'work done' a scalar quantity or a vector quantity? Justify.   [2M]

PART-B
(Answer any FOUR questions. All questions carry equal marks)

2(a) The resultant of two concurrent forces is 1500N and angle between the forces is 90^0. The resultant makes an angle of 36^0 with one of the forces. Determine the magnitude of each force.   [7M]

(b) A weight Q is suspended from a small ring C, supported by two cords AC and BC as shown in fig. The cord AC is fastened at A while the cord BC passes over a frictionless pulley at B and carries the weight P as shown. IF P = Q and a = 50⁰, Compute the value of the angle β.
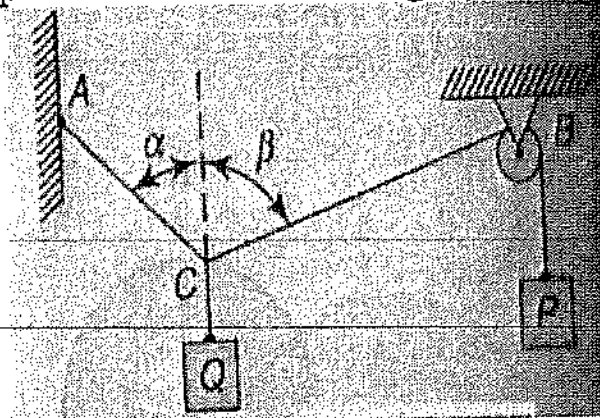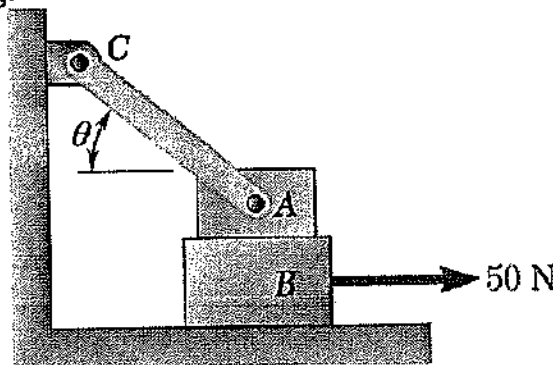

[8M]

3(a) Discuss the laws of friction. [7M]

~~(b) The 80 N block A is attached to link AC and rests on the 120~~ N block B. Knowing that the coefficient of static friction is 0.20 between all surfaces of contact and neglecting the mass of the link, determine the value of θ for which motion of block B is impending.

[8M]

4(a) A truck travels 164 m in 8 sec while being decelerated at a constant rate of 0.5 m/s². Determine (i) its initial velocity (ii) its final velocity and (iii) the distance travelled during the first 0.6 sec. [7M]

(b) Determine the minimum initial velocity with which a projectile may be fired so that it clears a wall 4 m height and falls on the side of the wall at a distance of 4 m. The wall at a distance of 6 m from the point of projection. [8M]

5(a) Two rough planes inclined at 30⁰ and 60⁰ to horizontal are placed back to back as shown in figure. The blocks of weights 50 N and 100 N are placed on the faces and are connected by a string running parallel to the planes and passing over a frictionless pulley. If the coefficient of friction between planes and blocks is 0.33, find the resulting acceleration and tension in the string.
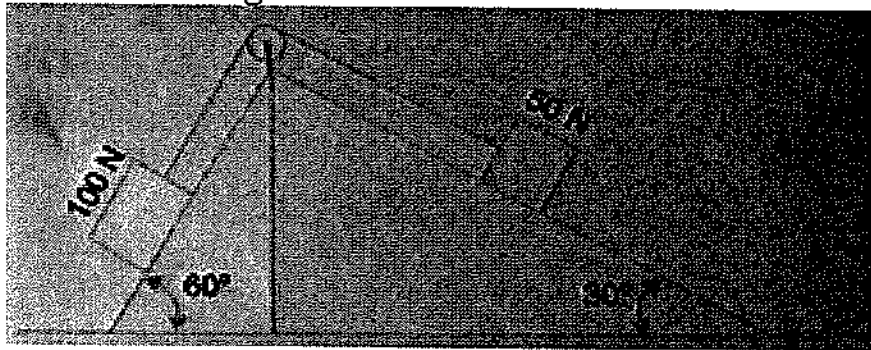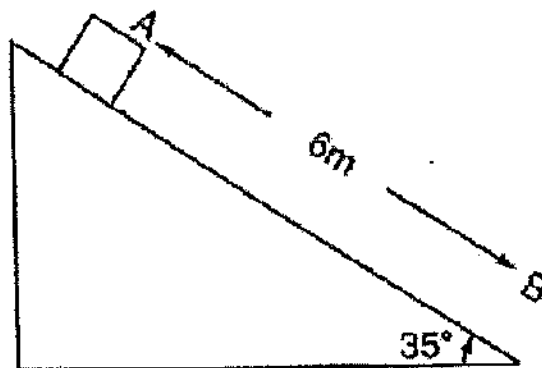

[7M]

(b) Write the units of the following quantities:
   (i)   Angular velocity
   (ii) Angular acceleration
   (iii) Angular displacement
   (iv) Mass moment of inertia

[8M]

6(a) A 250 N package slides at a speed of 12 m/s from point A on sloping board. Determine the speed at point B if the coefficient of kinetic friction is 0.3 as shown in the figure.


[7M]

(b) A solid cylinder and a sphere of same mass and equal radius are started top of an inclined plane, at the same time, and both roll without slipping down the plane. If, when the sphere reaches the bottom of incline, the cylinder has travelled a distance of 12m, what is the total length 'S' of the incline?

[8M]

7(a) Determine the compressive force in the boom and the tensile force in the cable as shown in figure.
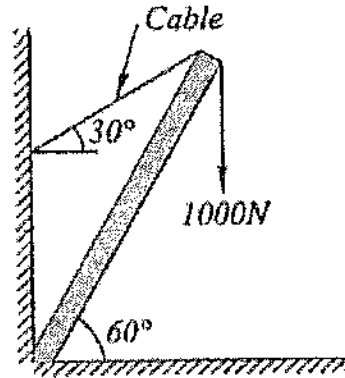
[7M]

(b) Derive Expression for the minimum effort required when it is parallel to inclined plane and the body (weight W) tends to slide down on inclined plane (angle 'θ'). Assume the coefficient of friction between block and plane is μ. [8M]
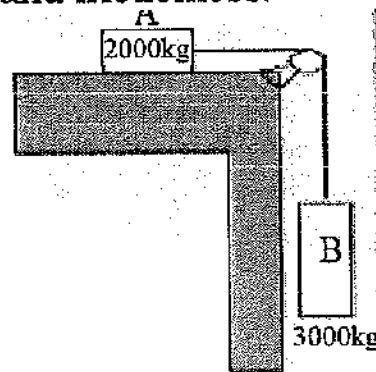
8(a) A stone is thrown freely in air with an initial speed of 30 m/s at an angle of 55° with the horizontal. Evaluate
   a) The horizontal distance from the point of projection to the point where the stone strikes the ground.
   b) The greatest height reached by the stone above the ground level.
   c) The velocity with which the stone strikes the ground.
   d) Time of flight. [7M]

(b) Two blocks are joined by an inextensible cable as shown in figure. If the system is released from rest, determine the velocity of block A after it has moved 2 m. Assume that μ equals to 0.25 between block A and the plane and that the pulley is weightless and frictionless.

[8M]

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