



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) (R14) Supplementary Examinations, August/September 2021

TIME TABLE

TIME : 02.00 PM to 05.00 PM

A.Y. 2020-21

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
26-08-2021 (Thursday)	S240 - English - II	S240 - English - II	S240 - English - II	S240 - English - II	S240 - English - II	S240 - English - II	S240 - English - II	S240 - English - II
27-08-2021 (Friday)	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
28-08-2021 (Saturday)	S238 - Engineering Physics	S238 - Engineering Physics	S238 - Engineering Physics	S232 - Engineering Chemistry	S232 - Engineering Chemistry	S232 - Engineering Chemistry	S238 - Engineering Physics	S238 - Engineering Physics
31-08-2021 (Tuesday)	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
01-09-2021 (Wednesday)	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: Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.

Date: 07-08-2021

CONTROLLER OF EXAMINATIONS

PRINCIPAL

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

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L.B.Reddy Nagar :: Mylavaram - 521230:: Krishna Dist.: A.P.

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

S282-INTRODUCTION TO ENGINEERING MECHANICS

(AE)

Time: 3 hours

Max. Marks: 75

PART-A

(Compulsory question)

- 1 (a) State Lame's theorem. [1M]
- (b) State varignon's theorem. [1M]
- (c) State Pappu's theorem to determine the area of surface. [1M]
- (d) What is mean by Limiting Friction? [1M]
- (e) Write the General Equation of Projectile Motion. [1M]
- (f) Explain with neat diagram the Angle of Repose. [2M]
- (g) A semicircular area having a radius of 100 mm is located in the XY-plane such that its diameter coincides with Y-axis. Determine the X-coordinate of the centroid. [2M]
- (h) A car accelerates uniformly from a speed of 30 Km/hr to a speed of 75 Km/hr in 5 seconds. Determine the acceleration of the car. [2M]
- (i) State the Parallel axis and Perpendicular axis theorem. [2M]
- (j) State the conditions for equilibrium of a Rigid Body in three dimensions. [2M]

PART-B

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) A 300N force is applied at C as shown in Fig.01. Determine
(i) The value of angle θ for which the larger of the cable tension is as small as possible. (ii) The corresponding values of tension in the cable AC and BC.

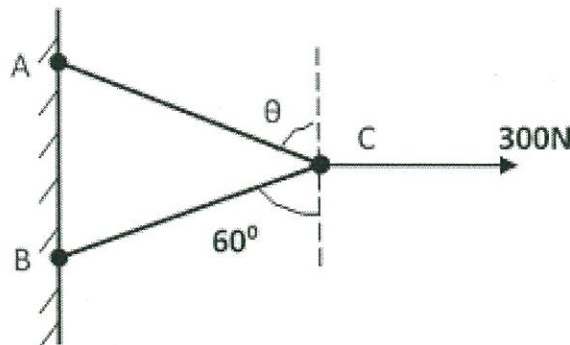


Fig.01

[7M]

- (b) An electric light fixture weighing 20 N hangs from a point C, by two strings AC and BC. AC is inclined at 60° to the horizontal and BC at 30° to the vertical as shown in Fig.02. Using Lame's theorem or otherwise determines the forces in the strings AC and BC.

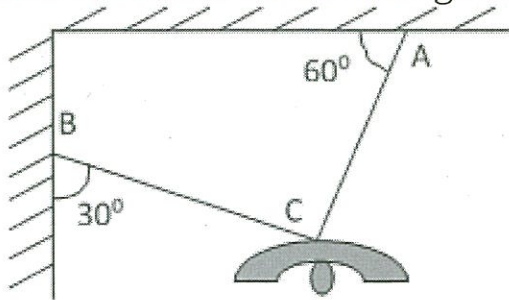
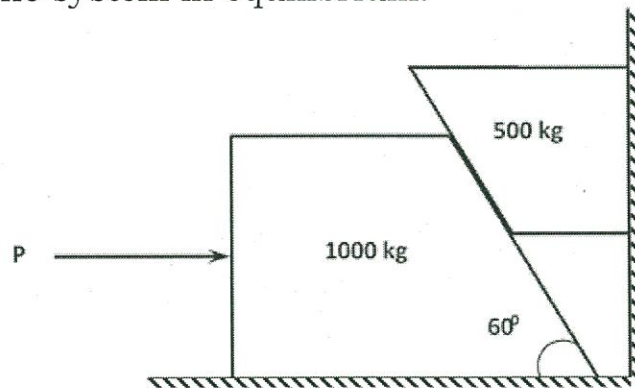


Fig.02

[8M]

3. Referring to the figure, the coefficients of friction are as follows: 0.25 at floor, 0.3 at the wall and 0.2 between the blocks. Find the minimum value of a horizontal force 'P' applied to the lower block that will hold the system in equilibrium.



[15M]

- 4(a) From the basic principle derive the Centroid of a triangle whose base width is 'b' and altitude height 'h'.
- (b) Determine the moment of inertia of following plane area about x-x and y-y axis as shown in Fig 04.

[7M]

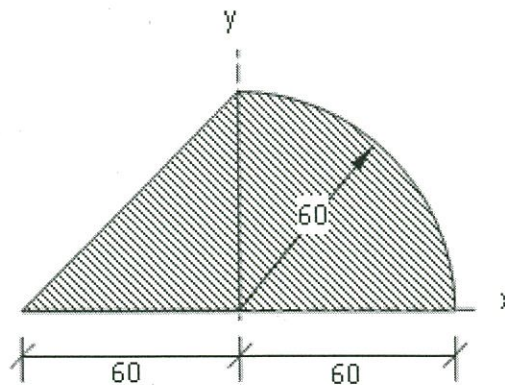


Fig. 04

[8M]

S282-INTRODUCTION TO ENGINEERING MECHANICS

- 5(a) From first principles determine the mass moment of inertia of a disk whose radius is 'R' and thickness 't' about its centroidal axis. [7M]
- (b) Brass cone is mounted on top of an aluminium cylinder as shown in fig.05. The density of brass is 8500 kg/m^3 and that of aluminium is 2560 kg/m^3 . Determine the Centre of Gravity for the system.

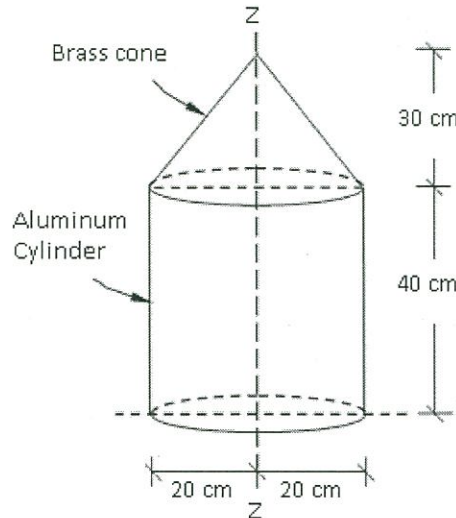


Fig. 05

[8M]

- 6(a) A stone dropped into a well is heard to strike the water after 4 seconds. Find the depth of the well, if the velocity of sound is 350 m/sec . [8M]
- (b) A flywheel which accelerates at uniform velocity is observed to have made 100 revolution to increase its velocity from 120 rpm to 160 rpm. if the flywheel originally at rest determine
- (i) Acceleration
 - (ii) Time taken to increase the velocity from 120rpm to 160 rpm
 - (iii) Revolution made in reaching a velocity of 160 rpm, starting from rest.
- [7M]

- 7(a) The following forces act at a point.
- (i) 30KN inclined at 35° towards North to East.
 - (ii) 22KN towards North.
 - (iii) 30KN inclined at 30° towards North to West
 - (iv) 35KN inclined at 25° towards South to West
- Find the magnitude and direction of the resultant force. [8M]
- (b) A 200N sphere is resting in a trough as shown in Fig.06. Determine the reactions developed at contact surfaces. Draw FBD

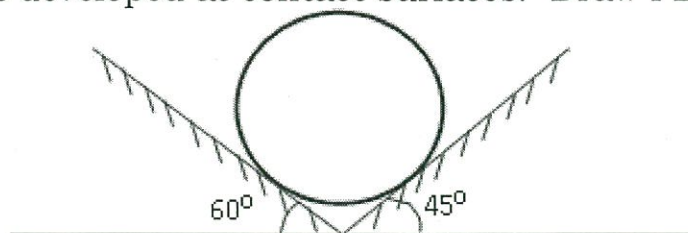


Fig.06

[7M]

S282-INTRODUCTION TO ENGINEERING MECHANICS

- 8(a) An aeroplane is flying in horizontal direction with a velocity of 540 kmph and at a height of 2200m when it is vertically above the point A on the ground a body is dropped from it. The body strikes the ground at point B. Calculate the distance AB (Neglect the Air Resistance). Also find velocity B and time taken to reach B. [8M]
- (b) A ball is projected from point A with a velocity $u = 10$ m/sec, which is perpendicular to the inclined plane. Determine the range R when $\theta = 30^\circ$ solve from fundamentals. [7M]

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

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)	Why breakdown occurs in Zener diode?	1M
(b)	Draw the simple clamper circuit with waveforms.	1M
(c)	Draw the op-amp non- inverting amplifier circuit.	1M
(d)	What is the output of monostable multivibrator?	1M
(e)	Convert $(266)_{10}$ to octal.	1M
(f)	Sketch the formation of a PN junction diode.	2M
(g)	Derive the expression for ripple factor for a full wave rectifier.	2M
(h)	Draw the dual inline package of IC.	2M
(i)	State the importance of R-S flip flop in 555 timer.	2M
(j)	Convert $(10A4)_{16}$ to binary .	2M

PART-B

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Derive the general expression for conductivity.	8M
(b)	Derive the expression for mobility of a charged particle.	7M
3(a)	Explain the construction of UJT with neat diagrams.	8M
(b)	Explain the operation of UJT with VI characteristics.	7M
4(a)	Discuss about CMRR and explain how is it measured.	8M
(b)	Memorize the concept of slew rate and explain how to measure it.	7M
5(a)	Discuss the applications of 555 Timer operated in Astable mode (Voltage controlled oscillator).	7M
(b)	Compare the working of R-2R Ladder DAC and inverted R-2R Ladder DAC.	8M
6(a)	Illustrate the concept of RS flipflop and D flipflop in detail.	8M
(b)	Compare combinational and sequential logic circuits.	7M
7(a)	Analyze the input characteristics of CE configuration of a transistor.	8M
(b)	Derive the relation between α , β and γ .	7M
8(a)	Memorize the concept of op amp terminals.	8M
(b)	Prove that op amp differential amplifier with feedback resistor can be used as a subtractor.	7M

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

S238-ENGINEERING PHYSICS

Time : 3 hours

(ASE, CE, CSE, IT & ME)

Max. Marks : 75

PART-A

(Compulsory question)

- 1(a) How do you name the diffraction pattern in which lenses are required? [1M]
- (b) Write the Schrodinger's time dependent equation in terms of Hamilton operator? [1M]
- (c) Write the expression for Acceptance angle. [1M]
- (d) State the meaning of magnetic flux density. [1M]
- (e) What is the value of critical temperature for mercury? [1M]
- (f) What do you mean by polarising angle? [2M]
- (g) Find the lowest energy level of an electron in a box of 1\AA width. [2M]
- (h) State the principle of Total internal reflection. [2M]
- (i) Write any two properties of diamagnetic material? [2M]
- (j) Write the expression for London penetration depth. [2M]

PART-B

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) What do you mean by Polarization? Can you distinguish between Polarized and Unpolarised lights. [7M]
- (b) Can you design the Nicol's prism and explain how it works as a polarizer and analyzer. [8M]
- 3(a) What are Matter waves? Explain their properties. Obtain an expression for the wavelength of matter waves. [8M]
- (b) Calculate the wavelength associated with an electron raised to a potential 1600V. [7M]
- 4(a) Distinguish between Spontaneous and Stimulated emissions. [7M]
- (b) Describe the construction and working of a Ruby laser. What are merits and demerits of Ruby laser? [8M]
- 5(a) What are the sources of permanent dipole moment in magnetic materials? [7M]
- (b) How would you explain magnetic recording process with a neat sketch? [8M]
- 6(a) What is superconductivity? Explain Meissner effect. [8M]
- (b) List out the applications of superconductors. [7M]
- 7(a) Describe the construction and working principle of Nicol's prism. [7M]
- (b) Comment on quarter wave plate and half wave plate. [8M]
- 8(a) Can you write a brief out line on Ac Josephson effect. [7M]
- (b) Distinguish between type-I and type-II super conductors. [8M]

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

S133-APPLIED MATHEMATICS-II

(AE,CE,CSE,EEE,EIE,IT&ME)

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

- 1(a) Find $L\{e^{-2t}\}$ [1M]
- (b) Find a_0 of the Fourier series of $f(x) = x^2$ in $(0, 2\pi)$ [1M]
- (c) State Fourier cosine integral formula [1M]
- (d) Find $Z(n)$ [1M]
- (e) Evaluate $\int_0^1 \int_0^2 \int_0^2 x^2 yz dx dy dz$ [1M]
- (f) Find $L\{t \sin 2t\}$ [2M]
- (g) If $f(x) = x \sin x$ for $0 < x < 2\pi$
then find the Fourier coefficient b_1 [2M]
- (h) Using the Z-transform, solve $u_{n+1} + u_n = 5$ [2M]
- (i) Express $f(x) = \begin{cases} 1 & \text{if } 0 \leq x \leq \pi \\ 0 & \text{if } x > \pi \end{cases}$ as a Fourier sine integral [2M]
- (j) Evaluate $\int_{-1}^2 \int_{x^2}^{x+2} dy dx$ [2M]

PART-B

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Find the Laplace transforms of $f(t) = e^{-3t} \sin 5t \sin 3t$. [7M]
- (b) Find $L^{-1} \left\{ \log \frac{s^2+1}{(s-1)^2} \right\}$. [8M]
- 3(a) Find the Fourier series of $f(x) = x^2$ in $(-\pi, \pi)$. [7M]
- (b) Find the half range Fourier cosine series of $f(x) = x$ in $(0, \pi)$. [8M]
- 4(a) Find the Fourier cosine transform of e^{x^2} [7M]
- (b) Find the Fourier transform of $f(x) = \begin{cases} 1 & \text{if } |x| < 1 \\ 0 & \text{if } |x| > 1 \end{cases}$ [8M]
- 5(a) Use convolution theorem to evaluate $Z^{-1} \left\{ \frac{z^2}{(z-2)(z-3)} \right\}$ [7M]
- (b) Using the Z-transform, solve $u_{n+2} - 2u_{n+1} + u_n = 3n + 5$ [8M]
- 6(a) Evaluate $\int_1^e \int_1^{\log y} \int_1^{e^x} \log z dz dy dx$ [7M]
- (b) Evaluate $\iint_R e^{2x-3y} dx dy$ over the triangle bounded by
 $x = 0, y = 0$ and $x + y = 1$ [8M]
- 7(a) Find $L^{-1} \left\{ \log \frac{s^2+1}{(s-1)^2} \right\}$ [7M]
- (b) Evaluate the double integral $\int_0^a \int_{\sqrt{ax}}^a \frac{y^2}{(y^4 - a^2 x^2)^{\frac{1}{2}}} dx dy$ by changing the order of integration. [8M]
- 8(a) Solve by the equation by Laplace transform method
 $y'' - 3y' + 2y = e^{3t}$ with $y(0) = 1, y'(0) = 0$ [7M]
- (b) Find the half range Fourier sine series of $f(x) = x - x^2$ in $(0, 1)$ [8M]

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

S135-APPLIED MECHANICS

(CE)

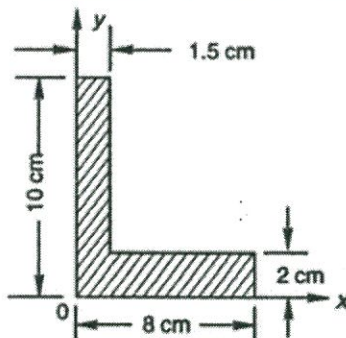
Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

- 1(a) What is a perfect truss? [1M]
- (b) Mention the main difference between moment and couple. [1M]
- (c) Define centroid. [1M]
- (d) Define limiting friction. [1M]
- (e) Define Projectile. [1M]
- (f) Define force and mention the characteristics of force. [2M]
- (g) Define moment of force and mention under what conditions moment may be zero. [2M]
- (h) Locate the x centroidal co-ordinate of the L – section shown in fig.

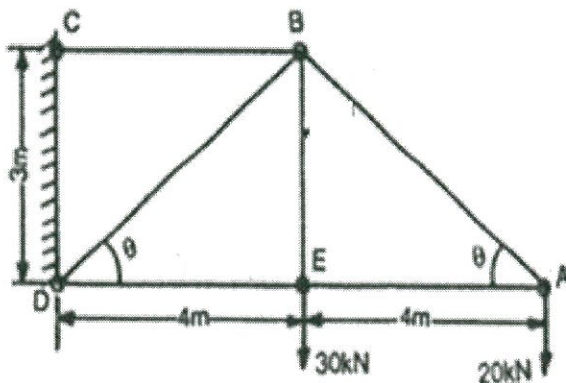


- (i) A body of weight 200 N is placed on a rough horizontal plane. If the coefficient of friction between the body and the horizontal plane is 0.3, determine the horizontal force required to just slide the body on the plane. [2M]
- (j) A particle is projected in air with a velocity of 100 m/s and at an angle of 30° with the horizontal. Find the horizontal range and the time of flight. [2M]

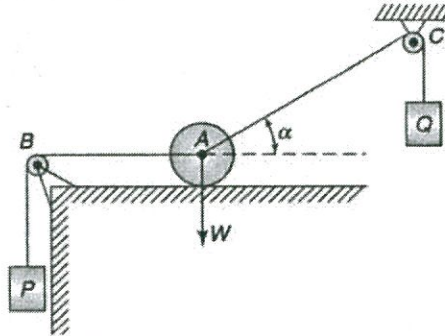
PART-B

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Compute the forces in all the members of the cantilever truss as shown in fig. and tabulate the magnitude along with their nature.

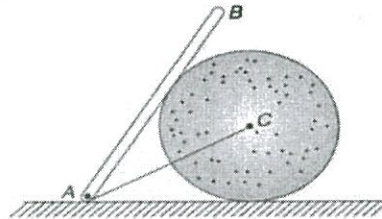


- (b) A ball of weight W rests upon a smooth horizontal plane and has attached to its center two strings AB and AC which pass over frictionless pulleys at B and C and carry loads P and Q , respectively, as shown in Figure. If the string AB is horizontal, find the angle α that the string AC makes with the horizontal when the ball is in a position of equilibrium. Also find the reaction R between the ball and the plane.



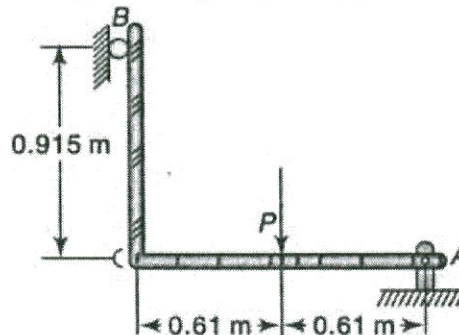
[8M]

- 3(a) A smooth right circular cylinder of radius r rests on a horizontal plane and is kept from rolling by an inclined string AC of length $2r$ (Fig.). A prismatic bar AB of length $3r$ and weight Q is hinged at point A and leans against the roller as shown. Find the tension S that will be induced in the string AC



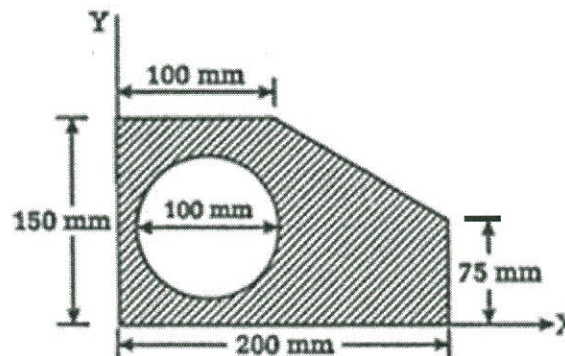
[7M]

- (b) Find the reactions R_a and R_b induced at the supports A and B of the right-angle bar ACB supported as shown in Fig. and subjected to a vertical load P applied at the mid-point of AC .



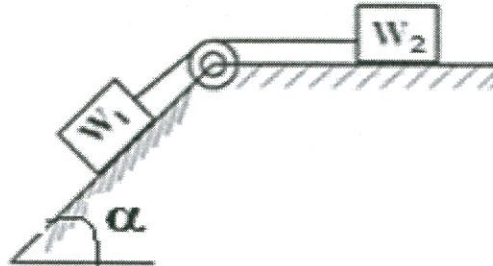
[8M]

- 4 Referring to the Figure, determine the coordinates x_c and y_c of the center of a 100mm diameter, circular hole cut in a thin plate so that this point will be the centroid of the remaining shaded area



[15M]

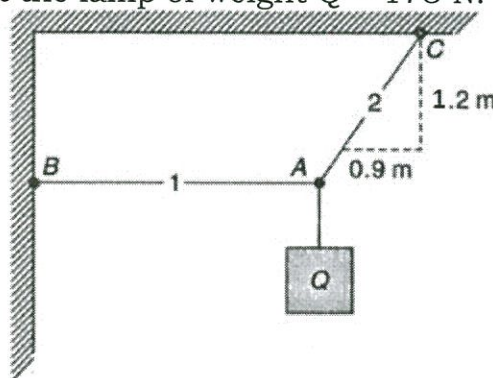
- 5 Two rectangular blocks of weights W_1 and W_2 are connected by a flexible cord and rest up on a horizontal and an inclined plane, respectively, with the cord passing over a pulley as shown in Figure. In the particular case where $W_1 = W_2$ and the coefficient of static friction μ is the same for all the contiguous surfaces, find the angle α of inclination of the inclined plane at which motion of the system will impend. Neglect friction in the pulley.



[15M]

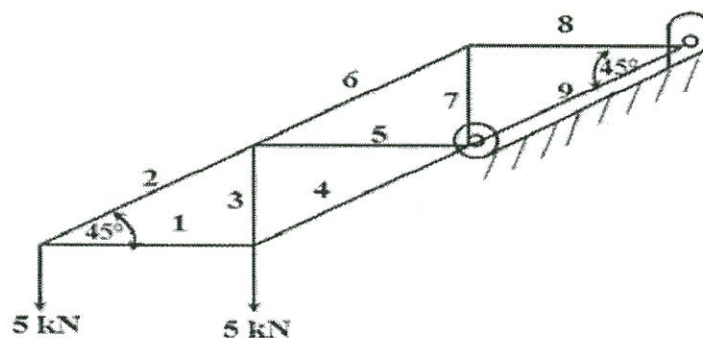
- 6(a) A particle is projected at an angle of 60° with the horizontal. The horizontal range of the particle is 5 kilometers. Find the velocity of projection and the maximum height attained by the projectile. [7M]
- (b) An air craft moving horizontally at a speed of 108 km/hr at an altitude of 1000 m towards a target on the ground releases a bomb which hits the target. Estimate the horizontal distance of the air craft from the target when it releases the bomb. Calculate also the direction and velocity with which the bomb hits the target. [8M]

- 7(a) Referring to Fig., calculate the tensions S_1 and S_2 , in the two strings AB and AC that support the lamp of weight $Q = 178$ N.



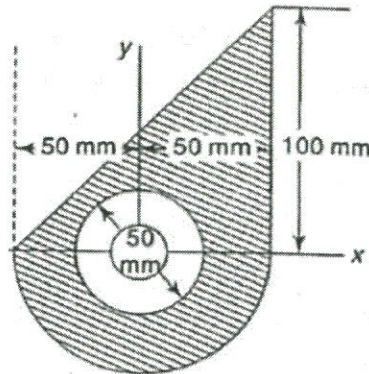
[7M]

- (b) Determine the axial force S in bars 1,2,3,4,5, 6 members of the plane truss supported and loaded as shown in the figure.



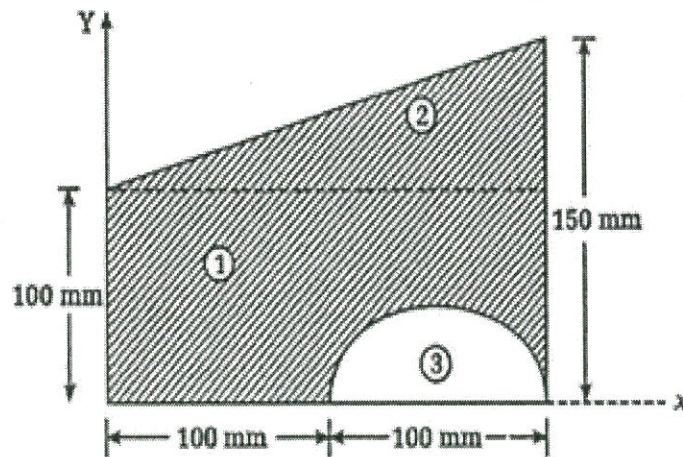
[8M]

- 8(a) Calculate the Moment of Inertia of shaded portion about X – axis



[7M]

- (b) A semi-circular area is removed from the trapezium as shown in the Figure. Determine the centroid of the remaining shaded area.



[8M]

31 AUG 2021

H.T.No

R14

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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)	How do you delete a node from a list?	1M
(b)	What is a Circular Queue?	1M
(c)	What is Sequential search?	1M
(d)	Write the applications of Binary tree.	1M
(e)	What is an acyclic graph?	1M
(f)	How many pointers need to be updated when inserting an element at the end of the circular linked list?	2M
(g)	Is it possible to insert different type of elements in a stack How?	2M
(h)	What are the mechanisms used for picking the pivot element in quick sort?	2M
(i)	Give an example of single and double rotation.	2M
(j)	What is quadratic probing?	2M

PART-B

(Answer any FOUR questions. All questions carry equal marks)

2.	What are the searching operations on linear list? Explain the singly linked list implementation.	15M
3(a)	What is an ADT? Explain about List ADT.	7M
(b)	Write a routine to insert an element into linked list.	8M
4(a)	Sort the following elements using Shell sort 9,2,11,3,5,7,6,11,15.	7M
(b)	Write an algorithm for Merge sort.	8M
5(a)	Write a program for non-recursive preorder traversal of BST.	7M
(b)	Explain various rotations in balancing AVL tree with an example.	8M
6(a)	Explain about hash function.	8M
(b)	Explain Closed addressing with an example.	7M
7(a)	Write the advantages and disadvantages of Queues.	7M
(b)	Write the operations on circular Queue.	8M
8.	How does a collision occur? Explain with an example and list the techniques for collision resolution.	15M

1 SEP 2021

H.T.No									
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R14

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

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

S224-ELECTRONIC DEVICES & CIRCUITS

(ECE, EEE&IT)

Time : 3 hours

Max. Marks : 75

PART-A

(Answer all questions)

- 1(a) Mention the applications of Hall effect. [1M]
- (b) Define various bias conditions for p-n junction diode. [1M]
- (c) Mention the region of operations for transistor to work it as a switch. [1M]
- (d) State the expression for stability (S) of a collector to base bias circuit. [1M]
- (e) Define voltage regulation. [1M]
- (f) Define diffusion current. [2M]
- (g) Draw the V-I characteristics of p-n junction diode and mention its region of operations. [2M]
- (h) Mention any two differences between BJT and FET. [2M]
- (i) List out the advantages of fixed bias circuit. [2M]
- (j) Mention any two differences between half wave and full wave rectifiers. [2M]

PART-B

(Answer any FOUR questions)

2. Derive an expression for concentration of electrons in an intrinsic type semiconductor material. [15M]
- 3(a) Define the Barrier potential and derive an expression for barrier potential in a p-n junction diode. [8M]
- (b) A p-n junction diode has a reverse saturation current of 30 μ amps at a temperature of 125°C. At the same temperature find the dynamic resistance for 0.2V bias in forward and reverse direction. [7M]
4. Define the current amplification factors α_{dc} , β_{dc} , γ_{dc} of a transistor and derive the relation between α , β and γ . [15M]
- 5(a) Define stability factors S, S^I & S^{II} and using general procedure derive the expression for 'S' [7M]
- (b) For a fixed bias circuit with $V_{CC} = 10V$, $V_{BE} = 0.7V$, $R_C = 2.2K\Omega$, $R_B = 120K\Omega$ and $\beta = 100$. Calculate I_B , I_C , V_{CE} , V_B , V_C and V_{BC} . [8M]
- 6(a) Explain the operation of full wave rectifier with π -filter and derive the expression for the ripple factor using π -filter. [7M]
- (b) Estimate the range of input voltage for a zener regulator which the output will remain constant with $V_Z = 6.1V$, $I_{Zmin} = 2.5mA$, $I_{Zmax} = 25mA$, $r_Z = 0\Omega$, $R = 2.2 K\Omega$ and $R_L = 1 K\Omega$. [8M]
- 7(a) State and explain law of mass action. [7M]
- (b) Justify that Fermi level lies in the centre of the energy band for intrinsic semiconductors. [8M]
8. Explain the construction and operation of enhancement mode MOSFET with its transfer and drain characteristics. [15M]

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)**

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

B.Tech. (II 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 is the disadvantage of using hard water cooking?	1M
(b)	What is meant by flue gas?	1M
(c)	What is meant by critical humidity?	1M
(d)	Why teflon is highly chemical resistant ?	1M
(e)	What is the eco friendly starting compound for the synthesis of adipic acid?	1M
(f)	Outline the more advantageous one among cold and hot lime soda processes giving reasons.	2M
(g)	How to improve octane number of gasoline?	2M
(h)	How does water line corrosion occur?	2M
(i)	What are the monomers of nylon 6:6?	2M
(j)	How liquid crystals can be identified?	2M

PART-B

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Construct a model cell for desalination of brackish water by using reverse osmosis.	7M
(b)	How does boiler corrosion occur?	8M
3(a)	Classify fuels based on origin and physical state. Give examples.	7M
(b)	Discuss about environment around crude oil and its mining process.	8M
4(a)	Illustrate the phenomenon of dry corrosion in metals.	8M
(b)	How material selection and design help to control corrosion?	7M
5(a)	How are fiber reinforced plastics prepared? What are the advantages of using them?	8M
(b)	Why natural rubber needs vulcanization? How it is carried?	7M
6(a)	Write short notes on lamellar and hexagonal phases in lyotropic liquid crystals.	8M
(b)	Discuss the structural specification of molecules that can form liquid crystalline phase.	7M
7(a)	Calculate total hardness of water sample which was found to contain $\text{Ca}(\text{HCO}_3)_2 = 4 \text{ mg/L}$, $\text{Mg}(\text{HCO}_3)_2 = 6 \text{ mg/L}$, $\text{CaSO}_4 = 8 \text{ mg/L}$, $\text{MgSO}_4 = 10 \text{ mg/L}$.	8M
(b)	How hardness is caused to water? What are the different types of hardness of water?	7M
8(a)	Explain rusting of iron under the influence of acidic environment in the absence of oxygen.	8M
(b)	State the principle of cathodic protection and explain how it helps to control corrosion.	7M

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B.Tech. (II Semester) Supplementary Examinations

S209-ELECTRICAL CIRCUITS-I

(EEE)

Time : 3 hours

Max. Marks : 75

PART-A

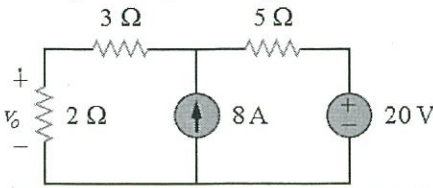
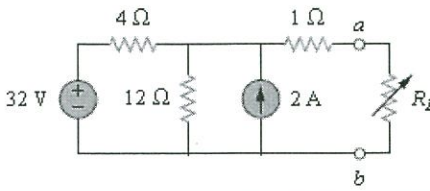
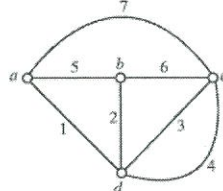
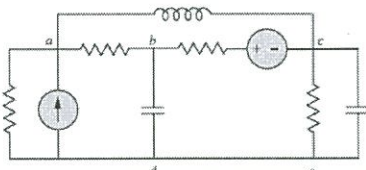
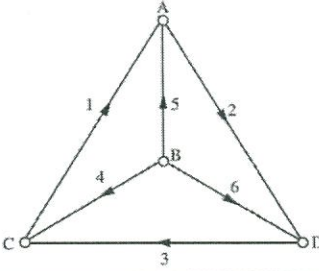
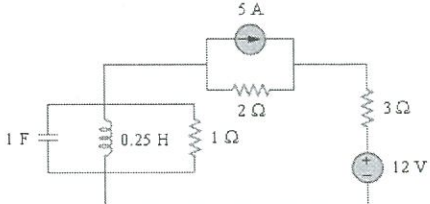
(Compulsory question)

Q.No	Questions	Marks
1(a)	What is the resistance across any open circuited terminals?	1M
(b)	Define magnetic field strength and mention their units.	1M
(c)	Write the expression for the resonance frequency of series RLC circuit	1M
(d)	State Norton's theorem.	1M
(e)	What is a Dual Network?	1M
(f)	Two bulbs marked 200 watt, 250 volts and 100watt, 250 volts are joined in series to 250 volts supply. What is the total power consumed by the circuit.	2M
(g)	Give the expression for the equivalent inductance of two coupled coils connected in series opposition.	2M
(h)	Draw the locus diagram of series R-C circuits as R varies from 0 to infinity.	2M
(i)	A d.c. source has an open-circuit voltage of 20V and an internal resistance of 2Ω . Determine the value of the load resistance that gives maximum power dissipation.	2M
(j)	Tie set matrix is the relation between which quantities?	2M

PART-B

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Calculate the equivalent resistance R_{ab} in the circuit	7M
(b)	For the circuit shown in Fig. , determine: (i) the voltage v_o , (ii) the power supplied by the current source, (iii) the power absorbed by each resistor.	8M
3(a)	What is the magnetic coupled coil? define Mutual flux, Mutual inductance , and Mutual induced e.m.f.	7M
(b)	Coils A and B are magnetically coupled. Coil A has a self inductance of 0.30 H and 300 turns, and coil B has a self inductance of 0.20 H and 120 turns. A change of flux of 8 mWb occurs in coil B when a current of 3 A is reversed in coil A. Determine (i) the mutual inductance between the coils, and (ii) the coefficient of coupling	8M
4(a)	Find the active power, reactive power and draw the power triangle to the given circuit. Also calculate the power factor of the source.	8M

(b)	What is the current locus diagram? Sketch the current locus diagram of series RL circuit as R varies from 0 to Infinity and show that it is a circle.	7M
5(a)	Using the superposition theorem, find v_o in the given circuit 	7M
(b)	Find the current passing through $R_L=36\Omega$ by using Thevenin's theorem. 	8M
6(a)	Write the incidence matrix and tie set matrix to the given graph (Tree branches are: 2, 5, 6). 	8M
(b)	Draw dual network to the given circuit. 	7M
7(a)	Two mutually coupled coils X and Y are connected in series to a 240 V DC supply. Coil X has a resistance of 5Ω and an inductance of 1 H. Coil Y has a resistance of 10Ω and an inductance of 5 H. At a certain instant after the circuit is connected, the current is 8 A and increasing at a rate of 15 A/s. Determine (i) the mutual inductance between the coils and (ii) the coefficient of coupling.	8M
(b)	Two coils are connected in series and their effective inductance is found to be 15 mH. When the connection to one coil is reversed, the effective inductance is found to be 10 mH. If the coefficient of coupling is 0.7, determine (i) the self inductance of each coil, and (ii) the mutual inductance.	7M
8(a)	Write the fundamental tie-set matrix and cut-set matrix to the given graph (Tree branches are: 4, 5, 6). 	8M
(b)	Draw the duality of the network shown in below figure. 	7M

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B.Tech. (II Semester) Supplementary Examinations

S237-ENGINEERING MECHANICS

(ME)

Time : 3 hours

Max. Marks : 75

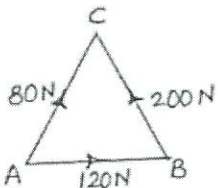
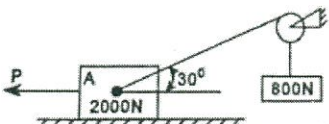
PART-A

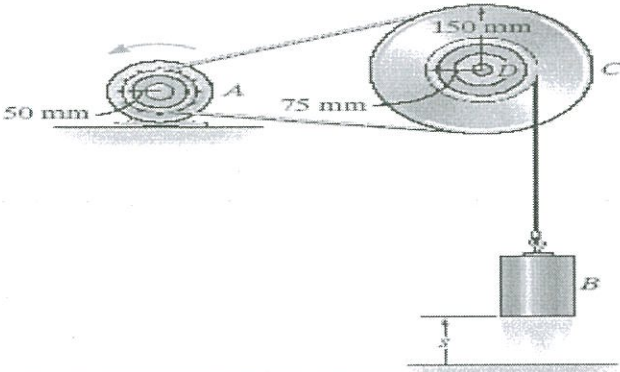
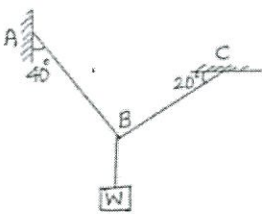
(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define Moment of a Force.	1M	CO1	L1
(b)	Define Angle of Repose.	1M	CO2	L1
(c)	Define Rectilinear Motion.	1M	CO3	L1
(d)	Define Translation.	1M	CO4	L1
(e)	State the law of conservation of energy.	1M	CO5	L1
(f)	Explain concurrent force system with sketch.	2M	CO1	L1
(g)	list out the Laws of Friction.	2M	CO2	L1
(h)	Explain the Motion of a Body Projected Horizontally.	2M	CO3	L1
(i)	Explain about General plane motion.	2M	CO4	L1
(j)	Explain about Kinetics of Rolling Bodies.	2M	CO5	L1

PART-B

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Identify the magnitude and the direction of the resultant of two forces 7N and 8N acting at a point with an included angle of 60° with between them. The force of 7N being horizontal.	7M	CO1	L3
(b)	Calculate the resultant and its position wrt. point A for the force system shown in Figure. 	8M	CO1	L3
3(a)	A body of weight 300N is lying on a rough horizontal surface having coefficient of friction as 0.3. Find the magnitude of force, which can move the body, while acting at an angle 25° with the horizontal.	7M	CO2	L3
(b)	The block A shown in fig. weighs 2000 N. the cord attached to A pass over a frictionless pulley and supports a weight equal to 800 N. the value of coefficient of friction is 0.35. solve for horizontal force P: (i) if the motion is impending towards the left, (ii) if the motion is impending towards the right. 	8M	CO2	L3
4(a)	Derive The Equations of Motion Under Uniform Velocity And Acceleration.	7M	CO3	L3
(b)	A stone is thrown vertically upwards with a velocity of 4.9 m/s. Calculate (i) the maximum height reached. (ii) the time taken to reach the maximum height. (iii) the velocity with which it returns to the ground and (iv) the time taken to reach the ground.	8M	CO3	L3

5(a)	Explain types of Planar Rigid Body Motion and explain any of one with neat sketch.	7M	CO4	L2
(b)	<p>Starting from rest when $s = 0$, pulley A ($r_A = 50$ mm) is given a constant angular acceleration, $\alpha_A = 6$ rad/s². Pulley C ($r_C = 150$ mm) has an inner hub D ($r_D = 75$ mm) which is fixed to C and turns with it.</p> <p>Find: The speed of block B when it has risen $s = 6$ m.</p> <p>(i) The angular acceleration of pulley C (and hub D) can be related to α_A if it is assumed the belt is inextensible and does not slip.</p> <p>(ii) The acceleration of block B can be determined by using the equations for motion of a point on a rotating body.</p> <p>(iii) The velocity of B can be found by using the constant acceleration equations.</p> 	8M	CO4	L3
6(a)	A 12Nm torque is applied to a flywheel that rotates about a fixed axis and has a moment of inertia of 30kgm ² . If the flywheel is initially at rest, what is its angular velocity after it has turned through eight revolution sin work energy method?	7M	CO5	L3
(b)	Derive the Equation for Translation in work energy method.	8M	CO5	L2
7(a)	<p>Calculate the tension induced in the cable used for the assembly shown in Figure.</p> 	7M	CO1	L3
(b)	A ladder 6m long and with 300N weight is resting against a wall at an angle of 60° to the ground. A man weighing 750N climbs the ladder. At what position along the ladder from bottom does he induce slipping? The coefficient of friction for both wall and the ground with ladder is 0.2.	8M	CO2	L3
8(a)	<p>A balloon is climbing vertically upwards with a constant velocity of 4.2ms⁻¹. A sandbag is dropped from the balloon and hits the ground 3.6 seconds later.</p> <p>Calculate or find: (i) Velocity of the sandbag as it hits the ground.</p> <p>(ii) Height of the sandbag at the instant that it is dropped.</p>	7M	CO3	L3
(b)	A uniform ladder of length of 3.25m & weight of 250N is placed against a smooth wall with its lower end 1.25M from the wall. Coefficient of friction between the ladder and floor is 0.3. What is the frictional force acting on the ladder at the point of contact between the ladder and the floor? Show that the ladder will remain in equilibrium in this position.	8M	CO2	L3

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B.Tech. (II Semester) Supplementary Examinations

**S147-BASIC MECHANICAL ENGINEERING
(ME)**

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks
1(a)	What are the functions of electrode coating?	1M
(b)	When figure is symmetric about X-axis, what is the value of Y-coordinate of centroid?	1M
(c)	What do you mean by Mechanical and Thermal Equilibrium?	1M
(d)	Classify various fuels.	1M
(e)	What are the essential components of a simple closed cycle gas turbine plant?	1M
(f)	Why is it necessary to use a flux in some arc welding processes?	2M
(g)	Distinguish between centroid and centre of gravity.	2M
(h)	What is PMM1?	2M
(i)	What are the requirements of a good fuel?	2M
(j)	What do you mean by port timing diagram in an internal combustion engine?	2M

PART-B

(Answer any FOUR questions. All questions carry equal marks)

2(a)	In a few words explain the essential properties of a moulding sand.	7M
(b)	Why allowances are provided on a pattern? What are various allowances?	8M
3(a)	A Body consists of a Right circular solid cone of height 40mm and radius 30mm placed on a Solid Hemisphere of radius 30mm of the same material. Find the centre of gravity of the body.	8M
(b)	Originate an expression for centre of gravity of sector of a circle.	7M
4(a)	Write a short note on Thermodynamic, Chemical, Mechanical and Thermal Equilibrium.	8M
(b)	Discuss the similarities between Heat and work.	7M
5(a)	Write short notes on pour point and cloud point.	7M
(b)	What factors are to be considered for selecting a lubricant for a particular application?	8M
6(a)	Discuss the advantages and disadvantages of closed cycle gas Turbine.	7M
(b)	Demonstrate the working principle of a two stroke cycle petrol engine.	8M
7(a)	Define Resistance welding. What are various factors mainly responsible for Resistance welding?	7M
(b)	Sketch and elucidate the steps involved in making a spot-weld.	8M
8(a)	Sketch and explain the velocity triangles for a simple impulse turbine.	7M
(b)	Draw the combined velocity triangle for a simple impulse turbine.	8M