

Code: 13CE2006**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Supplementary Examinations, August-2015****STRENGTH OF MATERIALS-II
(CIVIL ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 X 10 = 10M]**

1. a) Write the expression for circumferential stress in thin spherical shell, when subjected to an internal pressure (p).
- b) Give the formula for longitudinal strain in case of thin cylindrical shell when subjected to an internal pressure (p).
- c) Write the lame's equation for hoop stress in thick cylindrical shell.
- d) Differentiate between thin cylinders and thick cylinders.
- e) Define principal stress.
- f) What is the Magnitude of shear stress on principal plane.
- g) Write the expression for torque transmitted by hollow shaft.
- h) Write the expression for power transmitted by solid shaft.
- i) Write Perry's formula.
- j) Define slenderness ratio.

PART-B**Answer one question from each unit****[5 X 12=60M]****UNIT-I**

2. A cylindrical thin drum 800 mm in diameter and 3 m long has a shell thickness of 10 mm. If the drum is subjected to an internal pressure of 2.5 N/mm^2 , determine (i) change in diameter, (ii) change in length and (iii) change in volume. Take $E = 2 \times 10^5 \text{ N/mm}^2$: Poisson's ratio = 0.25.

(OR)

3. A spherical shell of internal diameter 0.9m and of thickness 10mm is subjected to an internal pressure of 1.4 N/mm^2 . Determine the increase in diameter and increase in volume. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $\mu = 1/3$.

UNIT-II

4. State assumptions and derive the Lamé's equations and also sketch the pressure and hoop stress distribution across the thickness of the shell.

(OR)

5. A steel tube of 200 mm external diameter is to be shrunk onto another steel tube of 60 mm internal diameter. The diameter at the junction after shrinking is 120mm. Before shrinking on, the difference of diameters at the junction is 0.08 mm. Calculate the radial pressure at the junction and the hoop stresses developed in the two tubes after shrinking on. Take E as $2 \times 10^5 \text{ N/mm}^2$.

UNIT-III

6. At a point in a strained material, on plane BC there are normal and shear stresses of 560 N/mm^2 and 140 N/mm^2 respectively. On plane AC, perpendicular to plane BC, there are normal and shear stresses of 280 N/mm^2 and 140 N/mm^2 respectively. Determine
- principal stresses and location of the planes on which they act,
 - maximum shear stress and the plane on which it acts.

(OR)

7. At a certain point in a strained material, the intensities of stresses on two planes at right angles to each other are 20 N/mm^2 and 10 N/mm^2 both tensile. They are accompanied by a shear stress of magnitude 10 N/mm^2 . Find graphically or otherwise, the location of principal planes and evaluate the principal stresses.

UNIT-IV

8. Two shafts of the same material and of same lengths are subjected to the same torque, if the first shaft is of a solid circular section and the second shaft is of hollow circular section, whose internal diameter is $2/3$ of the outside diameter and the maximum shear stress developed in each shaft is the same, compare the weights of the shaft.

(OR)

9. A hollow shaft of diameter ratio $3/8$ (internal dia. to outer dia.) is to transmit 375 kW power at 100 r.p.m. The maximum torque being 20% greater than the mean. The shear stress is not to exceed 60 N/mm^2 and twist in a length of 4m not to exceed 2° . Calculate its external and internal diameters which would satisfy both the above conditions. Assume modulus of rigidity. $C = 0.85 \times 10^5 \text{ N/mm}^2$.

UNIT-V

10. (a) A solid round bar 3m long and 50 mm in diameter is used with following conditions. Determine crippling load. Take $E = 2.0 \times 10^5 \text{ N/mm}^2$.
When the given strut is used for the following conditions
- Both ends hinged
 - One end is fixed and other is hinged
- (b) A column of timber section $150 \text{ mm} \times 200 \text{ mm}$ is 6m long both ends being fixed. If the Young's modulus for timber is 17.5 kN/mm^2 , determine
- Crippling load and
 - Safe load for the column if the factor of safety is 3.

(OR)

11. Compare the crippling loads given by Rankine's and Euler's formulae for tubular strut 2.25m long having outer and inner diameters of 37.5mm and 32.5mm loaded through pin-joint at both ends. Take: Yield stress as 315 MN/m^2 ; Rankine constant $a = 1/7500$, and $E = 200 \text{ GN/m}^2$. If elastic limit for the material is taken as 200 MN/m^2 , then for what length of the strut does the Euler formula cease to apply?

Code: 13EE2010

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, August-2015

ELECTRICAL CIRCUIT ANALYSIS-II
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours

Max Marks: 70

PART-A

Answer all questions

[1 X 10 = 10 M]

1. (a) What is the relationship between line voltages and phase voltages in a 3 phase delta connected system.
- (b) Draw the voltage phasors of a 3 phase balanced CBA phase sequence.
- (c) In a series RL circuit with $R=5\ \Omega$ and $L=5\text{H}$, what is the current $i(t)$ when applied voltage is 10V.
- (d) What is the time constant of a series RC circuit.
- (e) A series RLC circuit with $R=2\ \Omega$, $C=1\text{F}$ is to be made critically damped by the selection of the inductor. Find the value of inductor.
- (f) A series RLC circuit has $R=200\ \Omega$, $L=1\text{H}$ and $C=1\text{F}$. Find the natural frequency of the circuit.
- (g) A series RLC circuit with $R=2\ \Omega$ and $C=1\text{F}$ is to be made critically damped by the selection of the inductance. Find the value of L .
- (h) What is the necessary and sufficient condition for a rational function $F(s)$ to be the driving point impedance of an RC network.
- (i) Define band elimination filter
- (j) Define attenuation band.

PART-B

Answer one question from each unit

[5 X 12=60M]

UNIT-I

2. a) A three phase, three –wire, ABC system, with an effective line voltage of 120V, has three impedances of $5\ \Omega \angle 45^\circ$ in a delta connection. Determine the line currents. [6 M]
- b). Explain, with a neat sketch, how a three phase power is measured in a delta connected load using two watt meters? [6 M]

(OR)

3. a) A four-wire star-star circuit has $V_{an}=120\ \angle 120^\circ$, $V_{bn}=120\ \angle 0^\circ$, $V_{cn}=120\ \angle -120^\circ$ V. If the impedances are $Z_{an}=20\ \angle 60^\circ$, $Z_{bn}=30\ \angle 0^\circ$ and $Z_{cn}=40\ \angle 30^\circ$, find the current in the neutral line. [6 M]
- b) For the circuit shown in the Figure 1, the line voltage is 240 V. Take V_{ab} as reference and determine following : i) phase currents, ii) line currents. [6 M]

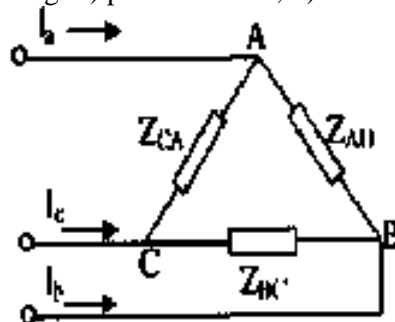


Figure 1

$$Z_{AB} = 25\ \Omega$$

$$Z_{BC} = 12\ \angle 60^\circ\ \Omega$$

$$Z_{CA} = 16\ \angle -30^\circ\ \Omega$$

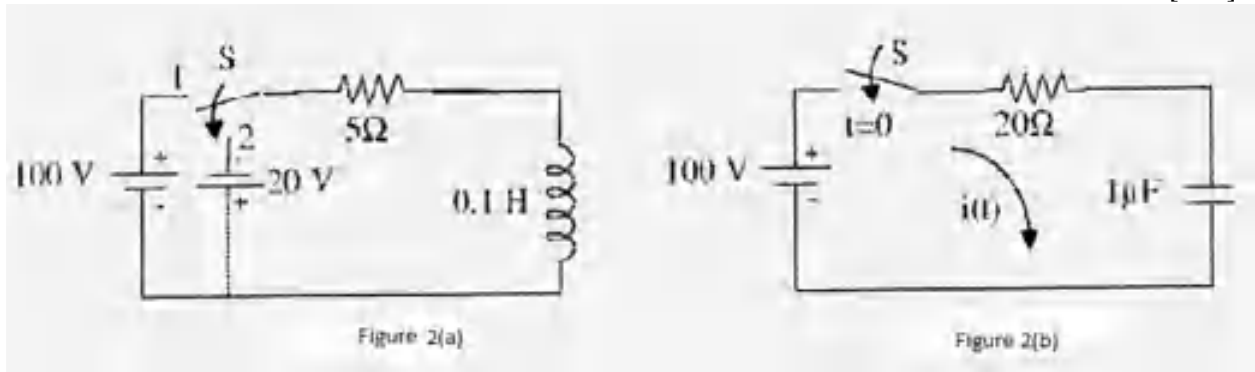
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UNIT-II

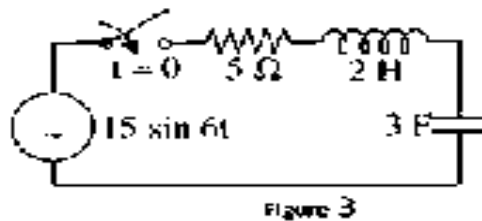
4. a) Derive an expression for a series RL circuit when it is excited by a unit step voltage. [6 M]
 b) In a series RLC circuit $L=0.5\text{H}$, and $C=2\text{F}$. A DC voltage of 20V is applied at $t=0$. Obtain an expression for current $i(t)$ in the circuit, when $R=3$. [6 M]

(OR)

- 5.a) In the circuit shown in the Figure 2(a), the switch S is in position 1 for 0.01 seconds and then changed to position 2. Find the time at which the current is zero and reversing its direction. [6 M]
 b) In the circuit shown in Figure 2(b), find the time when the voltage across the capacitor becomes 25V . after the switch is closed at $t=0$. [6 M]

UNIT-III

6. Find the voltage across the capacitance for $t>0$ in the circuit shown in Figure 3. [12M]



(OR)

7. Find the expression for current at $t>0$ when switch S is moved from 1 to 2 position at $t=0$ in Figure 4. Assume a steady state current of 1A in the R-L circuit when the switch is moved from position 1 to 2. [12M]

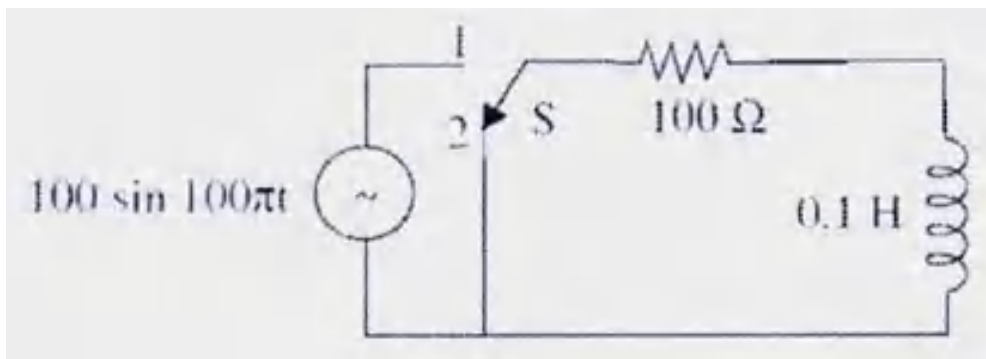


Figure 4

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UNIT-IV

8.a) List the properties of positive real function and test whether the following function is positive real or not? $F(s) = \frac{s^2+4}{s^2+3s^2+3s+1}$ [6 M]

b). Determine the Foster I form of realization of the RC impedance function. $Z(s) = \frac{(s+1)(s+3)}{s(s+2)(s+4)}$ [6 M]

(OR)

9. a) List the properties of positive real function and test whether the following function is positive real or not? $F(s) = \frac{s(s^2+4)}{(s^2+3)^2}$ [6 M]

b) Realize the driving point impedance function $Z(s) = \frac{(s+2)(s+3)}{(s+1)(s+3)}$ in Foster form-II. [6 M]

UNIT-V

10.a) What are classifications of filters? Discuss them briefly. [6 M]

b). Design a constant k-low pass filter having $f_c = 2\text{kHz}$ and design impedance $R_0 = 600 \Omega$. Obtain the value of attenuation at 4 kHz. [6 M]

(OR)

11.a) Explain the concept of m-derived filters. [6 M]

b) Design a prototype band stop filter section having cut-off frequencies of 2000 Hz and 5000 Hz and design resistance of 600 Ω . [6 M]

CODE: 13ME2009**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Supplementary Examinations, August-2015****KINEMATICS OF MACHINERY
(MECHANICAL ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 X 10 = 10 M]**

1.
 - a) Define Kinematic pair.
 - b) Illustrate the types of constrained motion using neat sketches
 - c) Mention any two examples of exact straight line mechanisms
 - d) What is a Hooke's joint ?Where is it used
 - e) Identify the direction of coriolis component of acceleration when the link rotates counter-clockwise and slider moves radially inwards.
 - f) What is velocity of rubbing?
 - g) Define the terms Base Circle Pitch, Circle in the context of cams.
 - h) Justify the statement: "Cycloidal motion is the most ideal programme for high speed follower motion".
 - i) Define the term Pressure Line of a gear.
 - j) Differentiate between a simple gear train and a compound gear train.

PART-B**Answer one question from each unit****[5 X 12=60M]****UNIT-I**

2. Explain the significance of a straight line mechanism? Distinguish between Peaucellier mechanism and Hart's mechanism with necessary illustrations. [12M]

(OR)

3.
 - a) What do you understand by degrees of freedom? Derive Grubler equation for a kinematic chain. [8M]
 - b) Compare between crank and slotted lever mechanism with whitworth quick return motion mechanism. What are the applications? [4M]

UNIT-II

4. Explain the Grashopper mechanism in detail. How is it different from modified Scott-Russell mechanism? Discuss in detail with necessary illustrations and analytical expressions. [12M]

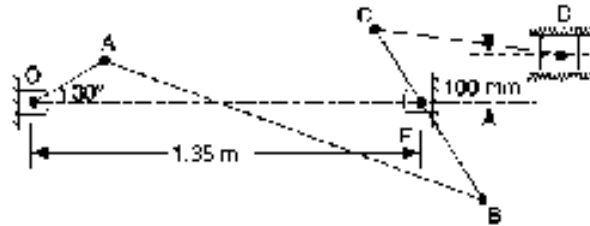
(OR)

5.
 - a) Compare between the Davis steering Gear mechanism and Ackermann Steering gear mechanism by mentioning their working principles and applications. [8M]
 - b) Identify the major applications areas of Universal coupling in industries. [4M]

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UNIT-III

6. a) The mechanism shown in the figure has following dimensions: $OA=200\text{mm}$; $AB=1.5\text{m}$, $BC=600\text{mm}$; $CD=500\text{mm}$ and $BE=400\text{mm}$. then, (a) Locate all the Instantaneous centres. (b) find velocity of B, C, D (slider) and the angular velocity of the links AB, BC, CD if the crank rotates uniformly at 120rpm. [6M]



- b) Determine the velocity at Point D using relative velocity method and compare it with the corresponding answer obtained in 6(a). [6M]

(OR)

7. a) State and explain angular-velocity-ratio theorem as applicable to mechanisms. [4M]
- b) The crank AB of a Four bar mechanism with links $AB = 100\text{ mm}$, $BC = 200\text{ mm}$, $CD = 225\text{ mm}$ and $AD = 300\text{ mm}$ rotates at 30 rad/sec. consider that BC is the coupler link and CD is the rocker. Determine the velocity and acceleration of the mid-point of the link BC. [8M]

UNIT-IV

8. A cam is needed to be designed to give the following motion with a knife edge follower: raise through 30 mm with uniform acceleration and deceleration during 120° rotation of the cam, Dwell for next 30° of rotation. To lower the follower with SHM during the next 90 degrees of rotation, and dwell for remaining motion. The cam has a minimum radius of 30 mm, and rotates counterclockwise at a uniform speed of 800 rpm. Draw the profile of the cam if the line of stroke of the follower passes through the axis of the cam shaft. Also draw the displacement, velocity and acceleration diagrams for one complete revolution of the cam. [12M]

(OR)

9. A tangent Cam with straight working faces tangential to a base circle of 120 mm diameter has a roller follower of 48 mm diameter. The line of stroke of the roller follower passes through the axis of the cam. The nose circle radius of the cam is 12 mm and the angle between the tangential faces of the cam is 90° . If the speed of the cam is 180 rpm, determine the acceleration of the follower (i) during the lift, the roller just leaves the straight flank. (ii) The roller is at the out end of its lift (at the top of the nose) [12M]

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SET-2

CODE: 13ME2009

UNIT-V

10. a) Define the following: (i) Helix angle (ii) Circular pitch. [4M]
b) The central distance between two meshing spiral gears is 260 mm and the angle between the shafts is 75° . The normal circular pitch is 14 mm and the gear ratio is 2.5. the driven gear has a helix angle of 35° . Find (i) number of teeth on each wheel, (ii) exact center distance, (iii) efficiency assuming the friction angle is 6.5° . [8M]

(OR)

11. a) Describe the structure of a reverted gear train. What are its applications. [4M]
b) An epicyclic gear train consists of an arm and two gears A and B having 30 and 40 teeth respectively. The arm rotates about the center of the gear A at a speed of 60 rpm counterclockwise, Determine the speed of the gear B if, (i) the gear A is fixed, and (ii) the gear A revolves at 240 rpm clockwise instead of being fixed. [8M]

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Code: 13EC2010**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Supplementary Examinations, August-2015****PULSE AND DIGITAL CIRCUITS
(ELECTRONICS AND COMMUNICATION ENGINEERING)****Time: 3 Hours****Max. Marks: 70****PART-A****Answer all questions****[1 X 10 = 10 M]**

1. a) Give the relation between rise time and higher cutoff frequency/
b) State clamping circuit theorem.
c) Draw the element diagram for positive peak clipper.
d) What are the stable states of a bistable multivibrator?
e) Define rise and fall times.
f) What is transmission error e_t ?
g) Mention the applications of blocking oscillator.
h) Write the expression for perfect compensation?
i) Define sweep speed error.
j) Draw the circuit diagram of astable multivibrator.

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) A ramp of slope $1/T$ having an amplitude 1V is applied to a highpass RC-circuit. [6M]
Draw to scale the output waveform for the cases (i) $T=RC$ (ii) $T=0.2RC$ (iii) $T=5RC$
b) Derive the compensation condition for a resistive attenuator. [6M]
- (OR)
3. a) Discuss the response of high pass RC circuit for exponential input. [8M]
b) Draw the response of low pass of RC circuit to ramp input for various time constants. [4M]

UNIT-II

4. Classify different types of clipper circuits. Give their circuits and explain their operation with the aid of transfer characteristics. [12M]
- (OR)
5. Draw the circuit diagram of a DC restorer circuit and explain its operation. Sketch the output waveform for a sinusoidal input signal for different clamping circuits. [12M]

Code: 13EC2010**UNIT-III**

6. Why commutating capacitors are used in binary? Define various times involved with this and relate them. [12M]
- (OR)**
7. a) Explain stable and unstable states of a binary. [6M]
b) Explain about different types of triggering. [6M]

UNIT-IV

8. Explain the operation of monostable multivibrator and draw the voltage levels in stable and quasi stable state. [12M]
- (OR)**
9. Derive the expression for e_s (slope error) of Bootstrap sweep circuit. [12M]

UNIT-V

10. With a neat circuit diagram and relevant waveforms explain in detail about blocking oscillator. [12M]
- (OR)**
11. a) Why are sampling gates called linear gates? [6M]
b) Compare unidirectional and bidirectional sampling gates. [6M]

Code: 13CS2007**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Supplementary Examinations, August-2015****DATABASE MANAGEMNET SYSTEMS****(COMMON TO CSE & IT)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 X 10 = 10M]**

1. a) What is data model?
- b) What is DML?
- c) Define Foreign key?
- d) What is 3NF?
- e) What is Projection operator ?
- f) Define integrity constraints?
- g) Define a closure?.
- h) What is isolation ?
- i) What is Serializability?
- j) Define a indexing .

PART-B**Answer one question from each unit****[5 X12=60M]****UNIT-I**

2. a) Discuss in detail about database system architecture with neat diagram? [10M]
b) Write about a instance? [2M]
- (OR)**
3. a) Draw an E-R diagram for a banking enterprise with all components and explain? [10M]
b) Write about the schemas in dbms? [2M]

UNIT-II

4. a) Explain the difference between a weak and a strong entity-set. [6M]
b) Write about Additional features of ER Model [6M]
- (OR)**
5. a) Explain Logical Database design in detail [8M]
b) Explain the terms super Key, candidate key, primary key, Composite key. [4M]

UNIT-III

6. a) Write about the Aggregative Operators? [8M]
b) Briefly discuss about the outer join? [4M]
(OR)
7. a) Explain about null values with Example [8M]
b) Explain about the Active Database . [4M]

UNIT-IV

8. a) What is need of Normalization? Explain 2nd and 3rd Normal forms with examples. [8M]
b) Explain Multi-valued dependency? [4M]
(OR)
9. a) What is serializability? explain the types with examples . [8M]
b) Briefly discuss the two phase locking protocol used in concurrency control [4M]

UNIT-V

10. a) Write about the log based Recovery. [8M]
b) Write about Hash Based Indexing and Tree base Indexing [4M]
(OR)
11. a) Explain ISAM with Example? [8M]
b) Discuss about the data security? [4M]