AR13

CODE: 13CE2006 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2017

STRENGTH OF MATERIALS-II

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define thin cylinder.
   b) Write Lame's equation.
   c) Define principle planes and principle stresses.
   d) Write the radius of Mohr's circle for σ_x is tensile stress, σ_y is comressive stress and τ_{xy} is shear stress.
   e) Write the maximum normal stress theory.
   f) Write the maximum shear stress theory.
   g) Define torsional rigidity.
   h) Define equivalent length of a column.
   i) Write the Euler's critical load for a column both ends are fixed .
   j) Write secant formula.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Derive an expression for circumferential stress and langitudinal stress for thin cylinders. 6
   b) A long steel tube 80 mm internal diameter 15mm thick has closed ends is subjected to an internal fluid pressure 2.50 N/mm^2, taking E= 2 x 10^5 N/mm^2. Estimate the percentage of increase in the internal volume of the tube. 6

(OR)

3. a) What is the thickness of metal would be required for Cast Iron water pipe 80cm in diameter under a head of 100m? Assume the permissible tensile stress for Cast Iron is 20MPa. 6
   b) A cylindrical shall 3m long and 50cm in diameter and 1.25 cm thick is at atmospheric pressure. What would be its dimensions. When it is subjected to an internal pressure 2 MPa? E= 200 GPa and m =4 6

UNIT-II

4. a) Derive Lame's formula 6
   b) A pipe 200 mm internal diameter and 50 mm thick carries a fluid at a pressure of 10 Mpa. Calculate the maximum and minimum intensities of circumferential stresses across the section. 6

(OR)

5. A thick walled closed end cylinder is made of and Aluminim alloy has in side diameter of 200 mm and out side diameter of 800 mm. The cylinder is subjected to internal fluid of 150 Mpa. Determine principle stresses and maximum shear stress at a point on the inside surface of the cylinder. Also determine the increase in inside diameter due to fluid pressure. 12

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UNIT-III

6. At a point in an elastic material under strain, there are normal stresses of 50N/mm^2, 30 N/mm^2 at right angles to each other with a shearing stress of 25 N/mm^2. Find the principle stresses and principle planes and maximum shear stress and the plane of maximum shear stress. 12

(OR)

7. The state of stress at point of a machine σ_x = 50 N/mm^2 tensile , σ_y = 30 N/mm^2 compressive , τ_{xy} = 50 N/mm^2 shear . Draw the mohr's circle find normal stress on a plane 30^0 with the vertical plane and also find principle stresses and its planes, the plane of maximum shear stress and its magnitude. 12

UNIT-IV

8. a) Derive the torsion Equation. $T/Ip = \tau/R = C\,\theta/L$ 6
   b) What power can be transmitted at 300 r.p.m by a hollow shaft of 7.50 cm external and 5 cm internal diameters, when permissible shear stress for the steel is 70 N/mm^2 and the maximum torque is 1.3 times mean? 6

(OR)

9. i) Write the assumptions in deriving the torsion equation. 12
   ii) Two shafts of same material and same length are subjected to same torque. If the first shaft is of a solid circular section and second shaft is hollow circular section whose internal diameter is 2/3 of the out side and in each shaft the maximum shear stress is same, then, compare the weight of two shafts.

UNIT-V

10. a) Write assumptions in Euler's theory for long columns 3
    b) Derive Euler's buckling load for a long column both ends are fixed 9

(OR)

11. Find the Euler's crushing load for a hollow cylindrical cast iron column, 15 cm external diameter and 2cm thick, if it is 6 m long and hinged at both ends, E= 80 Gpa, Compare this load with the crushing load given by Rankine's formula using σ_c = 560 N/mm^2 and α = 1/1600 12

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AR13 SET-1

Code: 13EE2010

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2017

ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

Answer all questions **[1 X 10 = 10 M]**

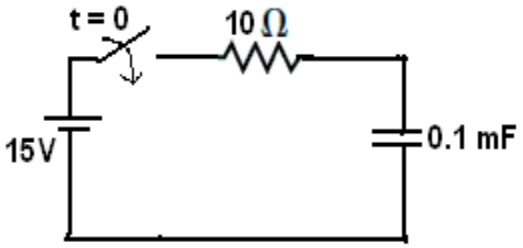
1 a) In a symmetrical Y connected supply, if the line to line voltage is $100 \angle 0^0$, what would be the phase voltage?

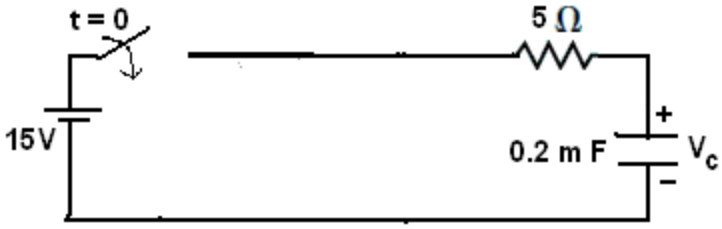
b) In a balanced Δ connected load, what is the relation between line current and phase current

.

c) Represent the transient response of voltage across capacitor.

d) Find the time constant of the circuit.





e) Find the value of i(t) in a R-L series circuit with A.C excitation.

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f) find the value of the of i(t) in a R-C series circuit with A.C excitation

g) Prove $s^6 + 5s^5 + 4s^4 - 3s^3 + s^2 + s + 3$ is Hurwitz or not.

h) Test whether F(s) = $\frac{s^2+1}{s^3+4s}$ is positive real function.

i) Differentiate between active filter and passive filter.

j) How m-derived is different from k-derived filter.

PART-B

Answer one question from each unit **[5 X 12=60M]**

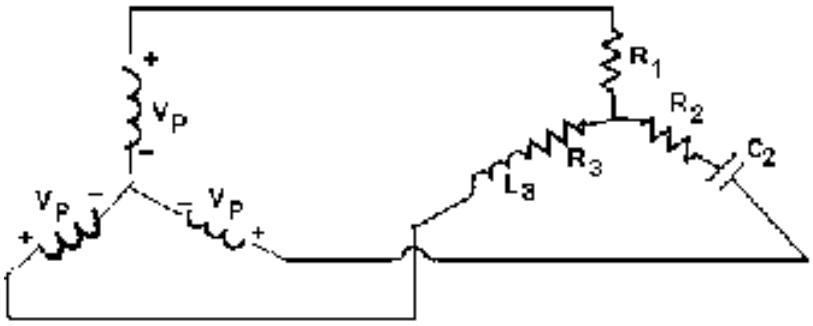
UNIT 1

2 A balanced Δ - connected load consists of three impedances each having R = 75 Ω and C = 0.2 μF connected in series. The supply is a Y-connected supply and has a 250 V phase voltage and 50 Hz frequency. Calculate the line currents and the phase angle of each line current with respect to the line voltages.

(OR)

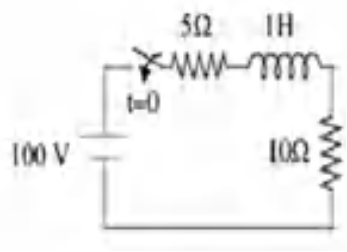
Code: 13EE2010

3 In the circuit shown in below figure, the generator line voltage is V_L = 200 V and its frquency is 50 Hz. The load impedance components are $R_1 = R_2 = R_3$ = 100 Ω, C_2 = 66.3 μF and L_3 = 159.2 mH. Calculate the line currents.



UNIT -II

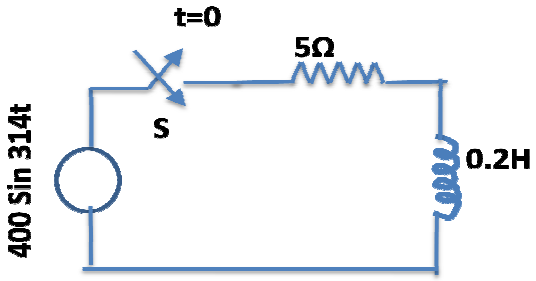
4. In the network shown below, the switch is closed at t=0. Find the value of current for t>0.



5 Find the expression for current i(t) in a R-L series circuit with D.C excitation after the switch is closed at t=0.

UNIT -III

6 For the network shown, find i (t) for t>0. Calculate the value of transient current 0.01sec after switching on.



Code: 13EE2010

(OR)

7 Determine the expression for current in R-C series circuit with A.C excitation after the switch is closed at t=0.

UNIT -IV

8 Using Foster – I form, synthesize the impedance function

$$Z(s) = \frac{(s^2+3)\,(s^2+5)}{s(s^2+4)\,(s^2+6)}$$

(OR)

9 Synthesize the following LC impedance function $Z(s) = \frac{s(s^2+4)\,(s^2+6)}{(s^2+3)\,(s^2+5)}$ using Cauer Form-II.

UNIT -V

10 A K-constant low pass filter has 2.4 kHz cut-off frequency and the design resistance R_0 = 650. Design the filter and determine at which this filter would give 20dB attenuation. Also, calculate its characteristic impedance, phase shift .constant.

(OR)

11 If a T-section of a constant k-low pass filter has series inductance 85 mH and shunt capacitance 0.025 μF, calculate its cut-off frequency and the nominal design impedance R_0. Design an equivalent π −section too.

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AR13 SET-1

Code: 13ME2009

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2017

KINEMATICS OF MACHINERY
(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

Answer all questions **[1 X 10 = 10 M]**

1. a) Write an expression for number of Degrees of Freedom of a mechanism.
   b) Write any two examples of a rolling pair
   c) What is the use of pantograph?
   d) What is the tangential component of acceleration of a link moving with uniform speed
   e) Write an expression for condition of steering in davis steering gear mechanism.
   f) What is the other name of a double helical gear?
   g) Draw the schematic representation of miter gear
   h) Write any two applications of cam and follower
   i) Write the application of reverted gear train.
   j) What is backlash in gears

PART-B

Answer one question from each unit **[5 X 12 = 60M]**

UNIT-I

2. Explain different inversions of a single-slider crank chain with the help of neat sketches. [12M]

(OR)

3. a) Prove that the path of locus of a point on link of elliptical trammel is ellipse. [6M]
   b) Explain the types of constrained motions with neat sketch and examples [6M]

UNIT-II

4. Explain briefly the types of approximately straight line mechanism [12M]

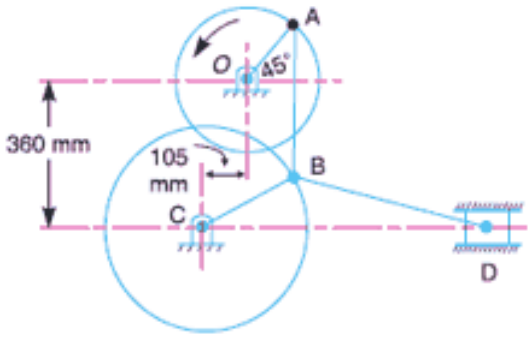
(OR)

5. a) Sketch and explain Ackerman's steering gear mechanism. [6M]
   b) Two shafts are connected by a universal joint. The driving shaft rotates at a uniform speed of 1200 r.p.m. Determine the greatest permissible angle between the shaft axes so that the total fluctuation of speed does not exceed 100 r.p.m. Also calculate the maximum and minimum speeds of the driven shaft. [6M]

Code: 13ME2009

UNIT-III

6. In the toggle mechanism shown in Figure, the slider D is constrained to move on a horizontal path. The crank OA is rotating in the counter-clockwise direction at a speed of 180 r.p.m. increasing at the rate of 50 rad/s2. The dimensions of the various links are as follows: OA = 180 mm ; CB = 240 mm ; AB = 360 mm ; and BD = 540 mm. For the given configuration, find 1. Velocity of slider D and angular velocity of BD, and 2. Acceleration of slider D and angular acceleration of BD. [12M]



(OR)

7. PQRS is a four bar chain with link PS fixed. The lengths of the links are PQ = 62.5 mm ; QR = 175 mm ; RS = 112.5 mm ; and PS = 200 mm. The crank PQ rotates at 10 rad/s clockwise. Draw the velocity and acceleration diagram when angle QPS = 60° and Q and R lie on the same side of PS. Find the angular velocity and angular acceleration of links QR and RS. [12M]

UNIT-IV

8. Draw a cam profile to drive an oscillating roller follower to the specifications given below : [12M]
(a) Follower to move outwards through an angular displacement of 20° during the first 120° rotation of the cam ;
(b) Follower to return to its initial position during next 120° rotation of the cam ;
(c) Follower to dwell during the next 120° of cam rotation.
The distance between pivot centre and roller centre = 120 mm ; distance between pivot centre and cam axis = 130 mm ; minimum radius of cam = 40 mm ; radius of roller = 10 mm ; inward and outward strokes take place with simple harmonic motion.

(OR)

9. A cam, with a minimum radius of 25 mm, rotating clockwise at a uniform speed is to be designed to give a knife edge follower, at the end of a valve rod, motion described below : [12M]
1. To raise the valve through 50 mm during 120° rotation of the cam ;
2. To keep the valve fully raised through next 30°;
3. To lower the valve during next 60°; and
4. To keep the valve closed during rest of the revolution i.e. 150° ;
The diameter of the cam shaft is 25 mm.
Draw the profile of the cam when the line of the stroke is passing through the axis of the cam shaft. The displacement of the valve, while being raised and lowered, is to take place with simple harmonic motion.

Code: 13ME2009

UNIT-V

10. a) State and prove Law of Gearing. [5M]

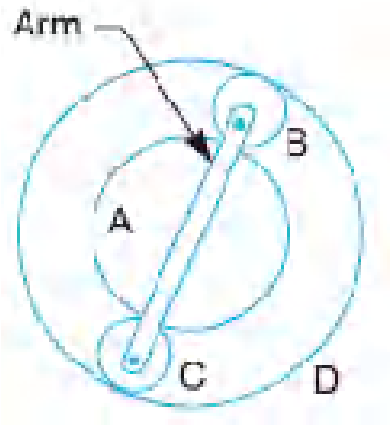
b) Two involute gears of 20° pressure angle are in mesh. The number of teeth on pinion is 20 and the gear ratio is 2. If the pitch expressed in module is 5 mm and the pitch line speed is 1.2 m/s, assuming addendum as standard and equal to one module, find : [7M]

1. The angle turned through by pinion when one pair of teeth is in mesh ; and
2. The maximum velocity of sliding.

(OR)

11. An epicyclic train of gears is arranged as shown in Figure. How many revolutions does the arm, to which the pinions B and C are attached, make : [12M]

1. when A makes one revolution clockwise and D makes half a revolution anticlockwise, and
2. when A makes one revolution clockwise and D is stationary ? The number of teeth on the gears A and D are 40 and 90respectively.



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AR13

CODE: 13EC2010 **SET-1**

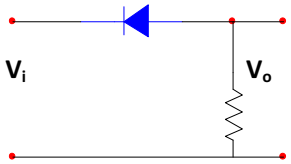
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2017
PULSE AND DIGITAL CIRCUITS
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

Answer all questions **[1 x 10 = 10 M]**

1. a) Define the term rise time and give the relation between rise time and bandwidth.
   b) Specify the condition for which a high pass circuit behaves as a differentiator and draw the output when input is a pulse.
   c) State clamping circuit theorem
   d) Draw the output waveform of following circuit when **V_i=10sinwt**



   e) Define delay time and fall time of a transistor
   f) What is the difference between symmetrical and unsymmetrical triggering?
   g) What is the expression for frequency of oscillation of astable multivibrator?
   h) Give the relationship between slope error, displacement error and transmission error.
   i) What are the applications of blocking oscillators?
   j) Define unidirectional and bidirectional gates?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) A symmetrical square wave of amplitude ±5V and frequency 2KHz is applied to a RC low pass circuit. If R=5KΩ, C=0.1μF, calculate and plot the steady state output with respect to time. **6M**
   b) Derive an expression for output of low pass circuit excited by ramp input **6M**

(OR)

3. Draw the output waveforms of a high pass circuit for RC=T, RC<T and RC>T when input is a square wave and derive the expression for % tilt. **12M**

UNIT-II

4. a) With the help of a neat circuit diagram, explain the working of an emitter coupled transistor clipper. **6M**
   b) Draw a series and shunt clipper circuit to transmit that part of a sine wave ($20V_{P-P}$) which is below +6V and also give its transfer characteristics. **6M**

(OR)

5. a) Explain the working of a positive clamping circuit. **6M**
   b) Design a clamping circuit to clamp the negative peaks to 5V given that R_f=0.1KΩ, R_r=1000KΩ,V_{R1}=5V, f=2kHz, k=10 and V_D=0.7V **6M**

AR13

CODE: 13EC2010 **SET-1**

UNIT-III

6. Derive the expression for the rise time of a transistor switch **12M**

(OR)

7. A fixed bias bistable multivibrator using n-p-n Si transistor having **12M** $\mathbf{V_{cc}=12V, R_c=1k\Omega, R_1=10k\Omega, R_2=20k\Omega, h_{fe}=50, V_{BB}=12V, V_{CE(sat)}=0.3v, V_{BE(sat)}=0.7v}$. Calculate stable state currents and voltages.

UNIT-IV

8. a) Derive the expression for pulse width of a monostable multivibrator **6M**
   b) Design an astable multivibrator, assuming that silicon devices with $h_{fe(min)=}40$ are used. Also assume that $V_{CC}=10V, I_{C(sat)=}5mA$, $f=5kHz, V_{CE(sat)}=0.2V, V_{BE(sat)}=0.7V$ **6M**

(OR)

9. Draw the circuit and explain the operation of bootstrap sweep generator and derive the expression for its slope error. **12M**

UNIT-V

10. a) Calculate the pulse width of a monostable blocking oscillator with base timing **6M**
    b) With the help of neat circuit diagram explain the working of an astable blocking oscillator with R-C control **6M**

(OR)

11. Explain the working of a bidirectional transistor sampling gate. Suggest a circuit that minimizes the pedestal **12M**

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AR13

CODE: 13CS2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2017

DATABASE MANAGEMENT SYSTEMS

(Common to CSE & IT)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Distinguish between procedural and nonprocedural DMLs
   b) Mention the components of query processor.
   c) Define Weak Entity Set.
   d) Specify the fundamental operations of Relational Algebra.
   e) Which keyword can be used to test for a null value.
   f) What is the purpose of the condition operators BETWEEN and IN?
   g) Define 2nd Normal form.
   h) Define Atomicity.
   i) What is the primary disadvantage of index-sequential file organization?
   j) Specify the two types of ordered indices.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Explain the differences between physical and logical data independence. **6 M**
   b) Explain levels of abstraction in DBMS. **6 M**

(OR)

3. a) Identify the main components in a DBMS and briefly explain what they do. **6 M**
   b) What is a transaction? What guarantees does a DBMS offer w.r.t. transactions. **6 M**

UNIT-II

4. a) Name the main steps in database design. What is the goal of each step? **6 M**
   b) Consider the following schema. **6 M**

   Sailors(sid:integer, Sname:string, rating:integer, age:real)
   Boats(bid:integer, bname: string, color: string)
   Reserves(sid:integer, bid: integer, day:date)
   Write the following queries in Relational Algebra.
   (i) Find the names of sailors who have reserved boat 103.
   (ii) Find the names of sailors who have reserved atleast one boat.
   (iii)Find the names of sailors who have reserved a red boat.

(OR)

5. a) Define all variations of join operations **6 M**
   b) Consider the following schema: **6 M**

   Suppliers(sid: integer, sname: string, address: string)
   Parts(pid: integer, pname: string, color: string)
   Catalog(sid: integer, pid: integer, cost: real)
   Write the following queries in relational algebra
   (i) Find the sids of suppliers who supply some red and green part
   (ii) Find the sids of suppliers who supply every part
   (iii) Find the sids of suppliers who supply every red part

AR13

CODE: 13CS2007 SET-1

UNIT-III

6.	a)	Explain the general form of SQL query. Explain each part.	**6 M**
	b)	Explain about NULL value and why we need to disallow NULL values	**6 M**
		(OR)	
7.	a)	What aggregate operators does SQL support ? Explain with examples.	**6 M**
	b)	Consider the following relations: Student(snum: integer, sname: string, major: string, level: string, age: integer) Class(name: string, meets_at: string, room: string, fid: integer) Enrolled(snum: integer, cname: string) Faculty(fid: integer, fname: string, deptid: integer) Write the following queries in SQL (i) Find the names of all classes that either meet in room R128 or have five or more students enrolled. (ii) Find the names of all students who are enrolled in two classes that meet at the same time.	**6 M**

UNIT-IV

8.	a)	Explain 3rd Normal form and BCNF with examples**.**	**6 M**
	b)	Define the terms schedule, complete schedule and serial schedule.	**6 M**
		(OR)	
9.		What is a locking protocol? Describe the strict two phase locking protocol**.**	**12 M**

UNIT-V

10.	a)	Describe the three steps in crash recovery in ARIES.	**6 M**
	b)	What are the main characteristics of B+ tree.	**6 M**
		(OR)	
11.	a)	What are three main principles lie behind the ARIES Recovery algorithm.	**6 M**
	b)	What are the main differences between ISAM and B+ tree indexes.	**6 M**

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