

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech I Semester Supplementary Examinations, Jan / Feb-2016

STRUCTURAL ANALYSIS-II

(CIVIL ENGINEERING)

Time:3 Hours

Max. Marks:70

PART-A

ANSWER ALL QUESTIONS

[1X10=10 M]

1. a) Distinguish between portal method and cantilever method.
- b) Brief about the degree of indeterminacy of a two hinged arch.
- c) Mention any three reasons due to which sway may occur in portal frames.
- d) Why a slope-deflection method is so called?
- e) What is C.O.F?
- f) Write the Fixed end moment for fixed beam with a point load at the centre.
- g) What is Degree of Kinematic Indeterminacy?
- h) Define stiffness and relative stiffness.
- i) What is flexibility coefficient.
- j) Which method of analysis is suitable, if static indeterminacy is more than kinematic indeterminacy?

PART-B

Answer one question from each unit

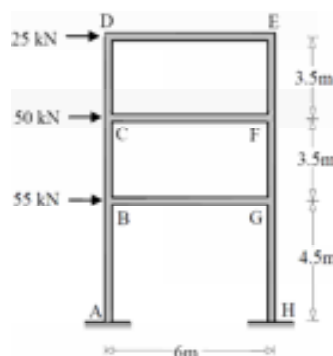
[5X12=60 M]

UNIT-I

2. A two hinged parabolic arch of span 40m and rise 7m carries two point loads, each 50kN, acting at 10m and 20m from the left end, respectively. The moment of inertia varies as the secant of the slope. Determine the horizontal thrust and maximum positive and negative moments in the arch rib.

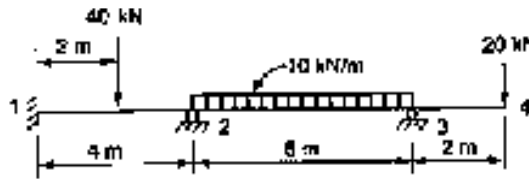
(OR)

3. Analyse the three-storeyed laterally loaded frame shown in figure , using the Portal Method and draw the bending moment diagram. Also sketch the deflected shape.



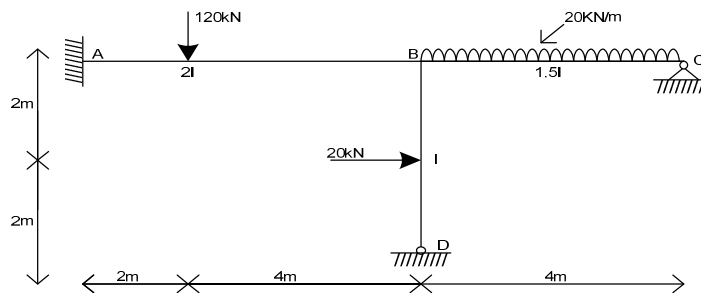
UNIT-II

4. A continuous beam is supported and loaded as shown in figure. Analyse the beam using the slope-deflection method for support moments and reactions

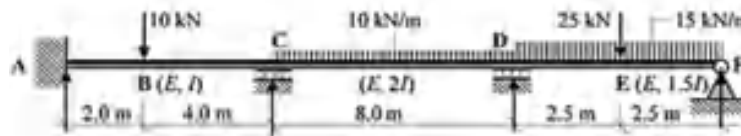


(OR)

5. Analyze the simple frame shown in fig. by slope – deflection method. End A is fixed and ends B & C are hinged. Draw the bending moment diagram.

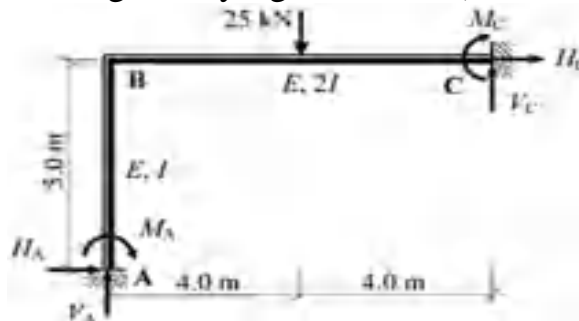
UNIT-III

6. A non-uniform, three span beam ABCDEF is fixed at support A and pinned at support F, as illustrated in figure. Using the moment distribution method determine the support reactions and sketch the bending moment diagram for the applied loading indicated.



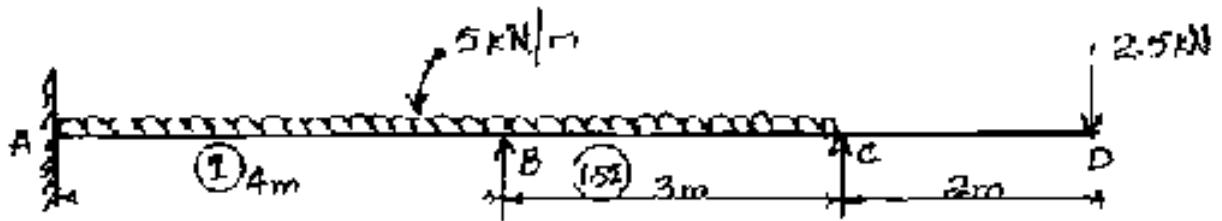
(OR)

7. Using the moment distribution analyse the rigid-jointed frame shown in figure in which the relative EI values and the applied loading are given. i) sketch the bending moment diagram and determine the support reactions, ii) sketch the deflected shape (assuming axially rigid members).



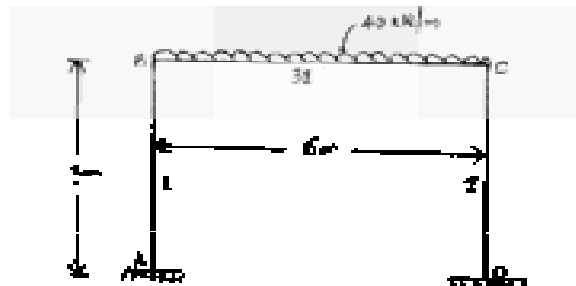
UNIT-IV

8. Analyze the continuous beam using Kani's method as shown in fig. and draw BMD & SFD

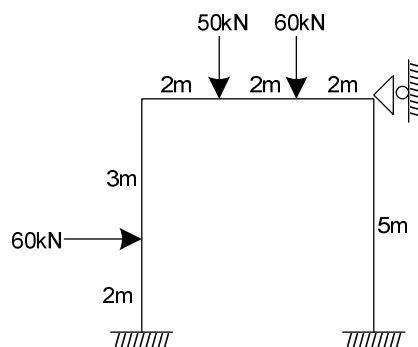


(OR)

9. Analyze the frame shown in fig. by kani's method and draw BMD & SFD

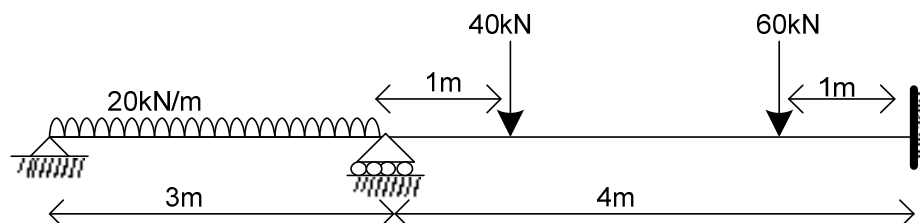
UNIT-V

10. Analyze the frame shown in fig. using stiffness method.



(OR)

11. Using stiffness method, analyze the beam shown in fig.



AR13

CODE: 13EC3017

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, Jan / Feb-2016

PULSE AND DIGITAL CIRCUITS
(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 relation between rise time and bandwidth of a low pass circuit?
 - b) What is the use of a ringing circuit?
 - c) What are the applications of voltage comparators?
 - d) What are the other names of clipping circuits?
 - e) How does a diode act as a switch?
 - f) Describe a bi-stable multi-vibrator?
 - g) Define the terms UTP and LTP of a Schmitt trigger?
 - h) Why is mono-stable multi-vibrator also called gating circuit?
 - i) What is meant by current time base generator?
 - j) What is the advantage of miller integrator over bootstrap circuit?

PART - B

Answer one question from each unit

[5 x 12 = 60M]

UNIT-I

2.
 - a) Derive an expression for the output of a low pass circuit excited by a ramp input?
[6M]
 - b) A limited ramp shown in figure is applied to an RC differentiator. Draw the output waveforms for the cases: (a) $T=0.2RC$, (b) $T=RC$, and (C) $T=5RC$.
[6M]

(OR)

3.
 - a) Explain how a low pass RC circuit acts as an integrator and derive the expression for output voltage?
[6M]
 - b) A 1KHz square wave output from an amplifier has rise time $t_r=350ns$ and tilt=5%. Determine the upper and lower 3dB frequencies.
[6M]

UNIT-II

4.
 - a) State and prove Clamping circuit theorem?
[6M]
 - b) Draw the negative clamping circuit. Show the input and output waveforms and explain the operation of each circuit.
[6M]

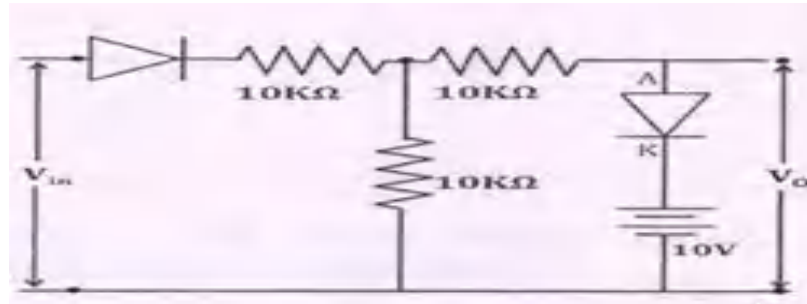
AR13

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SET-1

(OR)

5. For the circuit shown below obtain the transfer characteristics and the output waveform if the input varies as $V_i = 50 \sin \omega t$. The diodes are ideal. [12M]



UNIT-III

6. a) Explain how the transistor can be used as a switch? [6M]
b) Explain the working principle of fixed-bias transistor binary with the help of a neat diagram? [6M]

(OR)

7. The self-biased bistable multivibrator uses silicon transistors with $h_{FE}(\min) = 20$. The junction voltages and I_{CBO} may be neglected. Design the circuit subject to condition $V_{CC} = 18V$, $R_1 = R_2$, $I_{C(\max)} = 10mA$. The base current of ON transistor is twice the minimum base current, and V_{BE} of the OFF transistor is equal to $-1V$. [12M]

UNIT-IV

8. a) Show that an astable multivibrator can be used as a voltage-to-frequency converter? [6M]
b) With a neat circuit diagram explain the working of an collector-coupled monostable multivibrator? [6M]

(OR)

9. Design an astable multivibrator to generate a square wave of 1KHz frequency with a duty cycle of 25%. The circuit uses silicon transistors with $h_{FE}(\min) = 40$. [12M]

UNIT-V

10. a) Define Sweep speed error displacement error and transmission error? [6M]
b) With the help of a neat diagram, explain the working principle of unidirectional diode gate? [6M]

(OR)

11. Find the component values of a bootstrap sweep generator, given $V_{CC} = 18V$, $I_{C(sat)} = 2mA$, and $h_{FE}(\min) = 30$. [12M]

CODE: 13ME3017**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****III B.Tech I Semester Supplementary Examinations, Jan / Feb-2016****THERMAL ENGINEERING - II
(MECHANICAL ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 X 10 = 10 M]**

1. a) What are the limits of the maximum and minimum temperatures in a steam power cycle?
- b) Explain why reheat cycle is not used for low boiler pressures?
- c) Define exothermic and endothermic reactions.
- d) Define specific steam consumption?
- e) What do you understand by "boiler draught"?
- f) Write applications of gas turbine
- g) Sketch an evaporator condenser
- h) What is meant by stoichiometric air-fuel ratio?
- i) If cycle X has lower cycle efficiency than cycle Y, does it necessarily have a lower relative efficiency?
- j) Define nozzle efficiency.

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

2. (a) A power generating plant uses steam as a working fluid and operates at a boiler pressure of 50 bar, dry saturated and a condenser pressure of 0.05 bar. Calculate cycle efficiency, work ratio and specific steam consumption for Carnot and Rankine cycle. Take pumping work for Rankine cycle. [8M]
- (b) What should be the properties of working fluid so that the Rankine cycle, approaches the Carnot cycle? [4M]

(OR)

3. (a) Describe the apparatus that is commonly used for analysis of dry exhaust gases. Discuss the probable sources of error in such an analysis. [6M]
- (b) A boiler burns coal of the following composition: C-88%, H₂-3.82%, O₂-2.2% and remainder ash. On a particular occasion the percentage of CO₂ passing up the chimney was 10%. The temperature of chimney gases was then 250°C. If sample of this gas is analyzed by the Orsat apparatus at room temperature, what percentage of CO₂ would you expect, assuming complete combustion of the fuel. [6M]

UNIT-II

4. (a) Sketch and describe the working of a Lancashire boiler. Explain why it is still employed in some of the industries? [6M]
- (b) Describe the working of a Babcock and Wilcox water tube boiler. Show the arrangement of water tubes and furnace and indicate path of the furnace gases and water circulation by arrows. [6M]

(OR)

5. (a) Describe the working of Locomotive boiler and show the positions of various mountings. [5M]
- (b) Describe briefly the advantages which would expect to be gained from incorporating economizer, air pre-heater and super heater in a steam plant. [7M]

CODE: 13ME3017**UNIT-III**

- 6 (a) Explain the working of an evaporative condenser? [6M]
(b) What factors contribute to the loss of efficiency in a surface condenser? [6M]

(OR)

- 7 (a) Explain the physical significance of choked flow. [4M]
(b) The following refer to the expansion of air flowing through a nozzle. Inlet and outlet pressures, 4bar and 1bar. Temperatures and velocity of air at nozzle outlet 350°C and 700m/s. find the temperature at nozzle exit, nozzle efficiency and nozzle exit area for a flow rate of 4kg/s. [8M]

UNIT-IV

- 8 (a) Sketch and explain velocity compounded impulse turbine showing the pressure and velocity variations along the axis. [6M]
(b) One stage of an impulse turbine consists of a row of nozzles and one row of moving blades. The steam enters the nozzles at a pressure of 15bar, dry saturated, with a velocity 130m/s. the pressure drop along the nozzle is 9bar. The nozzles have discharge angle of 20° and steam passes into the blades without the shock. If the velocity coefficient for nozzles is 0.9. Determine for maximum efficiency conditions. [6M]
i) The blade angles were equi-angular blades. ii) the blading efficiency.

(OR)

- 9 (a) Explain the working of single stage reaction turbine. Show the expansion on h-s chart. [6M]
(b) Define the term 'degree of reaction' as applied to a steam turbine. Show that parson's reaction turbine the degree of reaction is 50 %. [6M]

UNIT-V

- 10 (a) What are the requirements of a good combustion chamber for a gas turbine? [4M]
(b) A gas turbine draws in air from atmosphere at 1 bar and 10°C and compresses it to 5 bar with an isentropic efficiency of 80%. The air is heated to 1200 K at constant pressure and then expanded through two stages in series back to 1 bar. The high pressure turbine is connected to the compressor and produces just enough power to drive it. The low pressure stage is connected to an external load and produces 80 kW of power. The isentropic efficiency is 85% for both stages. Calculate the mass flow of air, the inter-stage pressure of the turbines and the thermal efficiency of the cycle. [8M]
For the compressor $\gamma = 1.4$ and for the turbines $\gamma = 1.333$. The gas constant R is 0.287 kJ/kg K for both. Neglect the increase in mass due to the addition of fuel for burning.

(OR)

- 11 (a) Describe with a sketch the principle of pulse jet. How does it differ from ram jet? What is its field of applications? [6M]
(b) What is meant by thrust augmentation when is it necessary. Describe the two main methods of thrust augmentation [6M]

AR13

CODE: 13EC3013

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, Jan / Feb-2016

DIGITAL IC APPLICATIONS

(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 X 10 = 10 M]

- 1 a) What is wired-AND connection?
- b) A two-input TTL NAND gate has $V_{CC} = +5\text{ V}$ and $2\text{ K}\Omega$ load connected at its output. Calculate the output voltage when both inputs are low.
- c) What is the function of Pseudo Random Binary Sequence generator?
- d) List the steps in synchronous sequential circuit design.
- e) Draw the logic diagram for 4×1 Multiplexer constructed using three 2×1 Multiplexers.
- f) What is the function of asynchronous or direct inputs to a flip-flop?
- g) Draw the logic diagram for 16-bit adder realized using two 7483 ICs.
- h) List the applications of shift register.
- i) How many flip-flops are required to design a 5-bit ring counter?
- j) What are the features of IC 74x 381?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

- 2 a) Draw the circuit diagram and explain the operation of two-input TTL NAND gate with open-collector output. [6M]

- b) Draw the circuit diagram of a ECL NOR/OR gate and explain its operation. Show how it can be interfaced with TTL gate. [6M]

(OR)

- 3 a) Compare totem pole and open collector outputs. [4M]

- b) Draw the circuit and explain the operation of

- i) CMOS two-input NAND gate ii) CMOS two-input XOR gate [8M]

UNIT-II

- 4 a) Implement the 16×4 priority encoder using 74XX148 ICs and gates. [6M]
b) Design a parity generator circuit using 74180 IC to add an even parity bit to a 7-bit word. [6M]

(OR)

- 5 a) Write VHDL program for a 3×8 decoder. [6M]
b) Explain the role of tri-state buffers in the design of digital systems. [6M]

UNIT-III

- 6 Write VHDL code for a 16-bit barrel shifter that performs right circular shift. [12M]

(OR)

- 7 a) Write VHDL code for multiplication of two 4-bit numbers. [6M]
b) Explain the concept of dual priority encoder. [6M]

UNIT-IV

- 8 a) Write VHDL code to implement mod-11 binary ripple counter. [6M]
b) Design a divide-by-five ripple counter using IC 7490. [6M]

(OR)

- 9 a) Write VHDL code to simulate 4-bit shift left register. [4M]
b) Design a 3-bit up/down synchronous counter using T flip-flops. [8M]

UNIT-V

- 10 a) Implement a 3-bit even parity checker circuit using a suitable size ROM. [6M]
b) Draw the block diagram of CPLD and explain its structure. [6M]

(OR)

- 11 Implement the following Boolean functions using PAL.

$$f_1(A,B,C,D) = \sum (0,2,6,7,8,9,12,13)$$

$$f_2(A,B,C,D) = \sum (0,2,6,7,8,9,12,13,14) \quad [12M]$$

$$f_3(A,B,C,D) = \sum (2,3,8,9,10,12,13)$$

$$f_4(A,B,C,D) = \sum (1,3,4,6,9,12,14)$$

List the PAL programming table and draw the logic diagram.

CODE: 13CS3014**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****III B.Tech I Semester Supplementary Examinations, Jan / Feb-2016****OPERATING SYSTEMS
(COMMON TO CSE & IT)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) What is graceful degradation?
b) What is process control block?
c) What are conditions under which a deadlock situation may arise
d) What are a safe state and an unsafe state?
e) Define lazy swapper.
f) What is a reference string?
g) What are the various file operations?
h) How free-space is managed using bit vector implementation.
i) What is low-level formatting?
j) Mention any three character devices?

PART-B**Answer One Question From Each Unit****[5 x 12 = 60 M]****UNIT-I**

2. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

<u>Process</u>	<u>Burst time</u>	<u>Priority</u>
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order $P1, P2, P3, P4, P5$, all at time 0.

- i. Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a Non-preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.
- ii. What is the turnaround time of each process for each of the scheduling algorithms
- iii. What is the waiting time of each process for each of the scheduling algorithms

(OR)

3. a) Explain the various services provided by operating system in detail. 6M
b) Discuss about multi thread programming model. 6M

UNIT-II

4. What is the need of Banker's algorithm? Consider the following snapshot of a system:

12 M

	<u>Allocation</u>				<u>Max</u>				<u>Available</u>			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	1	1	0	0	2	1	0	1	5	2	0
P1	1	2	3	1	1	6	5	0				
P2	1	3	6	5	2	3	6	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker's algorithm:

- What is the content of the matrix Need?
- Is the system in a safe state?
- If a requests from Process p1 arrives for (2,1,1,0)) and (0,2,10) can the requests be granted immediately?

(OR)

- Explain what semaphores are, their usage, implementation given to avoid busy waiting and binary semaphores. 8M
 - What is critical section problem and explain the requirements? 4M

UNIT-III

- Explain the concept of demand paging and the performance issues of demand paging? 6M
 - Write in detail about virtual memory? 6M

(OR)

- Explain the basic concepts of segmentation. 4M
 - Consider the following page-reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 How many page faults would occur for the following replacement algorithms, assuming frame size is 4. Remember that frames are initially empty. 8M
- (i)LRU replacement (ii)FIFO replacement (iii)Optimal replacement

UNIT-IV

- Write in detail about directory structure in file system. 8M
 - Write notes about the protection strategies provided for files. 4M

(OR)

- Explain the indexed and linked file allocation methods. Discuss the advantages and disadvantages in those methods. 8M
 - Explain in detail about free-space management. 4M

UNIT-V

- Discuss with diagrams the following three disk scheduling: FCFS, SSTF, C-SCAN 8M
 - Discuss about file system mounting. 4M

(OR)

- Write notes about disk management and swap-space management. 8M
 - Explain projection and security goals. 4M