

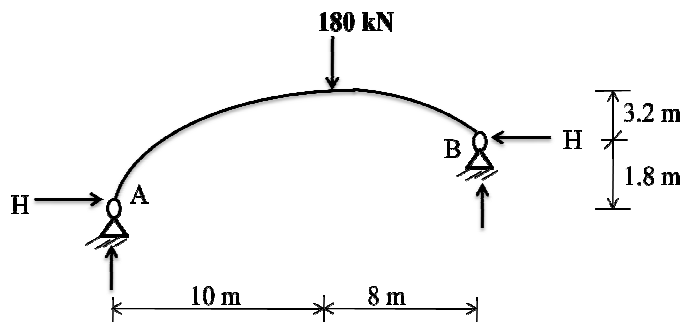
**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)  
III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2017  
STRUCTURAL ANALYSIS -II  
(Civil Engineering)**

**Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 X 10 = 10 M]**

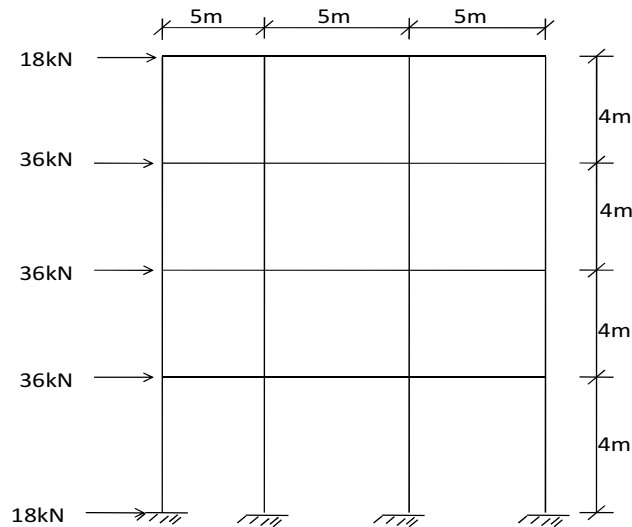
1. a) What is the effect on horizontal thrust in two hinged arch due to Rib shortening?
- b) Explain a assumption in Cantilever method with sketch.
- c) Differentiate between absolute and relative stiffness of members
- d) Differentiate between flexibility and stiffness.
- e) What is the effect of displacement at release in member?
- f) Draw two cases the portal frame having side sway.
- g) Explain practical situation where support rotation takes place.
- h) What do understand by carry over factor, give an example?
- i) What do you understand by flexibility?
- j) Calculate the fixed end moment for the figure in slope deflection method.

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

2. (a) A two hinged parabolic arch of span 60 m and central rise 6 m is subjected to a crown load of 40 kN. Allowing for rib shortening, temperature rise of 20° C and yield of each support of 0.006 cm/10kN. Determine H.  $I_c = 6 \times 10^5 \text{ cm}^4$ ,  $A_c = 1000 \text{ cm}^2$ ,  $E = 10 \text{ kN/mm}^2$ ,  $\alpha = 11 \times 10^{-6} / ^\circ\text{C}$ ,  $I = I_c \sec \theta$ .
- (b) An unsymmetrical two-hinged parabolic arch shown in fig. has a span of 18 m. The highest point of the arch is 5 m and 3.2 m above the left and right support, respectively. The arch is loaded with a concentrated load of 180 kN at the highest point. Assume the secant variation of inertia. Find the reactions at the support.

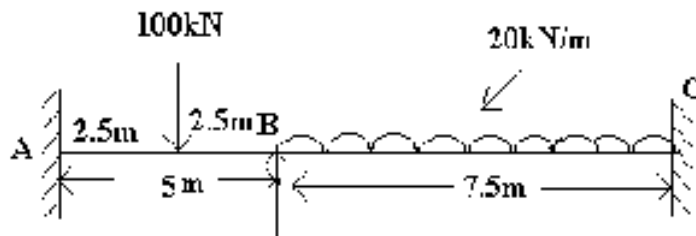
**(OR)**

3. (a) State the assumptions of Portal method.
- (b) Analyze the bottom most storey using portal method. (axial forces, shear forces and moments in columns and beams) provided the upper storey columns axial forces are 31.2 KN, -31.2 KN in the left and right exterior columns respectively and zero KN in the interior columns.



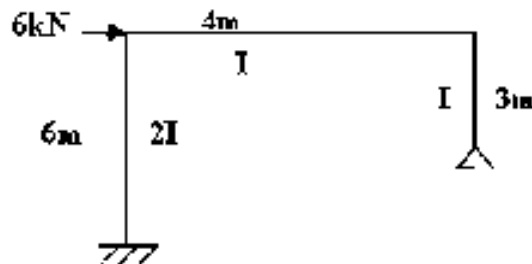
## UNIT-II

4. Analyse the continuous beam ABC using slope deflection method and Draw shear force and bending moment diagrams.



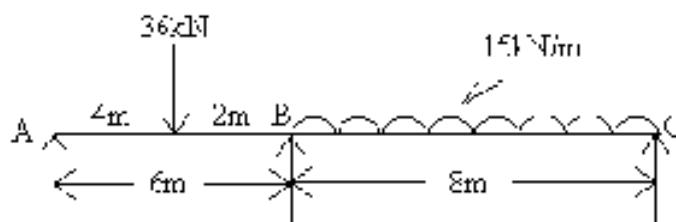
(OR)

- 5 Analyse the portal frame using slope deflection method and draw bending moment diagram



## UNIT-III

- 6 Using moment distribution method analyse the two span continuous beam loaded as shown in Figure, if the moment of inertia of AB = I while that of BC = 2I. The ends A and C are simply- supported. Sketch the B.M. and S.F. diagram.



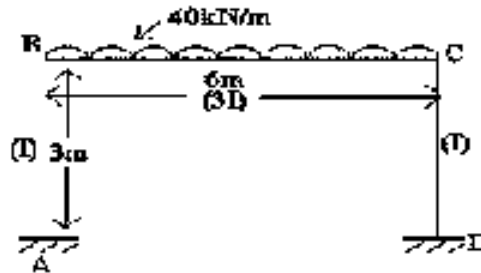
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SET-2

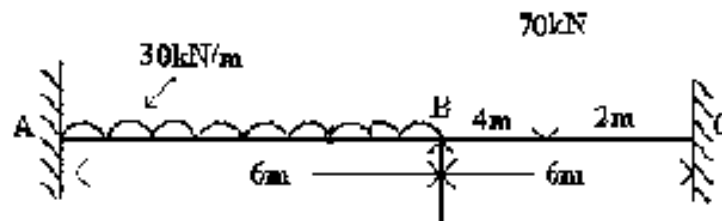
(OR)

- 7 Analyse the Portal frame as shown in figure using moment distribution method  
Draw B.M.D.



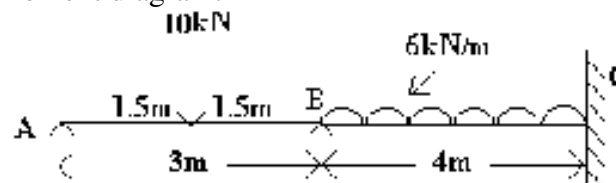
## UNIT-IV

- 8 Analyse the continuous beam as shown in figure using Kani's method.  
Draw shear force and bending moment diagram.



(OR)

- 9 Analyse the continuous beam as shown in figure using flexibility method.  
Draw bending moment diagram.

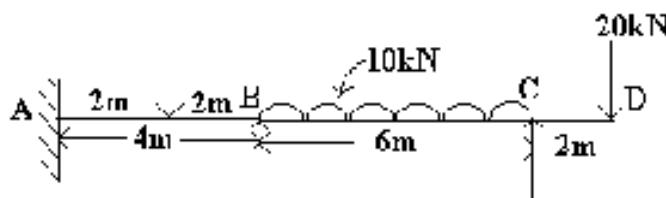


## UNIT-V

- 10 Analyse the continuous beam ABCD having spans AB, BC and CD 5m, 4m and 3m respectively. End supports are fixed. Span AB is subjected to a central concentrated load of 15 kN, span BC is subjected to a uniformly distributed load of 25 kN/m and span CD carries a concentrated load of 40 kN. Use stiffness matrix method. Draw B.M.D.

(OR)

- 11 (a) Analyse the continuous beam loaded as shown in figure by the displacement method if the support B sinks by 10mm. Take  $E = 200 \text{ GN/m}^2$  and  $I = 10 \times 10^4 \text{ mm}^4$ . Sketch the B.M.D.



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SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)  
III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2017

## 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) Draw the Response of High Pass Filter when input is a Sine Wave  
b) Draw the Circuit Diagram of RLC Circuit  
c) What are the other names of Clipper  
d) What is the necessity of connecting Resistor in Clamping Circuit  
e) \_\_\_\_\_ is used to Speed up the Operation of Bistable Multivibrators  
f) Define Storage Time of a Diode  
g) What are the other names of Astable Multivibrator  
h) Which Multivibrator can be used as Voltage to Time Converter  
i) Define Restoration Time  
j) Mention any one Application of Sampling Gate

### PART-B

Answer one question from each unit

[5x12=60M]

#### UNIT-I

2. a) A pulse of 11 V amplitude and 0.5ms duration is applied to an RC high pass circuit with  $R=20\text{ K}\Omega$  and  $C=0.47\text{ }\mu\text{F}$ . Sketch the output waveform and determine the percentage tilt in the output **7 M**  
b) Prove that Low Pass Filter acts as an Integrator **5 M**  
(OR)
3. a) The periodic waveform shown in figure 1 is applied to an Low Pass Circuit whose time constant is  $20\mu\text{s}$ . Sketch the output waveform for the first two cycles of the input **6 M**

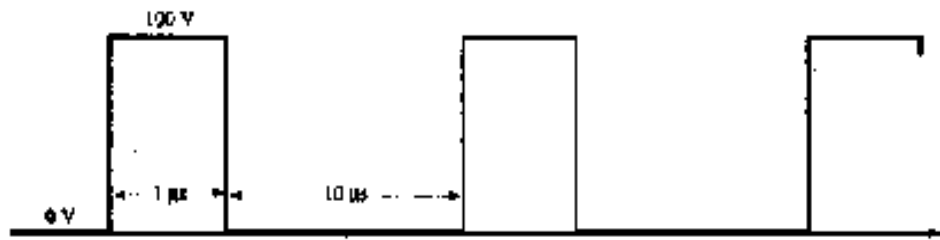


Figure-1

- b) Prove that Average Level of Output Waveform from the High Pass Circuit is always Zero Independently of the DC Level of the Input **6 M**

UNIT-II

4. The input voltage  $V_i$  to the two level clipper shown in figure 2 varies linearly from 0 to 200 V. Sketch the output voltage  $V_o$  to the same time scale as the same input voltage. Assume ideal Diodes

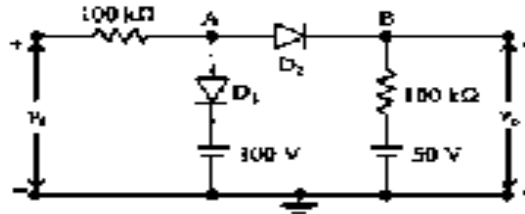


Figure 2

(OR)

5. a) Explain how Clipping Circuit acts as a Comparator **7 M**  
 b) A 100V peak Square wave with period of 25 ms is to be negatively Clamped at 20 V. Draw the circuit diagram necessary for this purpose. Draw the output waveform **5 M**

UNIT-III

6. a) Explain about Transistor Switching Times **6 M**  
 b) Design a Fixed Bias Bistable Multivibrator to meet the following Specifications **6 M**  
 $V_{CC} = V_{BB} = 12V$ ,  $I_C(SAT) = 6 \text{ mA}$ ,  $h_{fe} = 50$

(OR)

7. a) Explain breakdown voltage considerations of Transistor. **5 M**  
 b) Explain the Unsymmetrical Triggering in Bistable Multivibrator **7 M**

UNIT-IV

8. a) Explain the operation of Schmitt trigger with circuit diagram and Waveforms **7 M**  
 b) Derive the expression for the frequency Oscillation of Collector Coupled Astable Multivibrator **5 M**

(OR)

9. a) Design a Collector Coupled Monostable Multivibrator with a gate width of 2 ms **8 M**  
 $V_{CC} = 10V$  and  $-V_{BB} = -4V$ ,  $I_C(SAT) = 10 \text{ mA}$ ,  $h_{fe} = 20$  and assume Si transistors.  
 b) Explain the Triggering Action in Monostable Multivibrator **4M**

UNIT-V

10. a) Explain with circuit diagram the operation of a two input sampling gate which Does not have any loading effect on control signal. **4 M**  
 b) Derive the relationship between Sweep error, Displacement error, and Transmission error **8 M**

(OR)

11. a) Differentiate between Unidirectional Sampling Gate and Bidirectional sampling gate **4 M**  
 b) Explain the working of Transistor Miller Time Base Generator **8 M**

# AR13

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SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)  
III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2017

## THERMAL ENGINEERING - II (Mechanical Engineering)

Time: 3 Hours

Max Marks: 70

### PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Draw the PV diagram of Rankine Cycle.  
b) Explain the principle of Calorimeter.  
c) What is the function of safety valve in Boiler.  
d) What is the difference between jet condenser and surface condenser.  
e) Define Condenser efficiency.  
f) What is meant by compounding in Steam Turbine.  
g) Define diagram efficiency in steam turbine.  
h) Draw the PV diagram of closed cycle Gas Turbine.  
i) What type of compressor is used in Gas Turbine plant.  
j) What are the advantages of open loop gas turbine over closed loop gas turbine cycle.

### PART-B

Answer one question from each unit

[5 x 12=60M]

#### UNIT-I

2. (a) Explain in detail various methods of improving efficiency of Rankine Cycle. [6M]  
(b) In a steam power plant, the steam enters the turbine at 25 bar and 300 Deg C and is condensed in the condenser at a pressure of 0.60 bar. Determine the efficiency of the Rankine cycle without considering the pump work. [6M]
- (OR)
3. (a) Explain the working of ORSAT apparatus with neat sketch. [6M]  
(b) Explain why Rankine cycle is the ideal cycle of reference and not the Carnot cycle for steam power plant. [6M]

#### UNIT-II

4. (a) What is the difference between fire tube and water tube boiler. [6M]  
(b) Explain with a neat sketch working of Cochran Boiler. [6M]
- (OR)
5. (a) Define the term draught. State the difference between induced draught and forced draught. [6M]  
(b) Determine the draught produced in mm of water column by a chimney of height 36.2 m. The mass of air supplied per kg of fuel burnt is 19kg. The temperature of atmospheric air is 300 K and temperature of flue gases is 623 K. [6M]

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## UNIT-III

6. (a) Explain about Wilson Line in Steam Nozzle. [4M]  
(b) An impulse turbine is to develop 1200kW with a steam consumption of 8.4 kg per kWh, steam being initially at 20 bar and 300°C. If the throat diameter of each nozzle is 1.2cm, the exhaust pressure is 0.8bar. Determine i) Number of nozzles required ii) exit diameter of the nozzle. [8M]

(OR)

- 7 (a) What are sources of air leakage in Condenser. What is its effect on a Condenser. [4M]  
(b) The surface Condenser is designed to handle 16000 kg of steam per hour. The steam enters the condenser at 0.09 bar (absolute) and 0.88 dryness fraction and the condensate leaves the condenser at the corresponding saturation pressure. Determine the rise in cooling water temperature if the cooling water flow rate is  $8.96 \times 10^5$  kg/hr. Assume that the pressure is constant throughout the condenser. [8M]

## UNIT-IV

8. (a) Derive the expression for maximum efficiency of reaction turbine. [6M]  
(b) Steam with a velocity of 600m/s enters the row of blades of an impulse turbine. The blade angle at entry is 25°. The mean blade speed is 250m/s. The exit angle of the blade is 30°. There is 10% loss in relative velocity due to friction in the blades. Determine i) Nozzle angle ii) Work done for kg steam iii) Diagram efficiency iv) Axial thrust per kg of steam. [6M]

(OR)

9. (a) Differentiate between Impulse and Reaction Turbine. [6M]  
(b) A de-Laval turbine has a blade speed of 200m/s and the relative velocity of the steam at inlet 300m/s. The inlet and outlet angles of the blades are 30°, while the steam leaves the wheel inclined at an angle 85° to the plane of motion. If the steam consumption is 1.12 kg/sec. Determine i) Absolute velocity of steam at inlet ii) Blade friction coefficient iii) Power developed. [6M]

## UNIT-V

10. (a) List out the advantages of open cycle gas turbine over closed cycle gas turbine. [4M]  
(b) A gas turbine unit receives air at 100 kPa and 300 Kelvin and compresses it adiabatically to 620 kPa with efficiency of the compressor 88%. The fuel has a heating value of 44180 kJ/kg and the fuel/air ratio is 0.017. The turbine internal efficiency is 90%. Calculate the compressor work, turbine work and thermal efficiency. [8M]
- (OR)
11. (a) Explain the working difference between propeller jet, turbo jet and turbo prop. [6M]  
(b) A turbo jet engine consumes air at the rate of 60.2 kg/s when flying at a speed of 1000 km/hr. Calculate (i) Fuel flow rate in kg/s, when air fuel ratio is 70:1 (ii) propulsive power (iii) propulsive efficiency. [6M]

# AR13

CODE: 13EC3047

**SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2017

**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**  
(Electronics and Communication Engineering)

**Time: 3 Hours**

**Max Marks: 70**

## PART-A

**ANSWER ALL QUESTIONS**

**[1 X 10 = 10 M]**

1.
  - a) What is the effect of using a voltmeter of low sensitivity?
  - b) What are the different types of errors that may occur in measurements?
  - c) What is the spatiality of storage oscilloscope?
  - d) What is a Wave Analyzer?
  - e) What does the term phosphorescence means?
  - f) What is meant by distortion factor?
  - g) What is the drawback of Dual Trace Oscilloscope?
  - h) What two conditions must be satisfied to make an A.C bridge balance
  - i) Give the applications of LVDT.
  - j) What is the difference between thermocouple and thermister.

## PART-B

**Answer one question from each unit**

**[5x12=60M]**

### UNIT-I

2.
  - (a) Discuss in detail thermocouple type RF ammeter. [6M]
  - (b) Write the difference between a series type ohmmeter and a shunt type ohmmeter [6M]

**(OR)**

3.
  - (a) Draw the block diagram and explain the specifications of digital multi meter?. [6M]
  - (b) Why is a thermocouple measuring instrument classified as an RF instrument. And what is the limitation of a thermo couple. [6M]

### UNIT-II

4.
  - (a) Explain the working of a standard sweep generator. [6M]
  - (b) With a neat block diagram discuss about an AF wave analyzer [6M]

**(OR)**

5.
  - (a) Explain the working of Frequency Selective wave analyzer with neat diagram [6M]
  - (b) Explain with the help of block diagram, the working of a harmonic distortion analyzer. [6M]



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SET-2

## UNIT-III

- 6 (a) The lissajous pattern on an CRO is stationary and have five horizontal and two vertical tangencies. The frequency of the horizontal input is 1000 Hz. [6M]  
Determine the frequency of vertical input.
- (b) Explain the operation of a dual beam Oscilloscope and explain its working [6M]

(OR)

- 7 (a) With a block diagram explain the operation of a sampling oscilloscope [6M]  
(b) Explain the operation of a Digital storage Oscilloscope. What is its specialty? [6M]

## UNIT-IV

- 8 (a) Describe the operation of Kelvin's bridge and what its primary usage is. [6M]  
(b) Explain the principle and working of Q meter. [6M]

(OR)

- 9 (a) Define the term null. Explain how unknown resistance is measured a [6M]  
bridge.
- (b) Derive the balance condition for schearing bridge. [6M]

## UNIT-V

- 10 (a) What is Transducer? Write the classification of transducers. [6M]  
(b) What is LVDT? Explain the operation of a LVDT. [6M]

(OR)

- 11 (a) Write a short nodes on data acquisition systems. [6M]  
(b) Explain the working principle of Thermistors and give the applications. [6M]

**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 an operating system?
  - b) Define a thread.
  - c) What is a semaphore?
  - d) What is a safe state?
  - e) Define a dirty bit.
  - f) What is thrashing?
  - g) List out file operations.
  - h) Define a directory.
  - i) Distinguish between seek time and latency time.
  - j) What is the role of device controller?

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

2.
  - a) Compare and contrast the multiprogramming and time sharing operating systems. **6M**
  - b) Explain the functionalities of operating system. **6M**
- (OR)**
3. Consider the following set of processes, with the length of the CPU burst given in milliseconds: **12M**

Process	CPU Burst Time	Priority
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 that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1).
- ii. What is the turnaround time of each process for each of the scheduling algorithms in part i?
- iii. What is the waiting time of each process for each of the scheduling algorithms in part i?

# AR13

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**SET-2**

## UNIT-II

4. a) Define Monitor. Explain its concept with suitable example. **6M**  
b) Write and explain Readers/Writers classical synchronization problem. **6M**  
(OR)  
5. a) Explain in detail about deadlock detection techniques. **6M**  
b) Explain how to recover the system from a deadlock. **6M**

## UNIT-III

6. a) Consider the reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with three frames. Trace FIFO, optimal, and LRU page replacement algorithms. **6M**  
b) Explain in detail about demand paging. **6M**  
(OR)  
7. a) Describe how to share common code in paging. **6M**  
b) Explain in detail about segmentation. **6M**

## UNIT-IV

8. a) Discuss in detail about various file access methods. **6M**  
b) Explain in detail about various directory structures. **6M**  
(OR)  
9. Explain about different file allocation methods. **12M**

## UNIT-V

10. a) Discuss in detail about disk Scheduling algorithms. **6M**  
b) Explain about various character devices. **6M**  
(OR)  
11. a) What is a stream? Explain it. **6M**  
b) Discuss in detail about the protection and security of an operating system. **6M**