AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November 2020
WATER RESOURCE ENGINEERING
(Civil Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) List factors you consider in selecting for a rain-gauge station   6M
   b) Explain forms of precipitation. Which of them are of significance to a civil engineer?   8M

(OR)

2. a) Define hydrograph. Draw a single- peaked hydrograph and indicate its various components   8M
   b) The peak of flood hydrograph due to a 3-h duration isolated storm in a catchment is 270m3/s. The total depth of rainfall is 5.9cm, Assuming an average infiltration loss of 0.3cm/hr and constant baseflow of 20m3/s, estimate the peak of 3-h unit hydrograph of this catchment.   6M

UNIT-II

3. a) Define aquifer? What are the different type of aquifers?   6M
   b) What is Darcy's law? Derive the equation for Darcy's law.   8M

(OR)

4. a) Two observation wells 15m and 30m away from a pumping well of 20 cm diameter record drawdowns of 3.2m and 2.2m respectively. If the well penetrates to a full static water table of 40m, determine the transmissibility of the aquifer and draw down at the pumping well   6M
   b) Explain with a sketch different types of aquifers and wells   8M

UNIT-III

5. a) Illustrate various storage zones of a reservoir with neat sketch   8M
    b) Explain how would you determine reservoir capacity for a specified yield   6M

(OR)

6. a) Write a note on reservoir sedimentation. How do you estimate the probable life of a reservoir?   6M
    b) Explain various types of reservoirs. What do you advantages of multipurpose reservoir?   8M

UNIT-IV

7. a) Briefly explain the principal crops in India, also describe the different factors affecting the duty of a canal system   6M
    b) Find the following data pertaining to a cultivated land, determine irrigation interval and amount of irrigation water needed at each irrigation so that the moisture content of any stage does not fall below 40 of the maximum available moisture.   8M
       Field capacity of soil= 35%
       Permanent wilting point=12%
       Porosity of soil=0.42
       Depth of root zone of soil=1.2m
       Consumptive use= 12mm/day
       Application efficiency =60%

(OR)

8. a) Explain about the vertical distribution of soil moisture   7M
    b) List various water application methods? Compare the merits and demerits of each method.   7M

UNIT-V

9. a) For a channel, the discharge (q), rugosity (N), critical velocity ratio (m) and the bed width- depth ratio (B/D) are given. Explain how would you design the channel using Kennedy's theory   7M
    b) What are the objectives of the land drainage? Discuss the requirements of land drainage   7M

(OR)

10. Define canal lining? What are the different types lining.   14M

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CODE: 16EC3020 / EE   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November 2020
MICROPROCESSORS AND MICROCONTROLLERS
(Electrical & Electronics Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1	a)	Explain the addressing modes of 8086 with examples	7M
	b)	Explain in detail about the ISR and INT vector table	7M

(OR)

2	Draw and discuss the read and write cycle timing diagrams of 8086.	14M

UNIT-II

3	a)	Explain the arithmetic instructions of 8086.	7M
	b)	Explain assembler directives of 8086	7M

(OR)

4	a)	Difference between procedure and macro	7M
	b)	Write an ALP in 8086 to determine the square of the given N-numbers	7M

UNIT-III

5	Draw the format of flag register of Intel 80386 and describe only four salient flags of 80386	14

(OR)

6	Draw and explain the internal architecture of 80386	14

UNIT-IV

7.	a)	What is DMA? Explain the DMA data transfer using DMA controller	7M
	b)	Explain the architecture of 8255 PPI	7M

(OR)

8.	a)	Explain the importance of 8259 Interrupt controller and explain how does it handle the Interrupt	7M
	b)	Give on interfacing diagram, which shows the connection between 8086 and 8259	7M

UNIT-V

9.	a)	Explain the addressing modes of 8051.	7M
	b)	Discuss the PIC microcontrollers	7M

(OR)

10.	a)	Explain the 8051 block diagram and its features	7M
	b)	Explain the PSW register	7M

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CODE: 16ME3019   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November 2020
MECHANICAL VIBRATIONS
(Mechanical Engineering)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Define cam and follower mechanism and give some applications   4M
   b) A cam operating a knife - edged offset follower has the following data Follower moves outwards through 60mm during 100° of cam rotation. Follower dwells for the next 60°. Follower returns of its original position during next 120°. Follower dwells for the rest of the rotation. The offset radius is 12mm. The displacement of the follower is to take place with SHM during the outward and return strokes. The least radius of the cam is 50mm. Draw the cam profile.   10M

(OR)

2. a) Discuss about classification of followers.   4M

   b) Cam with 25 mm as minimum diameter is rotating clockwise at a uniform speed of 1000 rpm and has to give the motion to the roller follower 10mm diameter as defined below:
      - Follower to complete outward stroke of 30mm during 120^0 of cam rotation with equal uniform velocity
      - Follower to dwell for 60^0 of cam rotation.
      - Follower to return to its initial position during 120^0 of cam rotation with SHM.
      - Follower to dwell for the remaining 90^0 of cam rotation.   10M

      Layout the cam profile when the roller follower axis passes through the axis of the cam.

UNIT-II

3. a) Define Static and Dynamic Balancing.   4M
   b) Three masses A, B and C are 4kg, 3kg and 2.5kg respectively. The corresponding radii of rotations are 75mm, 85mm and 50mm. The angles of masses are 45^0, 135^0 and 240^0 with respect to x-axis. For static balancing of these masses, determine the amount of counter mass and its relative angular position, if the radius of rotation of counter mass is 65mm   10M

(OR)

4. a) Outline the role of balancing in Machines   4M
   b) A single cylinder reciprocating engine has speed 240 rpm stroke 300mm, mass of reciprocating parts 50kg, mass of revolving parts at 150mm radius 37kg. If two third of the reciprocating parts and all the revolving parts are to be balanced, find (1) the balance mass required at a radius of 400mm, and (2) the residual unbalanced force when the crank has rotated 60^0 from top dead centre   10M

UNIT-III

5. a) Explain the term 'whirling speed' or 'critical speed' of a shaft. 4M

   b) A cantilever shaft 50mm diameter and 300mm long has a disc of mass 100kg at its free end. The young's modulus for the shaft material is $200GN/m^2$. Determine the frequency of longitudinal vibrations and transverse vibrations of the shaft. 10M

(OR)

6. a) Explain free, damped and forced vibrations. 4M

   b) A harmonic motion is given by, $x = 10 \sin(\omega t - 60^0)$ mm. Determine 10M
   i. Frequency **ii.** Time Period **iii.** Maximum Velocity **iv.** Maximum acceleration

UNIT-IV

7. a) Explain importance of multi degree of freedom system. How it relates to practical applications. 4M

   b) Find the mass and stiffness matrix for the figure shown assume no friction. $K_1=100$ N/m, $K_2=200$ N/m. $m_1=150$kg. $m_2 =300$kg. 10M
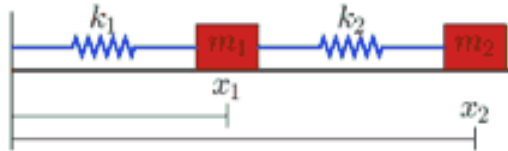
(OR)

8. a) Define Modal analysis 2M

   b) Obtain the frequency equation for the system shown in Figure. Also determine the natural frequencies and mode shapes when $k_1 = 2k$, $k_2 = k$, $m_1 = m$ and $m_2 = 2m$. 12M
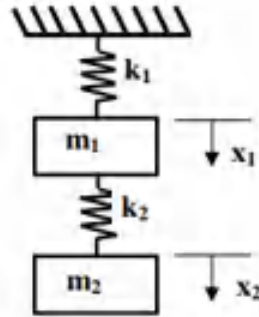

UNIT-V

9. a) Derive the expression for Natural frequency of free torsional vibrations. 4M

   b) A shaft of 100 mm diameter and 1 meter long has one of its end fixed and the other end carries a disc of mass 500 kg at a radius of gyration of 450mm. The modulus of rigidity of the shaft material is 80 GN/m^2. Determine the frequency of torsional vibrations. 10M

(OR)

10. a) Define the term radius of gyration. 2M

    b) A flywheel is mounted on a vertical shaft as shown in Figure. The both ends of the shaft are fixed and its diameter is 50 mm. The flywheel has a mass of 500 kg and its radius of gyration is 0.5m. Find the natural frequency of torsional vibrations, if the modulus of rigidity for the shaft material is 80 GN/m^2. 12M
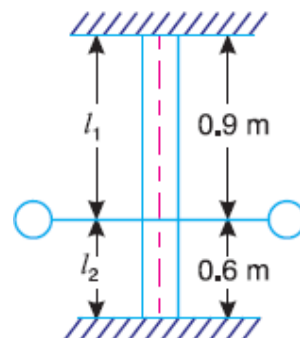
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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November 2020
MICROPROCESSORS AND MICROCONTROLLERS
(Electronics and Communication Engineering)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1	a)	Explain the addressing modes of 8086 with examples	7M
	b)	Explain in detail about the register set of 8086 micro processor.	7M
		(OR)	
2		Draw and discuss the read and write cycle timing diagrams of 8086 in maximum mode and minimum mode	14M

UNIT-II

3	a)	Explain the arithmetic and logical instructions of 8086	7M
	b)	Write an ALP to perform ascending order for a sequence of 8 numbers.	7M
		(OR)	
4	a)	Difference between procedure and macro	7M
	b)	Write an ALP in 8086 to determine the square of the given N-numbers	7M

UNIT-III

5		Explain the paging mechanism of Intel 80386 micro processor.	14M
		(OR)	
6		Draw and explain the internal architecture of 80386	14M

UNIT-IV

7.	a)	What is DMA? Explain the DMA bases data transfer using DMA controller	7M
	b)	Draw the architecture of 8255 and explain the operating modes.	7M
		(OR)	
8.	a)	Explain the importance of 8259 Interrupt controller and explain how does it handle the Interrupt	7M
	b)	Give on interfacing diagram, which shows the connection between 8086 and 8259	7M

UNIT-V

9.	a)	Explain the operation of following instructions of 8051. i) MOVX A, @dptr ii) DJNZ R3, rpt iii) ADDC A,40h	7M
	b)	Discuss the PIC microcontrollers	7M
		(OR)	
10.	a)	Explain the 8051 block diagram and its features	7M
	b)	Explain the any two special function registers.	7M

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, October / November 2020
COMPILER DESIGN
(Common to CSE & IT)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain different phases of compiler.	10M
	b)	Define the following terms: Interpreter, and Translator.	4M
		(OR)	
2.	a)	What is LEX? Discuss the usage of LEX in Lexical Analyzer generation.	7M
	b)	Explain in detail about Bootstrapping	7M

UNIT-II

3.	Define an LL(1) grammar. Is the following grammar LL(1). G:S → iEtS	iEtSes |a , E → b. Also write the rules for computing FIRST() and FOLLOW().	14M
	(OR)	
4.	What is an LALR(1) grammar?. Construct LALR parsing table for the following grammar: S→ CC, C → cC , C → c|d	14M

UNIT-III

5.	a)	What are different intermediate code forms? Discuss different Three Address code types and implementations of Three Address statements.	8M
	b)	Discuss about Heap Storage Allocation.	6M
		(OR)	
6.	a)	Discuss various storage structures with merits and demerits.	5M
	b)	Explain the format of the Symbol Table with a neat diagram.	9M

UNIT-IV

7.	a)	Explain the role of DAG in optimization with example	7M
	b)	What are the issues in the design of code generator? Explain in detail.	7M
		(OR)	
8.	a)	Explain the procedure to convert a given program into a flow graph.	6M
	b)	What is an induction variable? Explain with an example.	8M

UNIT-V

9.	a)	Explain various issues in the design of the code generation	7M
	b)	Explain various machine dependent code optimization techniques.	7M
		(OR)	
10.	a)	Explain the code generation algorithm in detail.	7M
	b)	Explain how a DAG is used for Register Allocation.	7M

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, October / November 2020
POWER SYSTEMS-III
(Electrical and Electronics Engineering)

Time: 3 Hours   Max Marks: 70

PART-A
ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) Why current chopping is considered a serious drawback in a circuit breaker?
   b) What is meant by breaking or rupturing capacity of a circuit breaker?
   c) Define the terms sensitivity and selectivity of a relay.
   d) What is meant by relay setting?
   e) Why is over current protection not necessary for modern alternators?
   f) What is magnetising inrush current?
   g) Why use of single bus-bar arrangement is restricted to small and medium sized substations and small power stations?
   h) What is unit type protection?
   i) Why earth wire is provided in overhead transmission lines?
   j) What is the difference between lightning conductor and lightning arrester?

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

2. a) Derive the expressions for restriking voltage and RRRV. What measures are taken to reduce it?
   b) In a 220 kV system, reactance and capacitance up to location of circuit breaker is 8 ohm and 0.025 micro farad. A resistance of 600 ohm is connected across the contacts of circuit breaker. Determine (i) natural frequency of oscillation (ii) damped frequency of oscillations (iii) critical value of resistance.

(OR)

3. a) Explain the working of an air blast circuit breaker with the help of suitable diagram. And also explain the current chopping phenomena associated with ABCB.
   b) Describe with a neat sketch the principle of operation of a minimum oil circuit breaker. Why is it called so?

UNIT-II

4. a) What are the shortcomings in electromagnetic relays? Discuss briefly. Discus also how these shortcomings are overcome in induction cup relays.
   b) Describe with a neat sketch the operating principle of an inverse type over current relay. How plug settings control the pick-up current of such a relay?

(OR)

5. a) Explain the principle of distance relays stating clearly the difference between impedance relay, reactance relay, and mho relay.
   b) What is meant by percent bias? How is this achieved on practice in a differential relay? Under what circumstances is a percentage differential relay preferred over the differential one.

UNIT-III

6. a) A large turbo generator is running in synchronism with an infinite bus when there is a sudden failure of its excitation system. What may be the consequence? Describe a suitable protection scheme to prevent such consequences.
   b) Calculate the required value of neutral resistance for a three-phase 11 kV alternator, so as to protect 70 percentage of the winding against earth fault by a relay with pick-up current of 1 A. The neutral CT has a ratio of 250/5.

(OR)

7. a) Draw a neat circuit diagram of Merz-Price percent differential protection scheme for a three-phase delta-star connected transformer.
   b) Why is a harmonic restrained differential relay required to be used for protecting a large size transformer? Describe the construction and working of such a relay.

UNIT-IV

8. a) Describe in detail the protection of parallel feeder and ring mains.
   b) With neat sketch explain Translay protection to a three-phase feeder.

(OR)

9. a) Discuss and compare briefly various bus-bar arrangements in power system.
   b) Explain differential protection of a bus bar in the power system.

UNIT-V

10. a) Describe the construction, principle of operation of valve type lighting arrester.
    b) Describe the construction and explain the operation of Zn oxide type lightning arrester

(OR)

11. a) What is the purpose of earthing? Distinguish between system earthing and equipment earthing.
    b) What is the need of grounding the neutral? Describe briefly the various grounding techniques.

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AR13

CODE: 13EI3002   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, October / November 2020
INSTRUMENTATION AND CONTROL SYSTEMS
(Mechanical Engineering)

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

PART-A

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

1. a) What is meant by calibration?
   b) Explain the principle on which the bimetallic thermometer works?
   c) What Are Primary Elements to Measure Pressure?
   d) What is the purpose of providing backing for bonded strain gauges**?**
   e) What are the basic elements of a control system?
   f) What is Peltier effect?
   g) What are the desirable properties of thermometric liquid?
   h) What is root locus?
   i) What is Thomson effect?
   j) Write a merit of Nyquist over Routh Hurwitz criteria.

PART-B

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

UNIT-I

2. a) List out the differences between direct and indirect comparison.   6M
   b) Describe the construction and working of a Bourdon tube. Describe the   6M
      C type, Spiral   type and helical type Bourdon gauges with neat
      diagrams.

(OR)

3. a) Briefly explain measurement system and what the types of   6M
      measurement standards.
   b) Write about McLeod pressure gauge.   6M

UNIT-II

4. a) An electric resistance strain gauge of 100 resistance and gauge factor 2   6M
      is bonded to a specimen of steel. Calculate the change in resistance of
      the gauge when a tensile stress of 60MN/m^2 is applied on the
      specimen.
   b) What is Hot Wire Anemometer? Describe its construction and   6M
      principle of Working.

(OR)

5. a) Distinguish between bonded and unbounded type of resistance strain gauge   6M

   b) Describe the working principle of total radiation pyrometers? List out its advantages and limitations.   6M

UNIT-III

6. a) Explain any two torque measuring techniques with neat sketches.   6M

   b) Describe the functioning of a stroboscope and explain how speed of a rotating shaft can be measured using a single pattern and multi-pattern disc?   6M

(OR)

7. a) Write the principle and working of seismic type accelerometer.   6M

   b) Explain principle and operation of dynamometer?   6M

UNIT-IV

8. a) Discuss advantages and disadvantages of open loop and closed control systems?   6M

   b) List out the differences between the Positive and negative feedback systems and open loop and closed loop control systems.   6M

(OR)

9. a) Derive the expressions for Rise time, Peak time, and Peak overshoot.   6M

   b) Draw the response of second order system for critically damped case and when input is unit step.   6M

UNIT-V

10. Construct Nyquist plot for a feedback control system whose open loop transfer function is given by G(S)H(S) =5/ S(1-S).Comment on the stability of open loop and closed loop transfer function.   12M

(OR)

11 a) Discuss PID control algorithm.   6M

   b) Define frequency domain characteristics.   6M

AR13

CODE: 13EC3019   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, October / November 2020
MICROPROCESSORS AND MICROCONTROLLERS
(Electronics & Communication Engineering)

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

PART-A

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

1. a) The content of two registers is given as, CS = 0000H, and IP = 8000H. Calculate the physical address from where the instruction will be fetched.
   b) Compare the following assembler directives: DW and DD
   c) What is the range of memory locations reserved for interrupt vector table?
   d) Compare hardware and software interrupts.
   e) State the advantages of using cache memory in a processor.
   f) Differentiate protected mode and real mode.
   g) What are the advantages of programmable interrupt controller?
   h) What is meant by overrun error?
   i) Distinguish the following instructions in 8051: RET and RETI
   j) What is an immediate addressing mode in 8051? Give example.

PART-B

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

UNIT-I
2. Illustrate any 8 addressing modes in 8086 Microprocessor with suitable example.   12

(OR)

3. Explain in detail about various general purpose registers (GPRs) in 8086 Microprocessor. Also give details about the special functions performed by these GPRs.   12

UNIT-II
4. Discuss various string manipulation instructions in 8086 with suitable examples.   12

(OR)

5. Write an ALP to move the contents of Ten consecutive memory locations (Block) available at 35000H into another set of locations with a starting address of 85000H. Initialize the segment and index registers accordingly and offer your comments.   12

UNIT-III
6. Draw and explain 80386 Microprocessor architecture.   12

(OR)

7. Explain memory paging mechanism in Intel 80386 Microprocessor.   12

UNIT-IV
8. Draw and discuss the architecture of 8255. Also discuss different modes of operation.   12

(OR)

9. Explain in details about the output (display) mode of operation of 8279 chip.   12

UNIT-V
10. Develop an 8051 ALP to create a square wave of 2 KHz frequency with 50% duty cycle on bit 2 of port 1. Make necessary assumptions on Timer and its mode. XTAL = 12 MHz   12

(OR)

11. Write short notes on (i) DPTR (ii) SCON (iii) PCON (iv) TMOD (v) TCON (vi) IP   12

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, October / November 2020
UNIX PROGRAMMING
(Computer Science & Engineering)

Time: 3 Hours   Max Marks: 70

PART-A
ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) What is the difference between cmp and diff?
    b) Which command is used to delete duplicate lines?
    c) What is shell?
    d) Define meta character.
    e) Define system call.
    f) Differentiate dup() and dup2 () system calls.
    g) How to create new process in UNIX?
    h) What is zombie process?
    i) Define IPC.
    j) What is semaphore?

PART-B

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

2. a) Explain the following commands with examples   6M
        i) mkdir   ii) cp iii) head   iv) tr   v) sort   vi) df
    b) Explain briefly vi editor with example.   6 M
                                (OR)
3. a) Explain the following commands with examples   6 M
        i) rm   ii) ls iii) who   iv) tail   v) wc   vi)
        more
    b) Which command is useful to change permissions of a file?   6 M
        Explain different ways to change permissions.

UNIT-II

4. a) Write short note on I/O redirection.   6 M
   b) Write a shell script to generate multiplication table.   6 M

(OR)

5. a) Explain various control structures in shell.   6 M
   b) Write a shell script to display number of lines and words present in a given file.   6 M

UNIT-III

6. a) Write a short note on Unix file structure.   6 M
   b) Explain the following system calls with example: 6 M
      i) open()   ii) chown()   iii) lseek() iv) close()

(OR)

7. a) Illustrate the difference between System calls & Library functions?   6 M
   b) Explain the following system calls with example: 6 M
      i) chmod()   ii) dup()   iii) link()   iv) mkdir()

UNIT-IV

8. a) Define process. With a neat sketch explain different states of a process.   6 M
   b) Write a program to create a child process using system call.   6 M

(OR)

9. a) List and explain the process identifiers with example.   6 M
   b) With example explain the following system calls: 6 M
      i) kill()   ii) alarm() iii) sleep() iv) pause ()

UNIT-V

10. a) Differentiate named and unnamed pipes.   6 M
    b) Define semaphore. Demonstrate semaphores with example program.   6 M

(OR)

11. Explain various IPC mechanisms.   12 M

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