

**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) Define unit hydrograph? Illustrate how you can obtain the unit hydrograph from a flood hydrograph resulting from a storm of certain duration. 7M
- b) Determine the unit hydrograph of an effective duration of 3 hours. The flood hydrograph due to an isolate storm of 3 hours duration has 6 hours ordinates as under in cumecs: 2; 4; 33; 116; 86; 64; 46; 32; 18; 15; 9; 7; 5; and 3. Assume a base flow of 2 cumecs. The catchment area of the basin is 200 km<sup>2</sup> 7M

**(OR)**

2. a) Compare between recording and non-recording type rain gauges. 6M
- b) Explain hydrologic cycle with a neat sketch. Discuss the various process and storages involved in the system. 8M

**UNIT-II**

3. a) Derive an expression for discharge from a tube well in unconfined aquifer. The well fully penetrates it 8M
- b) Calculate the discharge in m<sup>3</sup> /day from a tube well under the following conditions of an unconfined aquifer: Diameter of the well = 50 cm; Drawdown at the well = 10 m; length of strains = 25 m; radius of influence of the well = 250 m; coefficient of permeability = 0.01 cm/s. 6M

**(OR)**

4. a) Derive the basic differential equation for steady ground water flow in a well fully penetration into a confined aquifer 6M
- b) During a recuperation test, the water in an open well was depressed, by pumping by 2.5 m and it recuperated 1.8 m in 80 minutes. Determine (i) yield from a well of 4 m diameter under a depression head of 3 m, (ii) the diameter of the well to yield 8 lit/sec under a depression head of 2 meters. 8M

**UNIT-III**

5. a) Illustrate various investigations required for reservoir planning 8M
- b) Explain how would you determine safe yield from a reservoir of given capacity 6M

**(OR)**

6. a) Discuss various methods of reservoir sediment control 8M
- b) List and explain the factors on which selection of site for a reservoir depend 6M

#### **UNIT-IV**

7. a) What is meant by Duty and Delta of canal water? Derive the relationship between them for a given base period. 6M
- b) Compute the depth and frequency of irrigation required for a certain crop with data given below: root zone depth = 100 cm; field capacity = 22%; wilting point = 12%; apparent specific gravity of soil = 1.5; consumptive use = 25mm/day; efficiency of irrigation = 50%; Assume 50% depletion on available moisture before application of irrigation water at field capacity. 8M
- (OR)**
8. a) Explain various types of irrigation methods bringing out advantages and disadvantages 8M
- b) Explain any two methods used for estimating consumptive use of water. 6M

#### **UNIT-V**

9. a) Design an irrigation channel section for the following data: discharge = 30 cumecs; silt factor = 1.0; side slopes =  $\frac{1}{2} : 1$ , Determine the longitudinal slope also. 7M
- b) Illustrate Kennedy's silt theory. What are the drawbacks in this theory 7M
- (OR)**
10. a) Explain the necessity of lining of canal. Enumerate the various types of linings practiced in India. 7M
- b) Design an earth canal section to carry 50 cumecs discharge at a slope of 0.25 m/km,  $N = 0.0225$ ,  $m = 1.0$ . 7M

# AR16

**CODE:** 16EC3020/EE

**SET-2**

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

**III B.Tech II Semester Supplementary Examinations, February-2021**

**MICROPROCESSORS AND MICROCONTROLLERS**

**(Electrical and 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 independent functional parts of 8086  $\mu$ P? 7M
- b) Describe the following pin functions of 8086  $\mu$ P. 7M

i. Address/Data      ii. ALE      iii.  $\overline{RD}/\overline{INTA}$

iv.  $\overline{DEN}$       v.  $DT/\overline{R}$

**(OR)**

2. a) Describe the register organization of 8086 micro processor. 7M
- b) Explain the interrupt response sequence of 8086 with the help of a diagram. 7M

## UNIT-II

3. a) Explain the following 8086 assembler directives with examples. 7M

i. DB      ii. ASSUME      iii. ORG      iv. ENDS

- b) Write a program equivalent to 8086 for the following equation: 7M

$$(A + (B \times C) + (D \times E) - \left(\frac{F}{G}\right) - (H \times I))$$

**(OR)**

4. a) Explain the arithmetic instructions of 8086 with examples. 7M
- b) Write an assembly language program to find the sum of n numbers 7M

## UNIT-III

5. a) Explain the addressing modes of 80386 with examples? 7M
- b) Illustrate the register organization of 80386. 7M

**(OR)**

6. a) Describe the mechanism which divides the physical memory into variable sizes in 80386? 7M
- b) Explain the architecture of the processor which has inbuilt floating-point unit? 7M

## UNIT-IV

7. a) With a neat sketch, explain 8257 DMA controller? 7M
- b) Describe the functionality of each block in 8255 PPI? 7M

**(OR)**

8. a) Explain mode 0 and mode 1 operations of 8255 PPI? 7M
- b) With a neat sketch explain the interfacing of 8259A with 8086? 7M

## UNIT-V

9. a) Explain the port structure of 8051 for I/O operations? 7M
- b) Explain IP and IE registers of 8051 microcontroller. 7M

**(OR)**

10. a) Explain the architecture of 8051 microcontroller with neat sketch? 7M
- b) Explain the addressing modes of 8051 microcontroller. 7M

# AR16

**CODE: 16ME3019** **SET-1**  
**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**  
**(AUTONOMOUS)**  
**III B.Tech II Semester Supplementary Examinations, February , 2021**

## **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) Differentiate between base circle and prime circle. 2  
b) A cam is to give the following motion to a knife edged follower: 12
- To raise the follower through 30 mm with uniform acceleration and deceleration during  $120^\circ$  rotation of the Cam.
  - Dwell for the next  $30^\circ$  rotation of the Cam rotation.
  - To lower the follower with SHM during the next  $90^\circ$  rotation of the Cam.
  - Dwell for the rest of the cam rotation
- The Cam has a minimum radius of 30 mm and rotates anti clockwise at a uniform speed of 800 rpm. Draw the profile of the cam for in-line stroke of the follower. Also draw the velocity and acceleration diagrams.

**(OR)**

2. a) What are the methods for reducing pressure angle of cam? 4  
b) The follower of a tangent cam is operated through a roller of 50 mm and its line of stroke passes through the axis of the cam. The minimum radius of the cam 40 mm and the nose radius is 15 mm. The lift is 25 mm. If the speed of the camshaft is 600 rpm, calculate the velocity and acceleration of the follower at the instant when the cam is (a) in a full position, and (b) 20 from full lift position. 10

### **UNIT-II**

3. Derive the following expression of effects of partial balancing in two cylinder locomotive engine (i) Variation of tractive force, (ii) Swaying couple and (iii) Hammer blow. 14

**(OR)**

4. a) The cam shaft of high speed pump consists of parallel shaft 2.5 cm diameter and 48 cm long carries three eccentrics, each of diameter 6.0 cm and a uniform thickness of 1.8 cm. The assembly is symmetrical as shown in figure and bearings are at A and B. The angle between the eccentrics is  $120^\circ$  and of each is 1.25 cm. The material weights  $0.007 \text{ kg/cm}^3$  and speed of rotation is 1430 rpm find dynamic load on each bearing due to out of balance couple. 10  
b) What for balancing of rotating masses are required? 4

### **UNIT-III**

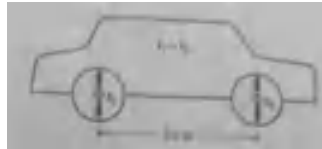
5. a) Derive frequency of oscillations of a spring-mass system using Rayleigh's method. 7  
b) A vibration system consists of a mass  $m$  and a spring of stiffness  $k$ . It has natural frequency of 12 Hz. The natural frequency decreases by 2 Hz when an extra mass of 2 kg is attached to  $m$ . Find  $k$  and  $m$ . 7

**(OR)**

6. A vehicle of mass 490 kg and total spring constant of its suspension system is  $60 \times 10^3 \text{ N/m}$ . The profile of the road may be approximated to a line curve of amplitude 4.0 cm and wave length of 4 m. Determine: i) the critical speed of the vehicle  
ii) the amplitude of the steady state motion of the mass when the vehicle is driven at critical speed and the damping factor is 0.5  
iii) the amplitude of the steady state motion of the mass when the vehicle is driven at 57 km/hr and the damping factor is 0.5

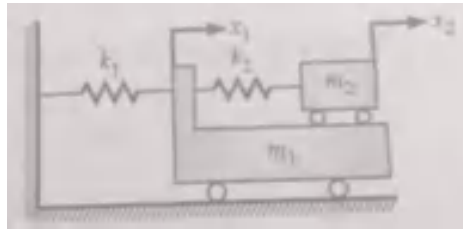
#### UNIT-IV

7. a) What is the difference between vibration absorber and vibration isolator. 4  
b) Find the natural frequencies of car with the following conditions: total mass of a car = 300 kg, wheel base = 3 m, radius of gyration is 1 m, spring constant of front rear springs are  $70 \times 10^3 \text{ N/m}$  each. 10



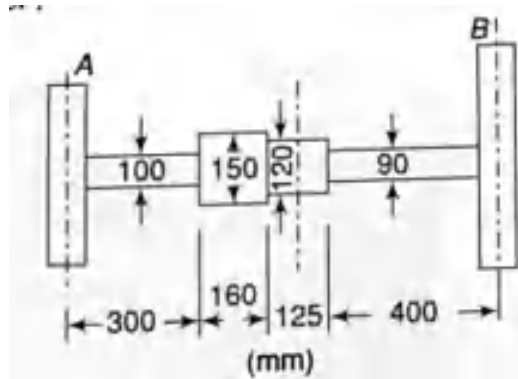
(OR)

8. a) Write about degree of freedom and natural frequency? 4  
b) Derive the equation of motion of the vibratory system shown in figure. Determine the natural frequencies for given data  $k_1=98000 \text{ N/m}$ ,  $k_2=19600 \text{ N/m}$ ,  $m_1=196 \text{ kg}$ ,  $m_2=49 \text{ kg}$ . 10



#### UNIT-V

9. The shaft shown in Figure below carries two masses. The mass A is 300 kg with a radius of gyration of 0.75m and the mass B is 500 kg with radius of gyration of 0.9m. Determine the frequency of the torsional vibrations. It is desired to have the node at the mid section of shaft of 120 mm diameter by changing the diameter of the section having a 90 mm diameter. Determine the new diameter. 14



(OR)

10. a) Define forced damped vibrations? 4  
b) Calculate the natural frequency of the shaft of diameter 10 cm and length 300 cm carrying two discs of diameters 125 cm and 200 cm respectively at its ends and weighing 480 N and 900 N respectively. Take  $G=1.96 \times 10^{11} \text{ N/m}^2$  10

# AR16

**CODE:** 16EC3020/ECE

**SET-2**

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

**III B.Tech II Semester Supplementary Examinations, February-2021**

**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 architecture of 8086 microprocessor with a neat diagram. 7M  
b) Describe the following pin functions of 8086  $\mu$ P with timing cycle operations? 7M
  - i. Address/Data      ii. ALE      iii.  $\overline{RD}/\overline{INTA}$
  - iv.  $\overline{DEN}$       v.  $\overline{DT}/\overline{R}$

**(OR)**

2. a) Describe the common functions in minimum and maximum mode of 8086  $\mu$ P? 7M  
b) Explain the interrupt response sequence of 8086 with the help of a diagram. 7M

## **UNIT-II**

3. a) Explain the following 8086 assembler directives with examples. 7M
  - i. DB      ii. ASSUME      iii. ORG      iv. ENDS  
b) Write an assembly language program to perform average. 7M

**(OR)**

4. a) Explain the following 8086 instructions with examples. 7M
  - i) AAD      ii) RCR      iii) MOVSW      iv) WAIT
  - v) CMC      vi) RET      vii) JNB  
b) Assume that 5 BCD data items are stored in RAM locations starting at 40H. Write a program to find the sum of all the numbers. The result must be in BCD. 7M

## **UNIT-III**

5. a) Explain the operating modes of 80386 with examples? 7M  
b) Illustrate the conversion of linear address to physical address (Paging mechanism) in 80386 microprocessor. 7M

**(OR)**

6. a) Describe the mechanism which divides the physical memory into variable sizes in 80386? 7M  
b) Explain the architecture of the processor which has inbuilt floating-point unit? 7M

## **UNIT-IV**

7. a) With a neat sketch, explain 8259 interfacing to 8086 microprocessor? 7M  
b) Describe the functionality of each block and signal description in 8251A? 7M

**(OR)**

8. a) Explain mode 0 and mode 1 operations of 8255 PPI? 7M  
b) With a neat sketch explain the interfacing of 8257 DMA controller with 8086? 7M

## **UNIT-V**

9. a) Explain the port structure of 8051 for I/O operations? 7M  
b) Write an 8051 ALP to find larger of two 8-bit numbers stored in external RAM 2000H and 2001H. 7M

**(OR)**

10. a) Explain the architecture of 8051 microcontroller with neat sketch? 7M  
b) Explain the five addressing modes of 8051 microcontroller with an example. 7M

**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) Describe the role performed by lexical analysis of the compiler 7M
- b) Explain in detail about the Lexical analyser with the possible error recovery actions. 7M

**(OR)**

2. a) Explain briefly how to recognize tokens in lexical analysis 7M
- b) Convert the Regular Expression  $a b b ( a / b ) ^*$  to DFA using direct method and minimize it. 7M

**UNIT-II**

3. a) Calculate first and follow for the following grammar? 7M
  - i)  $E \rightarrow E+T/T$
  - ii)  $T \rightarrow T * F / F$
  - iii)  $F \rightarrow (E) / id$
- b) Consider the grammar  $E \rightarrow E+T$ ,  $T \rightarrow T * F$ ,  $F \rightarrow (E) / id$ . Using predictive parsing table parse the string  $id+id*id$ . 7M

**(OR)**

4. a) Explain about Left factoring with an example 7M
- b) Write algorithm to compute FOLLOW of a non-terminal. 7M

**UNIT-III**

5. a) Describe the evaluation order of SDT with an example 7M
- b) Consider the grammar 7M
 
$$S \rightarrow AB \mid ABA$$

$$A \rightarrow d$$

$$E \rightarrow b$$

$$D \rightarrow b \mid \epsilon$$

$$B \rightarrow c$$

Derive the predictive parsing table. Show that the given grammar is LL(1) or not

**(OR)**

6. a) Explain the type expression and type equivalence 7M
- b) Write an algorithm for Non recursive predictive parsing 7M

**UNIT-IV**

7. a) Explain about the loop optimization techniques with an example 7M
- b) Distinguish between static scope and dynamic scope. Briefly explain access to non-local names in static scope 7M

**(OR)**

8. a) Explain basic concept of static and dynamic storage allocation 7M
- b) Construct DAG and optimal target code for the expression 7M
 
$$x = ((a + b) / (b - c)) - (a + b) * (b - c) + /$$

**UNIT-V**

9. a) Summarize the issues arise during the design of code generator. 7M
- b) Explain peephole optimization and various code improving transformations. 7M

**(OR)**

10. a) Explain various issues in the design of code generator. 7M
- b) Translate the following assignment statement into three address code. 7M
 
$$D := (a - b) * (a - c) + (a - c)$$
 Apply code generation algorithm and generate a code sequence for the three address statement.

# AR13

**CODE: 13EI3002**

**SET-1**

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

**III B.Tech II Semester Supplementary Examinations, February-2021**

**INSTRUMENTATION AND CONTROL SYSTEMS  
(Mechanical Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

## **PART-A**

**ANSWER ALL QUESTIONS  
M]**

**[1 x 10 = 10**

1. a) What Is Instrumentation?  
b) Define Dead zone and Hysteresis.  
c) Name Different Types Of Bourdon Tubes.  
d) What is the purpose of strain rosette?  
e) State the advantages of closed loop systems.  
f) What is Thomson effect?  
g) Write the principle used in RTD.  
h) Define closed loop control system  
i) Define Resonant Peak?  
j) Sate the working principal of LVDT

## **PART-B**

**Answer one question from each unit**

**[5x12=60M]**

### **UNIT-I**

2. a) Draw a block diagram representation of a generalized measuring system identify the various elements and point out the function performed by each element. 6 M  
b) With the aid of neat sketch, explain the working principle of dead –weight type Tester. 6M
- (OR)**
3. a) Explain different types of errors occur during measurement with an instrument. 6 M  
b) Write about Ionization type pressure gauges. 6M

### **UNIT-II**

4. a) Distinguish between bonded and unbounded type of resistance strain gauge. 6 M  
b) With neat diagram, explain the working of turbine flow meter and point out its limitations. 6M
- (OR)**
5. a) Derive an expression for gauge factor, If a strain gauge has a low gauge factor, what does it indicate? 6 M  
b) Explain the principle of working of thermocouples. State the law of intermediate Temperatures and intermediate metals for thermocouples. 6M



### **UNIT-III**

6. a) Explain the working principle of variable-inductance transducer with a neat sketch and also list out its advantages. 6 M  
b) Describe the constructional and operation of rope brake type of absorption Dynamometer. 6M

**(OR)**

7. a) 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? 6 M  
b) How does a mechanical load cell work? Explain the principle of measuring shaft torque using strain gauge torsion meter? 6M

### **UNIT-IV**

8. a) Derive the expressions and draw the response of first order system for unit step input 6 M  
b) Draw the response of second order system for critically damped case and when input is unit step 6M

**(OR)**

9. a) List out the differences between the Positive and negative feedback systems and open loop and closed loop control systems. 6 M  
b) With a neat sketch explain the position control system 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. 12 M

**(OR)**

11. a) Discuss PID control algorithm 6 M  
b) Draw the response of second order system for critically damped case and when input is unit step 6M

# AR13

**CODE: 13EC3019**

**SET-1**

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

**III B.Tech II Semester Supplementary Examinations, February-2021**

**MICROPROCESSORS AND MICROCONTROLLERS**

**(Electronics & Communication Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

## **PART-A**

**ANSWER ALL QUESTIONS**

**[1 x 10 = 10 M]**

1. a) Write the functions of bus interface unit.  
b) The segment address is 3578H and offset address is 6676H, Calculate the physical address.  
c) Define an Instruction.  
d) List the stack operations.  
e) What is the function of prefetch unit in 80386 microprocessor  
f) Write the any two modes of Operation in 80386 microprocessor.  
g) What is the advantage of DMA.  
h) Draw the control word format of 8255 PIO.  
i) Draw the Program Status Word (PSW) of 8051 Microcontroller.  
j) Write any two advantages of Microcontrollers over microprocessors.

## **PART-B**

**Answer one question from each unit**

**[5x12=60M]**

### **UNIT-I**

2. a) Explain the Register organization of 8086 Microprocessor in detail. 4M  
b) Draw the Timing diagram for Memory read and Write operation in Minimum mode. 8M

**(OR)**

3. a) Draw the Minimum mode pin diagram of 8086 microprocessor. Explain the functionality of each pin. 7M  
b) What is an Assembler? Explain the different Assembler Directives used in 8086 Microprocessor. 5M

### **UNIT-II**

4. a) Explain about Machine control and bit manipulation Instructions. 4M  
b) Discuss about Interrupt Vector Table and Explain the Interrupt response sequence of 8086 microprocessor. 8M

**(OR)**

5. a) What is the role of Stack in calling a subroutine and return from the routine? 6M  
b) Write an ALP to convert an 8-bit binary into equivalent gray code in 8086. 6M

### **UNIT-III**

6. a) Explain the Protected mode of 80386 processor with a neat diagram? 7M  
b) Discuss the memory segmentation of 80386 processor in detail. 5M

**(OR)**

7. a) Explain the different data types used in 80386 processor with examples.. 4M  
b) Explain the Real mode of an 80386 processor with a neat diagram? 8M

#### **UNIT-IV**

8. a) Draw the pin diagram of 8255 PIO and explain the function of each pin. 6M  
b) Draw the architecture of 8257 DMA controller and explain the function of each block. 6M

**(OR)**

9. a) Draw the pin diagram of 8259 Interrupt Controller and explain the function of each pin. 6M  
b) Draw the block diagram of 8279 Keyboard/Display Interface and explain. 6M

#### **UNIT-V**

10. a) Draw and explain the generalized functional block diagram of 8051 microcontroller. 7M  
b) Explain the interrupt structure of 8051 microcontroller? 5M

**(OR)**

11. a) Explain the five addressing modes available in 8051 microcontrollers with an example. 5M  
b) Discuss the Special Function Registers (SFR) of 8051 Microcontroller. 7M

# AR13

**CODE: 13CS3019**

**SET-2**

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

**III B.Tech II Semester Supplementary Examinations, February-2021**

**UNIX PROGRAMMING  
(Computer Science Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

**PART-A**

**ANSWER ALL QUESTIONS**

**[1 x 10 = 10 M]**

1.
  - a) Define telnet?
  - b) Define ftp?
  - c) List the responsibilities of shell?
  - d) Give the syntax for declaring a shell variable?
  - e) List any five standard I/O functions?
  - f) Define stream error?
  - g) What is meant by zombie process?
  - h) Explain about exec?
  - i) Define semaphore?
  - j) List the applications of IPC?

**PART-B**

**Answer one question from each unit**

**[5x12=60M]**

**UNIT-I**

2.
  - a) Define navigation? Explain the commands which are used for navigation in vi editor? **6M**
  - b) Explain about unix file system? **6M**
- (OR)**
3.
  - a) Discuss the following commands with syntax **6M**  
(i) pwd (ii) awk (iii) ulink (iv) alias
  - b) Explain about the following filters, with examples? **6M**  
Head, tail, cut, tar

**UNIT-II**

4. Write a short note on **12M**  
(i) here document (ii) shell meta characters  
(iii) redirection operators
- (OR)**
5. Explain the following decision making procedures using shell scripts with examples: **12M**  
(a) If then else (b) Nested if (c) Case statements.

### **UNIT-III**

6. a) Programmatically explain the fseek, lseek and fopen system calls **6M**  
b) Compare and contrast system calls and library functions? **6M**
- (OR)**
7. Explain the following system calls with syntax: (a) mkdir() (b) rmdir() (c) **12M**  
chdir() (d) symlink()

### **UNIT-IV**

8. a) Differentiate between fork( ) and vfork( ). **6M**  
b) Explain following functions ? **6M**  
(i) pause (ii) abort (iii) sleep
- (OR)**
9. Write short notes on the following: (a) Process termination (b) Zombie process **12M**

### **UNIT-V**

10. Compare the IPC functionality provided by pipes and message queues. What **12M**  
are the advantages and drawbacks of each? Explain briefly.
- (OR)**
11. Define about inter process communication? List the ways to achieve inter **12M**  
process communication? Elaborate the same using semaphore with an  
example?