AR18

CODE: 18CET315   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular Examinations, September-2021

TRANSPORTATION ENGINEERING-I
(Civil Engineering)

Time: 3 Hours   **Max Marks: 60**

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)	Discuss the issues focused in Jayakar committee and central road fund?	6M
	b)	Explain the conflicts arise while aligning a new highway?	6M

(OR)

2.	a)	Explain the requirements of an ideal highway alignment?	7M
	b)	Explain the necessity and objectives of highway planning?	5M

UNIT-II

3.	a)	Calculate sight distance required to avoid a head on collision of two cars approaching from opposite directions at 90 and 60kmph assume reaction time of 2 seconds ,consider friction coefficient of 0.7 and brake efficiency of 50 percent in either case	5M
	b)	On a two lane highway car A & B are moving at a speed of 40 kmph and 80 kmph. Distance between A & C is 450 m. After initial hesitation period of 2 sec driver of A started overtaking operation. Distance between A & B at that time was 30 m. Acceleration of Vehicle A is 1.20 m/Sec2. Distance between B& A is 25 m. Determine the distance between two cars A & C at the instance of completion of overtaking operation also calculate the desirable length of overtaking zone.	7M

(OR)

4.		Define super elevation. Derive an expression for super elevation in road geometry.	12M

UNIT-III

5.	a)	Discuss the method of CBR test on soil and mention its significance in deciding road thickness	7M
	b)	Explain in detail on Los Angeles abrasion test	5M

(OR)

6.	a)	Discuss in detail the importance of shape test in selecting suitable road aggregates	5M
	b)	Explain in detail on aggregate crushing test and mention its significance	7M

UNIT-IV

7. a) Calculate the stresses at interior, edge and corner regions of a Cement 7M
        concrete pavement using Westergards's stress equation. Use the following
        data: Wheel load P = 4100 kg, Modulus of Elasticity of Concrete, E = 0.3
        million kg/cm2; Pavement thickness h= 15cm, Poisson ratio, μ= 0.15,
        Modulus of subgrade reaction, k= 3.0 kg/cm3, Radius of contact area, a =
        15 cm
    b) calculate the radius of relative stiffness of 15cm thick rigid pavement from 5M
        the following data modulus of elasticity of cement concrete =
        340000kg/cm2,poisson's ratio for concrete=0.14,modulus of subgrade
        reaction of   (i) K= 7.3 kg/cm3 (ii) K= 9.3 kg/cm3

(OR)

8. a) What do you understand by maintenance of roads? Explain about the 4M
        classification of maintenance operations?
    b) What are the various layers involved in flexible pavement. Explain in 8M
        detail with neat sketch.

UNIT-V

9. a) Explain various methods of conducting traffic volume studies. 8M
    b) Explain the terms i) PCU   ii) Spot speediii) AADT 4M
        iv) AAWT

(OR)

10. a) Explain various traffic control devices 7M
    b) Draw and explain any five Informatory signs? 5M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular Examinations, September-2021

POWER SYSTEM ANALYSIS
(Electrical and Electronics Engineering)

Time: 3 Hours   Max Marks: 60

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) A synchronous generator is rated at 150MVA, 22KV has a reactance of 0.25 p.u   **8M**
   and is connected to an over head line through a transformer rated 200 MVA,
   230/18 kV star delta with Xp.u is 0.21. Find the p.u reactance by considering the
   generator ratings as base values.
   b) What are the advantages of representing all parameters in p.u. values?   **4M**

(OR)

2. Obtain Ybus by direct inspection method for the following network; assume the   **12M**
   values are in p.u. admittances.
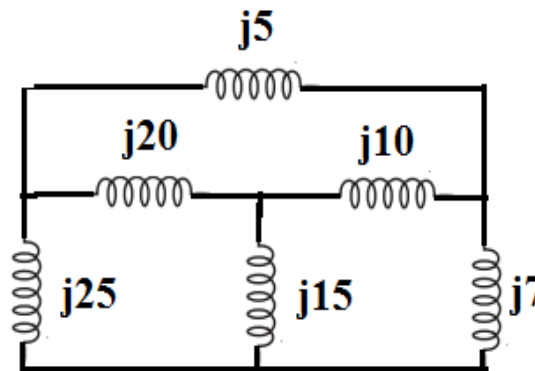
UNIT-II

3. a) Compare the decoupled method and fast decoupled methods with the Newton   **6M**
   Rapson method.
   b) For the power system network, the generators are connected at all four buses, while   **6M**
   loads are at buses 2, 3 and 4. The values of real and reactive powers are listed in
   table 1. All buses other than slack bus are of P-Q type. Line data are given in table
   2. Assuming a flat voltage start, determine the voltage magnitudes and the phase
   angles at the three buses using G- S(Gauss-Seidel) method for first iteration.

Table 1. Input data

Bus	Pi	Qi	Vt	Type of bus
1	--	--	1.05∟0	Slack
2	-0.45	-0.15	--	PQ
3	-0.51	-0.25	--	PQ
4	-0.6	-0.3	--	PQ

Table 2. Line data

Line No.	Bus Code(p-q)	Line Impedance
1	1-2	0.08+j0.2
2	1-4	0.05+j0.1
3	2-3	0.04+j0.12
4	3-4	0.04+j0.14

(OR)

4. a) Write the algorithm for Gauss-Seidal load flow method without PV buses. 8M
   b) Compare Newton-Raphson load flow method with Gauss-Seidal load flow method 4M
   .

UNIT-III

5. Formulate the Zbus Matrix when a link is added to the existing network. 12M

(OR)

6. Two 11 kV, 3-phase, 5MVA generators having sub transient reactance of 3% and 12M
   2% respectively operate in parallel. Suppose the power load through a 11/220 kV,
   10 MVA transformer has 4% equivalent reactance. Calculate fault current and fault
   MVA for three phase fault occurs on the HT side of the transformer. Also calculate
   the fault MVA supplied by each generator.

UNIT-IV

7. a) Derive an expression for fault current if line to line fault occurs through a fault 6M
   impedance Z_f in a power system. Show the connection of sequence network to
   represent the fault.
   b) What are the symmetrical components? Obtain the expression for symmetrical 6M
   components interms of unbalanced phasors of voltages and currents.

(OR)

8. a) Explain the assumptions made in short circuit studies. 6M

   b) An unbalanced 3 phase delta load, constituting resistances of 4.1 Ω, 6 Ω and 10 Ω 6M
   connected in delta formation and connected to a balanced three phase system of
   200 V line to line. Find the positive, negative and zero sequence currents in the
   load circuits and in the supply lines.

UNIT-V

9. a) Derive the swing equation of a synchronous machine. 8M
   b) Explain the methods to improve the steady state stability limit. 4M

(OR)

10. a) Find the maximum steady-state power capability of a system consisting of a 6M
    generator equivalent reactance of 0.4pu connected to an infinite bus through a
    series reactance of 1.0 p.u. The terminal voltage of the generator is held at 1.10
    p.u. and the voltage of the infinite bus is 1.0 p.u.
    b) Explain the application of equal area criterion to determine stability of a 6M
    synchronous machine connected to an infinite bus through a transmission line.

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CODE: 18MET314   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular Examinations, September-2021
DESIGN OF MACHINE MEMBERS - II
(Mechanical Engineering)

Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place
Any other data required for the design may be assumed.

UNIT-I

1. a) What is the pressure vessel and how do you distinguish between a thick and   4M
   thin cylinder   ?
   b) A hydraulic press has a maximum capacity of 1000 kN The piston diameter   8M
   is 250 mm. Calculate the wall thickness if the cylinder is made of material
   for which the permissible strength may be taken as 80 MPa. This material
   may be assumed as a brittle material.

(OR)

2. Design a cast iron piston for a single acting four-stroke diesel engine with   12M
   following data: Cylinder bore = 300 mm; Length of stroke = 450 mm; Speed =
   300 rpm; indicated mean effective pressure = 0.85 MPa; Maximum gas pressure
   = 5 Mpa; Fuel consumption = 0.30 kg per BP per hr; High calorific value of fuel
   = 44000 kJ/Kg. Assume suitable date if required and state the assumptions you
   make.

UNIT-II

3. Design a connecting rod for a high speed I.C. engine using following data.   12M
   Cylinder bore = 125 mm; Length of connecting rod = 300 mm; Maximum gas
   pressure = 3.5 MPa; Length of stroke = 125 mm; Mass of reciprocating parts =
   1.6 kg; Engine speed = 2200 rpm. Assume suitable data and state the
   assumptions made.

(OR)

4. Explain in detail the procedure for the design of centre crank shaft when the   12M
   crank is at an angle of maximum twisting moment.

UNIT-III

5. The lead screw of a lathe has Acme threads of 50 mm outside diameter and 8 mm   12M
   pitch. The screw must exert an axial pressure of 2500 N in order to drive the tool
   carriage. The thrust is carried on a collar 110 mm outside diameter and 55 mm
   inside diameter and the lead screw rotates at 30 rpm. Determine (a) the power
   required to drive the screw; and (b) the efficiency of the lead screw. Assume a
   coefficient of friction of 0.15 for the screw and 0.12 for the collar.

(OR)

6. A flat belt is required to transmit 30 kW from a pulley of 1.5 m effective diameter running at 300 rpm. The angle of contact is spread over 11/24 of the circumference. The coefficient of friction between the belt and pulley surface is 0.3. Determine, taking centrifugal tension into account, width of the belt required. It is given that the belt thickness is 9.5 mm, density of its material is 1100 kg/m³ and the related permissible working stress is 2.5 MPa. **12M**

UNIT-IV

7. A reciprocating compressor is to be connected to an electric motor with the help of spur gears. The distance between the shafts is to be 500 mm. The speed of the electric motor is 900 rpm and the speed of the compressor shaft is desired to be 200 rpm. The torque, to be transmitted is 5000 N-m. Taking starting torque as 25% more than the normal torque, determine: 1. Module and face width of the gears using 20 degrees stub teeth, and 2. Number of teeth and pitch circle diameter of each gear. Assume suitable values of velocity factor and Lewis factor **12M**

(OR)

8. A pair of helical gears are to transmit 15 kW. The teeth are 20° stub in diametral plane and have a helix angle of 45°. The pinion runs at 10000 rpm and has 80 mm pitch diameter. The gear has 320 mm pitch diameter. If the gears are made of cast steel having allowable static strength of 100 MPa; determine a suitable module and face width from static strength considerations. **12M**

UNIT-V

9. A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm2. The speed of the journal is 900 r.p.m. and the ratio of journal diameter to the diametral clearance is 1000. The bearing is lubricated with oil whose absolute viscosity at the operating temperature of 75°C may be taken as 0.011 kg/m-s. The room temperature is 35°C. Find : 1. The amount of artificial cooling required, and 2. The mass of the lubricating oil required, if the difference between the outlet and inlet temperature of the oil is 10°C. Take specific heat of the oil as 1850 J / kg / °C **12M**

(OR)

10. a) How do you express the life of a bearing? What is an average or median life? **6M**
    b) Design a self-aligning ball bearing for a radial load of 7000 N and a thrust load of 2100 N. The desired life of the bearing is 160 millions of revolutions at 300 rpm. Assume uniform and steady load. **6M**

CODE: 18ECT315   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular Examinations, September-2021
MICROPROCESSORS AND MICROCONTROLLERS
(Electronics and Communication Engineering)

Time: 3 Hours   **Max Marks: 60**

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.		Explain the architecture of 8086 microprocessor with a neat block diagram.	12M
		(OR)	
2.	a)	Illustrate how physical memory address is computed in 8086 microprocessor with example.	6M
	b)	Illustrate the following Signals in 8086 and write its direction (input or output): (i) INTR (ii) ALE (iii) HOLD (iv) NMI (v) RESET	6M

UNIT-II

3.		Elucidate the 8086 data transfer Instructions in detail with the help of Syntax and Example programs?	12M
		(OR)	
4.		Develop an 8086 algorithm and Assembly Language Program to find the largest & Smallest number in an array of ten bytes with Comments.	12M

UNIT-III

5.	a)	Explain the 8255 internal Architecture with a neat diagram.	6M
	b)	Explain the control word format of 8255 in I/O and BSR mode.	6M
		(OR)	
6.		Explain 8257 DMA controller and Interface DMA controller to 8086 microprocessor.	12M

UNIT-IV

7.	a)	Describe 80386 memory system, and explain the purpose and operation of the bank selection signals	6M
	b)	Describe the conversion of linear address to physical address in 80386 microprocessor with the help of paging mechanism.	6M
		(OR)	
8.		Explain in detail about Architecture of ARM with a neat sketch.	12M

UNIT-V

9.	a)	Sketch and explain the internal RAM architecture of 8051 microcontroller?	6M
	b)	Discuss the 8051 I/O port structure and explain the alternate functions of Port 0 and 3 in detail.	6M
		(OR)	
10.	a)	To perform a 8051 program to copy the value 75H into RAM memory locations 50H to 59H using (a) Direct addressing mode (b) indirect addressing mode with & without a loop.	6M
	b)	Classify the various Addressing Modes present in 8051 with examples	6M

AR18

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular Examinations, September-2021

COMPILER DESIGN
(Common to CSE & IT)

Time: 3 Hours   **Max Marks: 60**

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) Illustrate the functionality of different phases of a compiler. Indicate the input and output of each phase of a high level language statement   6M
a := b * c + 45.0
   b) Define lexeme, token, pattern. Identify the lexemes that make up the tokens in the following program fragment. Indicate the corresponding token and pattern.   6M
void swap (int i, int j)
{
int t;
t=i;
i=j;
j=t;
}

(OR)

2. a) Describe Tokens, Patterns and Lexemes with suitable examples.   6M
   b) Illustrate the need for compiler and narrate the role of the cousins of a compiler   6M

UNIT-II

3. a) Consider the following grammar.   8M
S → CC
C → cC | d
a. Create Closure sets   for CLR parsing

b. Diagram the GOTO graph for the created closure sets
   b) Write down the regular expression for binary strings such as "0 always followed by a 1".   4M

(OR)

4. a) Explain backtracking with an example   4M
   b) Consider the following grammar E → E+T | T, T → T*F | F, F → (E) | id   8M
Construct the SLR parsing table for the above grammar.

5. a) What is syntax tree? Write syntax-directed definition for constructing a syntax tree for an expression. The grammar for an expression is given below.   6M

      E → E+T | E-T | T
      T → (E) | id | num

  b) Compare and Contrast the following   6M
    1) Synthesized Attributes 2) Inherited Attributes

(OR)

6. a) Judge why is it necessary to break the intermediate code into basic blocks? Write down the intermediate code for the following code fragment, and show the basic blocks and the control flow within them.   6M

    Begin
      Sum = 0
      Term = 1
      While term<= 100 do
        Sum = Sum + term
        Term = term + 1
      End
    End

  b) Perform left factoring for the following grammar.   6M
    S → iCtSeS| iCtS
    C → a

UNIT-IV

7. a) Describe in detail the optimization technique " Strength reduction".   6M
  b) What do you mean by DAG? Construct the DAG for the following basic block.   6M
    D := B * C
    E := A + B
    B := B + C
    A := E – D

(OR)

8. a) What do you mean by Dead code? Explain with an example   6M
  b) Consider the following grammar for regular expressions.   6M
    R → R' | 'R |RR | R* | (R) | a | b
    Modify the grammar to make it LL(1). Generate the predictive parsing table for the resulting grammar

UNIT-V

9. a) Demonstrate the role of intermediate code generation in overall compiler design   6M
  b) Illustrate various register allocation and assignment methods in detail   6M

(OR)

10. a) Write the semantic actions to generate the three-address code for case statement of any language.   6M
  b) Analyze different machine dependent code optimization techniques with an example?   6M

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, September, 2021
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) Briefly explain evapotranspiration, overland flow, interflow, and direct runoff. 6M
   b) Given the ordinates of a 4-h unit hydrograph as below. Derive the ordinates of a 12-h unit hydrograph for the same catchment. 8M

Time (h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinate of 4h unit hydrograph (m^3/s)	0	20	80	130	150	130	90	52	27	15	5	0

(OR)

2. a) Explain factors affecting flood hydrograph. 6M
   b) A small catchment of area 150 ha received a rainfall of 10.5 cm in 90 minutes due to a storm. At the outlet of the catchment, the stream draining the catchment was dry before the storm and experienced a runoff lasting for 10 hours with an average discharge value of 2.0 m^3/s. The stream was again dry after the runoff event. What is the amount of water which was not available to runoff due to combined effect of infiltration, evaporation, and transpiration? Also find out the ratio of runoff to precipitation? 8M

UNIT-II

3. a) Define aquifer, aquitard, aquiclude, and aquifuge. 6M
   b) During the recuperation test of a 4.0 m open well a recuperation of the depression head from 2.5 m to 1.25 m was found to take place in 90 minutes. Determine the specific capacity per unit well area, and yield of the well for a safe drawdown of 2.5 m. What would be the yield from a well of 5.0 m diameter for a drawdown of 2.25 m. 8M

(OR)

4. a) Describe constant level pumping test and recuperation test of open well. 6M
   b) A well penetrating an unconfined aquifer 20 m thick below water table is pumped at a uniform rate of 600 litres per minute till the water level in the well becomes steady. Two observation wells drilled radially at a distance of 20 m and 80 m from the centre of the well show depression of 3.20 m and 1.10 m. Determine the hydraulic conductivity. 8M

UNIT-III

5. a) Explain the purpose of reservoir and investigations for reservoir planning in brief. 6M
   b) Describe the different processes of sediment management. 8M

(OR)

6. a) Describe the measures to reduce evaporation loss in reservoirs sedimentation. 6M
   b) Explain reservoir yield, mass curve, and demand curve. 8M

UNIT-IV

7. a) Explain types of irrigation systems. 6M
   b) Water is released at the rate of 12 cumec at the head of a canal. If duty at the field is 1250 hectares/cumec and loss of water in transit is 25%, find the area of the land that can be irrigated. 8M

(OR)

8. a) Describe gravitational water, hygroscopic water, and capillary water. 6M
   b) Write the advantages of micro-irrigation over conventional method of irrigation. 8M

UNIT-V

9. a) Write down the differences between Kennedy and Lacey theory. 6M
   b) The slope of an irrigation channel is 0.2 per thousand. Lacey's silt factor = 1.0, channel side slope = ½ :1. Find the full supply discharge and dimensions of the channel. 8M

(OR)

10. a) Describe measures of waterlogging. 6M
    b) Explain the procedure of channel design by Lacey theory with equations. 8M

AR16

CODE: 16EE3018   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, September, 2021
POWER SYSTEM ANALYSIS
(Electrical and Electronic Engineering)

Time: 3 Hours   Max Marks: 70

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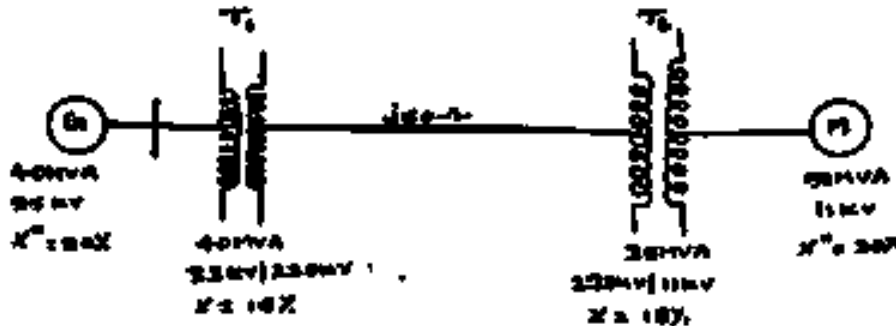All parts of the Question must be answered at one place

UNIT-I

1   Develop [Y] $_{Bus}$ matrix for the power system network represented in the   14M
        below table by using direct inspection method?

Element	5-1	5-2	1-2	2-3	1-4	3-6	4-6
Self-Reactance	0.04	0.05	0.04	0.03	0.02	0.07	0.10

(OR)

2   Develop per unit reactance diagram for the power system network shown in   14M
        the figure below.

UNIT-II

3. a) Classify the buses of power system and explain the significance of slack bus   7M
    b) Compare Gauss Siedal load flow technique with Newton Raphson method?   7M

(OR)

4. a) Derive the necessary static load flow equations for load flow studies?   7M
    b) Explain the step by step procedure of Newton Raphson load flow technique?   7M

1 of 2

UNIT-III

5.   Develop the [Z] bus matrix for the Power System network shown in below table by using Z-bus building algorithm?   14M

Element No	Connected between bus numbers	Self-Reactance
1	1-2	0.3
2	1-3	0.4
3	2-3	0.2
4	1-3	0.1

(OR)

6   Explain in detail about classification of faults in power systems? Derive an expression of fault current for a line-ground(L-G) fault on unloaded alternator without considering fault impedance   14M

UNIT-IV

7.   A 25 MVA, 13.2 kV alternator with solidly grounded neutral has a sub transient reactance of j0.25 p.u. The negative and zero sequence reactance's are j0.35 and j0.1 p.u. respectively. A single line to ground fault occurs at the terminals of an unloaded alternator; find the fault current and the line-to-line voltages. Neglect the fault impedance.   14M

(OR)

8. a) Discuss about importance of symmetrical components in fault analysis   7M

    b) Derive an expression of fault current for a line-line (L-L) fault on unloaded alternator without considering fault impedance   7M

UNIT-V

9. a) Derive the expression for swing equation with the help of necessary diagram   7M

    b) State factors affect the transient stability and explain methods to improve transient state stability limit?   7M

(OR)

10.   Find the steady-state power limit of a system consisting of a generator equivalent reactance 0.5 pu connected to an infinite bus through a series reactance of 1.0 pu. The terminal voltage of the generator is held at 1.20 pu and the voltage of the infinite bus is 1.0 pu   14M

AR16

CODE: 16ME3018   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech. II Semester Supplementary Examinations, September, 2021

DESIGN OF MACHINE MEMBERS – II

(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) Classiffy Pressure Vessels   4 M
   b) A cast iron cylinder of internal diameter 200 mm and thickness 50 mm is subjected to a pressure of 5 N/mm^2. Calculate the tangential and radial stresses at the inner, middle (radius = 125 mm) and outer surfaces.   10 M

(OR)

2. Design a cast iron piston for a single acting four stroke engine for the following data: Cylinder bore = 100mm, stroke = 125mm, maximum gas pressure = 5 N/mm^2, Induced mean effective pressure = 0.75 N/mm^2, mechanical efficiency = 80%, fuel consumption = 0.15 kg per BP per hour, higher calorific value = 42 x 10^3 kJ/kg, speed = 2000 rpm, assume suitable data if required and state the assumptions made   14 M

UNIT-II

3. a) List various forces acting on the Connecting Rod   4 M
   b) Design a connecting rod for an IC engine running at 1800 rpm and developing a maximum pressure of 3.15 N/mm^2. The diameter of piston is 100 mm. Mass of reciprocating parts per cylinder is 2.25 kg, length of CR is 380 mm, stroke of piston is 190 mm and compression ratio is 6:1. Take factor of safety as 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing as 2 and the corresponding bearing pressure as 10 N/mm^2 and 15 N/mm$^{2.}$ The density of the material of the rod may be taken as 8000 kg / m^3 and the allowable stress in the bolts as 60 N/mm^2 and in cap as 80 N/mm^2. The rod is to be of I-section for which you can choose your own properties. The elastic limit of compressive stress is 320 N/mm^2 and Rankine constant is 1/7500. Draw a neat dimensioned sketch.   10 M

(OR)

4. Design a plain carbon steel centre crankshaft for a single acting four stroke single cylinder engine for the following data: Bore = 400 mm ; Stroke = 600 mm ; Engine speed = 200 r.p.m. ; Mean effective pressure = 0.5 N/ mm^2; Maximum combustion pressure = 2.5 N/mm^2; Weight of flywheel used as a pulley = 50 kN; Total belt pull = 6.5 kN. When the crank has turned through 35° from the top dead centre, the pressure on the piston is 1N/ mm^2 and the torque on the crank is maximum. The ratio of the connecting rod length to the crank radius is 5. Assume any other data required for the design.   14 M

UNIT-III

5. a) What are the various belt joints used in belt drives. Explain them in brief.   4 M
    b) A V-belt drive is to transmit 14.7 kW to a compressor. The motor speed is 1150   10 M
       rpm and the compressor pulley runs at 400 rpm. Determine the size and number of
       belts required.

(OR)

6. a) What do you understand by simplex, duplex and triplex chains?   4 M
    b) Design a chain drive to actuate a compressor from 15 kW electric motor running at   10 M
       1000 r.p.m. The compressor speed being 350 r.p.m. The minimum centre distance
       is 500 mm. The compressor operates 16 hours per day. The chain tension may be
       adjusted by shifting the motor on slides.

UNIT-IV

7. a) Define the following terms.   4 M
       1. Module   2. Pitch Point,   3. Addendum   and   4. Backlash
    b) A pair of straight teeth spur gears is to transmit 20 kW when the pinion rotates at   10 M
       300 rpm. The velocity ratio is 1:3. The allowable static stresses for the pinion and
       gear materials are 120 MPa and 100 MPa respectively. The pinion has 15 teeth and
       its face width is 14 times the module. Determine i) Module ii) face width iii) pitch
       circle diameters of both the pinion and gear from the stand point of strength only,
       taking into consideration the effect of the dynamic loading.
       The tooth form factor can be taken as

$$y = 0.154 - \frac{0.912}{\text{no of teeth}} \quad \text{and the velocity factor,} \quad Cv = \frac{3}{3+v}$$

       where v is expressed in m/sec

(OR)

8. a) Explain different modes of gear tooth failure.   6 M
    b) A pair of parallel helical gears consists of a 20 teeth pinion meshing with a 100   8 M
       teeth gear. The pinion rotates at 720 rpm. The normal pressure angle is 20^0, while
       the helix angle is 25^0, the face width is 40 mm and the normal module is 4 mm. the
       pinion as well as gear is made of steel 40C8 (Sut = 600 N/mm2) and heat treated to
       a surface hardness of 300 BHN. The service factor and the factor of safety are 1.5
       and 2 respectively. Assume that the velocity factor accounts for the dynamic load
       and calculate the power transmitting capacity of gears.

UNIT-V

9. The radial reaction on a bearing is 9000N. It also carries a thrust load of 5000 N.   14 M
    The speed of the shaft is 1000 rpm. The outer ring is stationary. Expected average
    life of bearing is about 25000 hrs. The load on the bearing is smooth; the service
    is 8 hrs / day.
       1. Select a suitable roller bearing.
       2. What is the rated 90% life of bearing?

(OR)

10. A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure   14 M
    of 1.4 N/mm^2. The speed of the journal is 900 r.p.m. and the ratio of journal
    diameter to the diametral clearance is 1000. The bearing is lubricated with oil
    whose absolute viscosity at the operating temperature of 75°C may be taken as
    0.011 kg/m-s. The room temperature is 35°C. Find : (1) The amount of artificial
    cooling required, and (2) The mass of the lubricating oil required, if the difference
    between the outlet and inlet temperature of the oil is 10°C. Take specific heat of
    the oil as 1850 J / kg / °C.

AR16

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

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, September, 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.	Draw the register organization of 8086 and explain typical application of each register.	14M

(OR)

2.	a)	What is a timing diagram? Draw the timing diagrams for memory read and memory write machine cycle in minimum mode.	7M
	b)	Sketch the interrupt structure of 8086 and represent the memory required for the interrupts	7M

UNIT-II

3.	Use the concept of procedure and write the 8086 assembly code to generate 5!(factorial).	14M

(OR)

4.	a)	Classify the various Addressing Modes of Program Memory present in 8086 with example?	7M
	b)	List and explain any 4 Conditional Jump(Control Transfer) Instructions of 8086 with Syntax and Examples?	7M

UNIT-III

5.	Explain the architecture of 80386 with a neat skech	14M

(OR)

6.	a)	Distinguish between 80386 and Pentinum processors.	7M
	b)	Describe about segmentation and Paging in 80386 processor.	7M

UNIT-IV

7.	Interface a DAC 0800 to 8086 through 8255 PPI. And generate different waveforms. i. Square wave ii. Triangular wave iii. Rectangular wave	14M

(OR)

8.	Write about programmable interrupt controller 8259 and also write about the DMA controller 8257	14M

UNIT-V

9.	a)	Discuss the I/O port structure of 8051.	7M
	b)	Explain the Register organization of 8051?	7M

(OR)

10.	a)	Distinguish between Microprocessor and Microcontrollers with their functionality?	7M
	b)	Explain the basic instruction groups of 8051 microcontroller giving two examples in each group	7M

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Regular & Supplementary Examinations, September, 2021
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 various phases of compiler in detail. Write the output of each phase of the   12M
        compiler for the expression c:=a+b*12.
    b) What is the use of Symbol Table?   2M

(OR)

2. a) Explain the transition diagram for recognition of tokens and reserved words.   8M
    b) What is Boot Strapping? Explain.   6M

UNIT-II

3.   Explain the steps and remove the ambiguity from the following regular expression: 14M
        E-> E+E|E-E|E/E|E*E| (E)|-E/id

(OR)

4. a) Explain Shift reduce parsing with the help of an example.   10M
    b) Briefly explain about Error Recovery in parsing.   4M

UNIT-III

5. a) Define and explain How Syntax Directed Translation is implemented for array   10M
        types?
    b) What are the differences between static allocation and heap storage allocation?   4M

(OR)

6.   Explain the specification of simple Type checker for statements, expressions and   14M
        functions.

UNIT-IV

7. a) Discuss the role of semantic preserving transformations and dominators in code   10M
        Optimization.
    b) Justify the statement "Copy Propagation and Leads to Dead Code".   4M

(OR)

8. a) What is DAG? Construct a DAG for the following expression: 6M
          a+ a*(b-c)+(b-c)*d
    b) Write annotated parse tree for C+a[i][j] and derive 3-address code for the same   8M
        expression.

UNIT-V

9. a) Explain DAG representation for register allocation with a suitable example.   8M
    b) Discuss the design issues of Code Generator.   6M

(OR)

10.   Explain in detail about machine dependent code optimization process with   14M
        examples.

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