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II B.TECH. II SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2022



II B.Tech II Semester Supple Examinations, March-2022

Subject Code:19BCE4OE11

PUBLIC HEALTH ENGINEERING

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: CE& IT

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) Describe the operation of hauled container system and stationary container system.

OR

B) Discuss the biogas and gobar gas generation from waste recycling plants.

2. A) What is composition of air in a building? Explain the air requirements for human occupancy.

OR

B) Explain the different systems of ventilation provided in a building. Also discuss the effects of ventilation on human health.

3. A) Write a note on mosquito characteristics. What are the possible sources of transmission of malaria disease?

OR

B) What is the best anti-malarial method to counter its outbreak? Describe how this is carried out.

4. A) Discuss the following in brief i) Bacterial treatment of kitchen utensils

ii) Dairy barn sanitation iii) Milk test

OR

B) List out the different pasteurization methods and explain in brief.

5. A) Classify the different types of air pollutants and its sources. Also write the effects of air pollution on human beings.

OR

B) Explain the sources and effects of noise pollution. What are the control measures of noise pollution?



Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: 19BCS4OE12

II.B.TECH -II Semester Supple Examinations, March-2022

WEB DEVELOPMENT USING MEAN STACK TECHNOLOGY

Time: 3 hours

(CSE)

Max Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Explain the architecture of Angular framework. [6]
II) Write about one-way data binding with example. [6]
OR
B) I) Show the use of any two types of built-in pipes in Angular8 with suitable examples. [6]
II) Write short notes on Dependency Injection in Angular8. [6]

2. A) I) Apply angular material module to create a toolbar in an angular app. [6]
II) Write and explain the concept of reactive programming in Angular JS. [6]
OR
B) I) what is a reactive form? Explain with an example. [6]
II) How a pattern validator is used in form validation? Show with an example. [6]

3. A) I) What are the advantages of Node JS? Write about the Node JS process model. [6]
II) Write short notes on types of modules in Node.JS. [6]
OR
B) I) Write about the creation of Node.js web server with code. [12]

4. A) I) explain reading and writing operations on files in Node JS. [6]
II) Explain the use of different event emitter methods in Node JS. [6]
OR
B) I) write about the advantages of Express JS. [6]
II) Write the process of creating a web server in Express JS. [6]

5. A) I) Explain the use of insertMany () method in Mongoddb with an example. [6]
II) How database and collections are created in Mongoddb. Explain with an example. [6]
OR
B) Illustrate the use of different methods used to update and delete records in Mongoddb. [12]



II B.Tech II Semester Supple Examinations, March-2022

Subject Code: 19BEE40E03 **MICRO ELECTRO MECHANICAL SYSTEMS**

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: EEE

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Explain the difference between MEMS and Microsystems.
II) Define MEMS and write a brief note on it's history and development.
OR
B) I) Describe about piezoelectric sensors with it's applications.
II) Explain the working of pressure sensors and flow sensors with a neat diagram.

2. A) I) Discuss about micro lenses and mirrors.
II) Write a brief note on wave guide and tuning.
OR
B) I) Describe overview of shear stress measurement.
II) Explain briefly about digital micro mirror device and write it's applications.

3. A) I) What types of magnetic materials are used in MEMS? Defend their use.
II) Explain the working of feedback circuit integrated magnetic actuator.
OR
B) I) With the help of line diagram explain the construction and working of magneto Resistive Sensor
II) Discuss the working principle of MEMS magnetic sensor.

4. A) I) Write a brief note on Radio Frequency MEMS.
II) Discuss fluid actuation methods.
OR
B) I) Write the applications of MEMS inductors and varactors.
II) Discuss the working process of electro wetting.

5. A) I) Discuss briefly about the sensing mechanism & principle.
II) Explain the working and applications of chemical lab on chip chemo resistors.
OR
B) I) What are chemo capacitors and explain its application.
II) Discuss briefly about mass sensitive chemo sensors.



Subject Code: 19BCC40E09

DATABASE MANAGEMENT SYSTEMS

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: ECE

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) What are the Characteristics of Database Management System? 4 Marks
II) What is Database and explains different models of Database along with Advantages and Disadvantages? 8 Marks
OR
B)I) Explain different types of Database Users. 4 Marks
II) Draw Client Server architecture for the database and explain three different tiers with Advantages and Disadvantages? 8 Marks
2. A) I) What is Constraints and explain different Constraints in Database? 6 Marks
II) What are the Different types of Integrity Constraints in DBMS and explain? 6 Marks
OR
B)I) What are the representations of class hierarchy in DBMS? 6 Marks
II) What is ER Diagram? Draw and explain ER diagram of a Railway reservation system. 6 Marks
3. A) I) What is SQL? Explain different type's commands in SQL. 6 Marks
II) What is a nested query? What are the rules to follow and explain with example? 6 Marks
OR
B)I) What are the different type of SQL Functions and explain their Uses. 6 Marks
II) Explain the usage of SQL group by, order by and having clauses with syntax and examples. 6 Marks
4. A) I) What is Normalization? Explain about Normal Forms? 12 Marks
OR
B)I) Define Transaction Management, What are the states of Transactions and Explain ACID Properties? 6 Marks
II) What is buffering in DBMS? Explain various methods used by buffer managers. 6 Marks
5. A) I) What do you mean by Concurrency Control and explain the importance? 6 Marks
II) What are two types of locks used for concurrency control? 6 Marks
OR
B) What is Indexing? Explain Different types with Simple Example? 12 Marks

I B.Tech I Semester Supple. Examinations, March-2022

Sub Code: 19BCC1TH04

ENGINEERING DRAWING

Time: 3 hours

(Common to CE & ME)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No.	Questions	Marks
	Unit-I	
1	a Trace the curves when the distance of the focus from directrix is 50mm with eccentricity is $3/2$. Name the curve.	[12M]
	OR	
	b Construct a diagonal scale of 1:6 to show decimetres and centimetres and millimetres long enough to measure up to 1m. Show a distance of 5.31 dm on it.	[12M]
	Unit-II	
2	a i) A & B points are in the HP. A is 45mm in front of VP and B is behind VP. The distance between the projectors is 85. The line joining their top views makes 30° with x-y. Draw its projections & find distance of B from VP.	[6M]
	ii) A 100mm long line is parallel to and 25mm above HP. Its two ends are 25mm and 40mm in front of VP respectively. Draw its projections and find its inclination with VP.	[6M]
	OR	
	b Draw the projections of a line AB, 90 mm long, its mid-point M being 50 mm above the H.P. and 40 mm in front of the V.P. The end A is 20 mm above the H.P. and 10 mm in front of the V.P. Show the traces and the inclinations of the line with the H.P. and the V.P.	[12M]
	Unit-III	
3	a A pentagonal plane of 25 mm side is having a corner on V.P and the side opposite that corner is 30° inclined to H.P. Draw its projections when the surface is 45° inclined to V.P.	[12M]
	OR	
	b A thin rectangular plate of sides 60 mm x 30 mm has its shorter side in the V.P. and inclined at 30° to the H.P. Project its top view if its front view is a square of 30 mm long sides.	[12M]
4	Unit-IV	

a A pentagonal prism of base side 30 mm and axis 60 mm rests on one of its base side in the H.P. Draw its projection, when its axis 30° inclined to H.P. and parallel to V.P.

[12M]

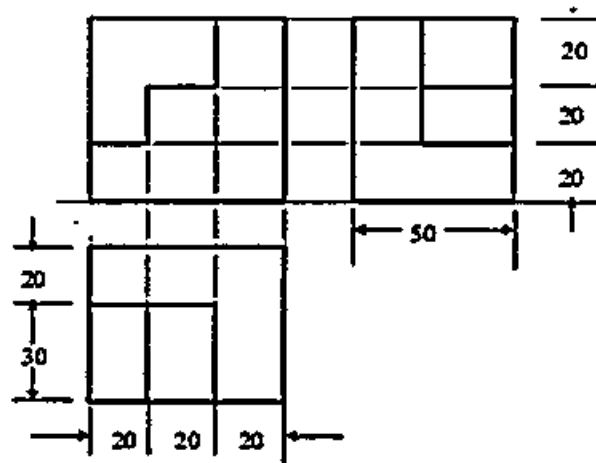
OR

b Draw the lateral surface development for a hexagonal pyramid of base side 40mm and axis 60mm

[12M]

Unit-V

a Draw the isometric view for the following figure. All the dimensions are in mm.

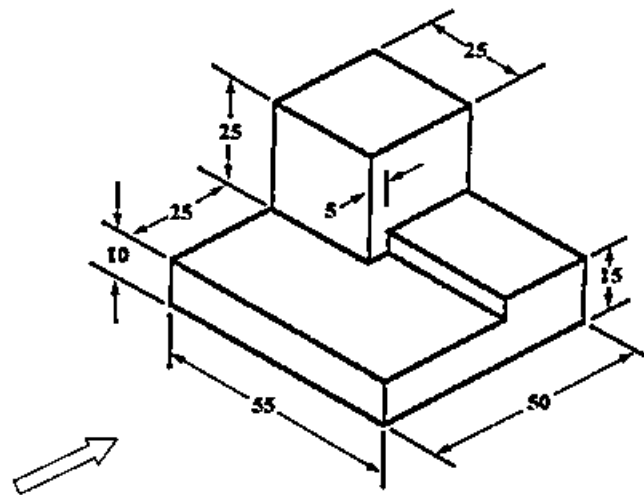


[12M]

5

OR

b Draw the front, top and side views for the following figure. All dimensions are in mm.



[12M]

II B.Tech II Semester Supple Examinations, March-2022

STRUCTURAL ANALYSIS-I

Subject Code:19BCE4TH02 Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

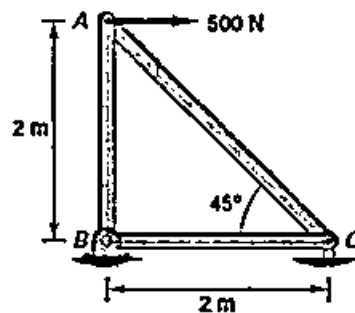
Branch:CE

Note: Answer All FIVE Questions.
 All Questions Carry Equal Marks (5 X 12 =60M)

No.	Questions	Marks
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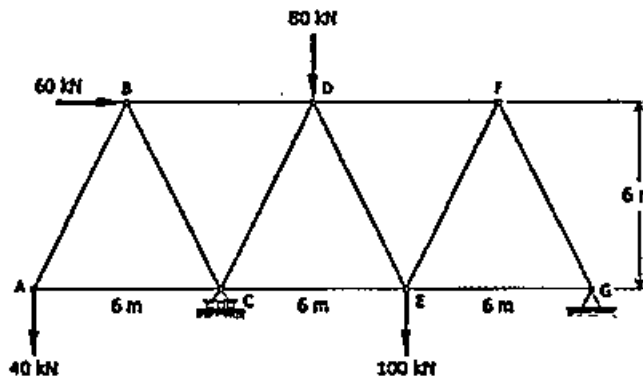
Unit-I

Determine the magnitudes and nature of forces in all members of the frame given in Fig.1 by Method of Joints. Fig.1 [12M]



OR

1 Determine the magnitudes and nature of forces in all members of the frame given in Fig.2. By Method of Joints. Fig.2. [12M]



Unit-II

2 i) A cantilever beam AB of length 5m carries a point load of 75 kN at free end and another point load 50kN at 2.5m from the free end. If $E = 10^5 \text{ N/mm}^2$ and $I=10^8 \text{ mm}^4$ for the cantilever then determine the slope and deflection at the free end by Moment area method. [6M]

a

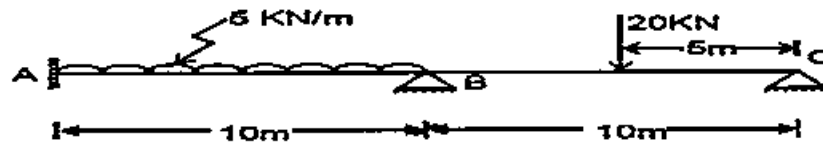
ii) A cantilever beam AB of length 5m carries a point load of 100kN at free end and another point load 75 kN at 2.5m from the free end. If $E = 10^5 \text{ N/mm}^2$ and $I=10^8 \text{ mm}^4$ for the cantilever then determine the slope and deflection at the free end by Macaulay's method. [6M]

OR

- i) A horizontal beam AB is simply supported at A and B, 5m apart. The beam is subjected to a clockwise couple of 250kNm at a distance of 3m from the left end. If $E=2 \times 10^5 \text{ N/mm}^2$ and $I=2 \times 10^8 \text{ mm}^4$. Determine (i) Deflection at the point where couple is acting (ii) the maximum deflection. [6M]

- b ii) Define Macaulay's method? And find out Deflection of a simply supported beam with a uniformly distributed load throughout the length of the beam. [6M]

Unit-III



- a i) Analyze the following beam by using conjugate beam method, EI Constant. [8M]

- 3 ii) State and prove Castigliano's first theorem [4M]

OR

- i) Derive the energy stored due to axial loading [4M]
- b ii) Define Strain energy. Derive an expression for strain energy due to bending moment. [8M]

Unit-IV

- a A parabolic 3 hinged arch carries a UDL of 25 kN/m on the left half of the span. It has a span of 16 m and a central rise of 3 m. Determine the resultant reaction at supports. Find also the bending moment, normal thrust and radial shear at a section 4 m from left support. [12M]

4 OR

- b A three hinged parabolic arch of span 100m and rise 20m carries a uniformly distributed load of 2kN/m length on the right half as shown in the figure. Determine the maximum bending moment in the arch. [12M]

Unit-V

- a Draw the Influence line diagram for reactions of a simply supported beam of 10 m span carries a UDL of 25kN/m. [12M]

OR

- 5 b Four point loads 5 kN, 10 kN, 10 kN and 8kN have centre to centre spacing of 2m between consecutive loads and they traverse a girder of 25m span from left to right with 10 kN load leading. Calculate the maximum bending moment and shear force at 6m from the left support. [12M]



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Subject Code: 19BCE4TH06

II B.Tech II Semester Supple Examinations, March-2022
FLUID MECHANICS AND HYDRAULIC MACHINERY

Time: 3 Hours

Program: B.Tech.

Branch: CE

Max. Marks: 60

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 = 60 M)

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1. A) i) A 15 cm diameter vertical cylinder rotates concentrically inside another cylinder of diameter 15.10 cm. Both cylinders are 25 cm high. The space between the cylinders is filled with a liquid whose viscosity is unknown. If a torque of 12 Nm is required to rotate the inner cylinder at 100 rpm. Determine the viscosity of the fluid.
- ii) Derive the expression for pressure head when fluid at a rest and develop an equation for Pascal's law.
- OR
- B) i) A plate 0.05 mm distance from a fixed plates moves at 75 cm/s and requires a force of 5 N per unit area to maintain this speed. Determine the fluid viscosity between the plates.
- ii) Define the terms gauge pressure, vacuum pressure and atmospheric pressure. Indicate their relative positions.
2. A) i) A rectangular plate 0.6 m wide and 1.2 m deep lies within a water body such that its plane is inclined at 45 degree to the horizontal and the top edge is 0.70 m below the water surface. Determine the total pressure on one side of the plate and the location of the centre of pressure.
- ii) The velocity component for a two dimensional incompressible flow are given by $u=3x-2y$ and $v=-3y-2x$. Show that the velocity potential exists. Determine the velocity potential function and stream function.
- OR
- B) i) If for a two dimensional potential flow, the velocity potential function is given by $\phi = x(2y-1)$, determine the velocity at the point P (4,5). Determine also the value of stream function (Ψ) at the point P.
- ii) Derive the continuity equation for a three dimensional incompressible flow.
3. A) i) Derive the expression for loss of head due to friction in pipes.
- ii) The water is flowing through a pipe having diameters 20 cm and 10 cm at sections 1 and 2 respectively. The rate of flow through pipe is 35 lit/sec. the section 1 is 6m above datum. If the pressure at section 2 is 4m above the datum. If the pressure at section 1 is 39.24 N/cm², find the intensity of pressure at section 2.

OR

- B) i) A pipe line 300 mm in diameter and 3200 m long is used to pump up 50 kg per second of oil whose density is 950 kg/m^3 and whose kinematic viscosity is 2.1 stokes. The center of the pipe at upper end is 40 m above than at the lower end. The discharge at the upper end is atmospheric. Find the pressure at the lower end and draw the hydraulic gradient and the total energy line.
- ii) Water flows through a pipe AB 1.2m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter at C, the pipe branches. Branch CD is 0.8m in diameter and carries one third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE.
4. A) i) Calculate the specific energy of $12 \text{ m}^3/\text{s}$ of water flowing with a velocity of 1.5 m/s in a rectangular channel 7.5 m wide. Find the depth of water in the channel when the specific energy would be minimum. Identify the value of critical velocity as well as minimum specific energy?
- ii) Determine the most economical section of rectangular channel carrying water at the rate of 0.6 cumecs. The bed slope of the channel is 1 in 2000. Assume Chezy's constant $C=50$.

OR

- B) i) Find the slope of the free water surface in a rectangular channel of width 20 m, having depth of flow 5 m. The discharge through the channel is 52 cumecs. The bed slope of the channel is 1 in 4000. Assume Chezy's constant C as 60.
- ii) The depth of flow of water at a certain section of rectangular channel 2 m wide is 0.3 m. The discharge through a channel is $1.5 \text{ m}^3/\text{s}$. Determine whether a hydraulic jump will occur, if so; determine its height and loss of energy per kg of water.
5. A) i) Describe the working principle of any one pump with a neat sketch.
- ii) A kaplan turbine is to be designed to develop 9100 kW. The net available head is 5.6 m. The speed ratio is 2.09 and the flow ratio is 0.68. The overall efficiency is 86% and the diameter of the boss is one-third the diameter of the runner. Examine specific speed of the turbine.

OR

- B) i) Explain the working principle of any one turbine with a neat sketch.
- ii) An inward flow reaction turbine operates under a head of 25 m running at 200 rpm. The peripheral velocity of the runner is 2 m/s and the radial velocity at the runner exit is 15 m/s. If the hydraulic losses are 20% of the available head, Identify the specific speed, if the width of the runner at the periphery is 30 cm.



II B.Tech II Semester Supple Examinations, March-2022

DIGITAL LOGIC CIRCUITS

Time: 3 Hours Subject Code: 19BEE4TH03 Program: B.Tech. Max.Marks:60. Branch:EEE

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

Q.No	Questions	Marks
Unit-I		
1	a i) Distinguish between weighted and non-weighted codes with examples. [6M]	[6M]
	a ii) Represent the decimal number 8620 in: (a) BCD (b) Excess-3 (c) Gray codes [6M]	[6M]
	OR	
	b i) What is the advantage of 2's complement representation in computers? Perform the following operations using 2's complement method: (a) (+55) - (+15) (b) (-55) - (-15) [8M]	[8M]
	ii) Given a = 10101001 and b = 1101. Find: (i) a + b (ii) a - b (iii) a . b (iv) a / b. [4M]	[4M]
Unit-II		
2	a i) Simplify the following Boolean function for minimal POS form using K-map and implement Using NOR gates. $F(W, X, Y, Z) = \Sigma(1, 2, 5, 6, 9) + d(10, 11, 12, 13, 14, 15)$ [6M]	[6M]
	a ii) Simplify the following Boolean functions to minimum number of literals. (a) $xyz + x^1y + xyz^1$ (b) $xz + x^1yz.$ [6M]	[6M]
	OR	
	b i) What are universal gates? Realize AND, OR, NOT, XOR gates using universal gates. [6M]	[6M]
	ii) Obtain the simplified expressions in sum of products for the following Boolean functions using K-map. a) $F(A, B, C, D) = \Sigma(7, 13, 14, 15)$ b) $F(w, x, y, z) = \Sigma(2, 3, 12, 13, 14, 15)$ [6M]	[6M]
Unit-III		
3	a i) Design a combinational circuit that accepts a three-bit binary number and generates an output binary number equal to the twice the input number. [6M]	[6M]
	a ii) Design 2x4 decoder using NOR gates. [6M]	[6M]
	OR	
	b i) Implement full adder using 4x1 multiplexer. [4M]	[4M]
	ii) Implement the following function $F(A,B,C,D) = \Sigma m(0,1,3,4,7,10,12,14)$ using (a) 16:1 MUX (b) 8:1 MUX [8M]	[8M]
Unit-IV		
4	a i) Design a serial binary adder using D-Flip Flop. [6M]	[6M]
	a ii) Draw the circuit diagram of J-K Flip-Flop with NAND gates with positive edge triggering and explain its operation with the help of truth table. How race around condition is eliminated. [6M]	[6M]

OR		
	b	i) Show how mod-12 JK counter could be built using mod-3 & mod-4 counters [6M]
		ii) Design the sequence detector which detects 110010 using T - Flip-Flops. [6M]
Unit-V		
5	a	i) Design a combinational circuit using PROM that converts a 3-bit binary number to equivalent excess-3 code. [8M]
		ii) Discuss the comparison between PROM, PLA and PAL. [4M]
	OR	
	b	i) Explain the general combinational PLD configuration with suitable block diagram [6M]
ii) Give the logic implementation of a 32 x 4 bit & 8 x 4 bit ROM using suitable decoder. [6M]		



Subject Code: 19BEE4TH04

II B.Tech -II Semester Supple Examinations, March-2022

ELECTRICAL MACHINES – II

Time: 3 Hours

Max.Marks:60.

Program: B.Tech.

Branch:EEE

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Generate the Torque-Slip characteristics of 3-phase induction motor and explain. [6M]
II) Explain the phenomenon of crawling and cogging effect in case of 3-Phase induction motor in detail. [6M]
- OR
- B) I) Explain why the speed of 3-phase induction motor can not be equal to synchronous speed. [2M]
II) Draw the circle diagram from no-load and short circuit test on a 3 phase 14.92KW, 440V, 6-pole induction motor from the following results
No-load test: 400V, 11A, PF=0.2
Short-circuit test: 100V, 25A, PF=0.4
Rotor Copper losses at stand still is half the total Copper losses from the circle diagram, find
(i) Line current, slip, efficiency, and PF at full load
(ii) Maximum Torque [10M]
2. A) I) Explain V/f control of 3-phase induction motor. [6M]
II) Explain the starting methods of 3-phase induction motor. [6M]
- OR
- B) I) Explain pole changing method of Speed control of induction motor. [6M]
II) Discuss the phenomenon of dynamic braking and regenerative braking in 3-phase induction motor. [6M]
3. A) I) Explain the constructional features and working principle of single phase induction motor. [6M]
II) Analyze the operation of single-phase induction motor by double-field revolving theory. [6M]
- OR
- B) I) Explain capacitor start – capacitor run single-phase induction motor. [6M]
II) Explain the constructional details and working of hysteresis motor. [6M]
4. A) I) Explain the principle of operation of a synchronous generator. [6M]
II) A 220V, 50Hz, 6-pole star-connected alternator with ohmic resistance of 0.06Ω per phase are the following data for open circuit and full load ZPF characteristics:

Field Current(A)	0.2	0.4	0.6	0.8	1.00	1.2	1.4	1.8	2.2	2.6	3.0	3.4
Open circuit Voltage (Volts)	29	58	87	116	146	172	194	232	261.5	284	300	310
ZPF voltage (Volts)	-	-	-	-	-	0	29	88	140	177	208	230

Find the percentage voltage regulation at full load current of 40Amps at power factor of 0.8 lagging. [6M]

OR

B) I) with the help of phasor diagram explain the parallel operation of alternators under no-load and loaded condition. [6M]

II) What is an armature reaction? Explain its effect on the terminal voltage of an Alternator at unity. [6M]

5. A) I) Derive the expression for the maximum torque developed per phase of a synchronous motor. [6M]

II) A 75KW, 400V, 4-pole, 3-phase, 50Hz, star connected synchronous motor has a resistance and synchronous reactance of 0.04Ω and 0.4Ω respectively. Compute for full load 0.8pf lead the open circuit emf per phase and gross mechanical power developed. Assume an efficiency of 92.5%. [6M]

OR

B) I) Explain the hunting phenomenon in case of synchronous motor. [6M]

II Explain the significance of V curves and inverted V-curves? [6M]



II B.Tech II Semester Supple Examinations, March-2022

Subject Code: 19BME40E12

OPERATIONS RESEARCH

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: ME.

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) Use Simplex method to solve the following problem:

Maximize $Z = 2X_1 + 5X_2$, Subjected to the constraints

$$3X_1 + X_2 \leq 21$$

$$X_1 + 4X_2 \leq 24$$

$$X_1 + X_2 \leq 9 \text{ and}$$

$$X_1, X_2 \geq 0$$

OR

- B) Solve the following LPP by Big-M method.

Maximize $Z = 3x_1 + 2x_2$

Subjected to the constraints

$$2x_1 + x_2 \leq 2$$

$$3x_1 + 4x_2 \geq 12$$

And $x_1, x_2 \geq 0$.

2. A) Solve the following transportation problem.

	To				Supply
From	21	16	25	13	11
	17	18	14	23	13
	32	27	18	41	19
Demand	6	10	12	15	

OR

- B) A batch of 4 jobs can be assigned to 5 different machines. The set up time (in hours) for each job on various machines is given below. Find the optimal assignment of jobs to machines which will minimize the total setup time.

		MACHINES				
		1	2	3	4	5
JOB	1	10	11	4	2	8
	2	7	11	10	14	12
	3	5	6	9	12	14
	4	13	15	11	10	7

3. A) I) Determine the optimal sequencing of the following 7 jobs on two machines M1 and M2.

JOB	1	2	3	4	5	6	7
M1	3	12	15	6	10	11	9
M2	8	10	10	6	12	1	3

II) Distinguish between PERT and CPM

OR

B) The following table indicates the details of a project. The durations are in days. 'a' refers to optimistic time, 'm' refers to most likely time and 'b' refers to pessimistic time duration.

Activity	a	m	b
1-2	2	4	5
1-3	3	4	6
1-4	4	5	6
2-4	8	9	11
2-5	6	8	12
3-4	2	3	4
4-5	2	5	7

- Draw the network
- Find the critical path
- What is the project length?
- Determine the expected standard deviation of the completion time

4. A) Arrivals at a telephone booth are considered to be following Poisson law of distribution with an average time of 10 minutes between one arrival and the next. Length of a phone call is assumed to be distributed exponentially with mean of 3 minutes.

- What is the probability that a person arriving at the booth will have to wait?
- What is the average length of queue that forms from time to time?

OR

B) Use the dynamic Programming to solve the LPP

Maximize $Z = X_1 + 9X_2$, Subject to the constraints

$$2X_1 + X_2 \leq 25$$

$$X_2 \leq 11$$

$$X_1, X_2 \geq 0$$

5. A) I) Solve the following game graphically.

	B1	B2	B3	B4
A1	2	1	0	-2
A2	1	0	3	2

II) Solve the following game.

	B1	B2
A1	8	-3
A2	-3	1

OR

B) I) The maintenance cost and the resale price of a machine are given below.

Year	1	2	3	4	5	6	7	8
Maintenance cost	1000	1300	1700	2200	2900	3800	4800	6000
Resale price	4000	2000	1200	600	500	400	400	400

The purchase price of the machine is Rs. 8000. Determine the time at which it is profitable to replace the machine.

II) The Cost of a product is Rs 80,000 and its Scrap value is Rs.500. The maintenance cost found from experience is as follows:

Year	1	2	3	4	5	6	7
Maintenance cost (Rs)	1,000	1,200	1,600	2,400	3,000	3,900	5000

When should the product be replaced?

Subject Code: 19BME4TH01

KINEMATICS OF MACHINERY

Program: B.Tech.

Max.Marks:60.

Branch: ME.

Time: 3 Hours

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Define kinematic link. Briefly explain its types. [6]
II) List the types of constrained motion. Explain any one. [6]

OR

- B) I) What is meant by inversion of a mechanism? Describe any one inversion of slider crank chain mechanism with the help of neat diagram. [8]
II) Explain in brief the "Oldham's coupling" with neat sketch. [4]

2. A) I) Draw a neat sketch and explain working of pantograph. [6]
II) Write a short note on Hart mechanism with neat sketch. [6]

OR

- B) I) With the help of a neat sketch, construct and explain the working of Ackerman steering gear mechanism. [12]

3. A) I) For the position of the mechanism shown in *Figure.1*. Calculate the angular velocity of the link *AR*. The link (*OA*) is 300 mm long and rotates at 20 rad/s in the clockwise direction. $OQ = 650$ mm and $QOA = 40^\circ$. [6]

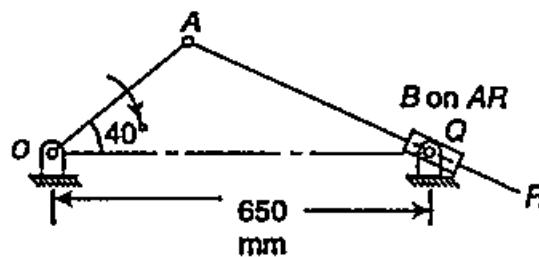


Figure.1

- II) Determine the Velocity of a point on a link by Relative Velocity Method? [6]

OR

- B) I) Determine the instantaneous centre by Arnold-Kennedy Theorem three centres in line theorem? [12]

4. A) I) Draw the displacement, velocity and acceleration diagrams for a follower when it moves with uniform acceleration and retardation. [6]

- II) Classify the different types of cam? Explain any two with neat sketch. [6]

OR

- B) I) Draw the profile of a cam operating a knife-edge follower having a lift of 30 mm. The cam raises the follower with Simple Harmonic Motion (SHM) for 150° of the rotation followed by a period of dwell for 60° . The follower descends for the next 100° rotation of the cam with uniform velocity, again followed by a dwell period. The cam rotates at a uniform velocity of 120 rpm and has least radius of 20 mm. What will be the maximum velocity and acceleration of the follower during the lift and the return? [12]
5. A) I) With respect to gears define followings with suitable neat sketch: [6]
- a) Addendum
 - b) Dedendum
 - c) Module
 - d) Pitch circle
- II) Two involute gears in mesh have 20° pressure angle. The gear ratio is 3 and the number of teeth on the pinion is 24. The teeth have a module of 6 mm. The pitch line velocity is 1.5 m/s and the addendum equal to one module. Determine the angle of action of pinion and maximum velocity of sliding. [6]

OR

- B) I) What is a gear train? Explain with neat sketches the different types of gear trains. [6]
- II) A reverted gear train shown in *Figure.2* is used to provide a speed ratio of 10. The module of gears 1 and 2 is 3.2 mm and of gears 3 and 4 is 2 mm. Determine suitable number of teeth for each gear. No gear has to have less than 20 teeth. The centre distance of the shaft is 160 mm. [6]

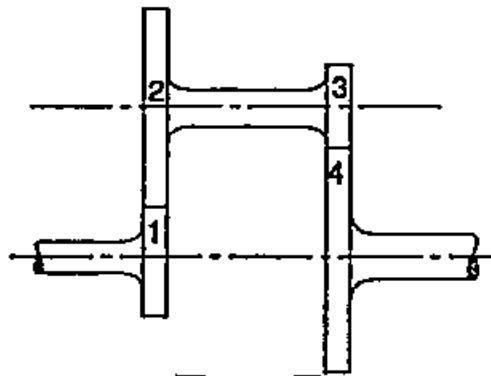


Figure.2

II B.Tech II Semester Supple Examinations, March-2022
BUILDING PLANNING, SERVICE DESIGN AND DRAWING

Time: 3 Hours Subject Code: 19BCE4TH03 Program: B.Tech. MaxMarks:60 Banch:CE

Note: Answer All Questions.

1. A) I Write a short notes on the following: setback, detached building, building line, floor area ratio.

II) Write short notes on: i. Area limitations ii. Height of the building. [6M+6M]

OR

- B) I) Define Floor area ratio (FAR), how is it related to height of the building.

II) Write short notes on: i. Open space requirements. ii. Lighting and ventilation requirements. [6M+6M]

2. A) what are the factors or principles which govern the theory of planning for a residential building and explain?[12M]

OR

- B) I) explain the significance of aspect and prospect for residential buildings. [6M+6M]

II) How dispositions of doors and mode of hanging shutters affect privacy in a building.

3. A) I) Explain the causes of fire in buildings [6M+6M]

II) Write the different types of plumbing in building and explain any one

OR

- B) I) Explain about a) Method of internal wiring b) Earthing c) Planning of electrical Installations [12M]

4. A) Draw the front elevation of a fully paneled wooden window of size 1300 mmX1500 mm. Also show the sectional plan. Assume any other data. [24M]

OR

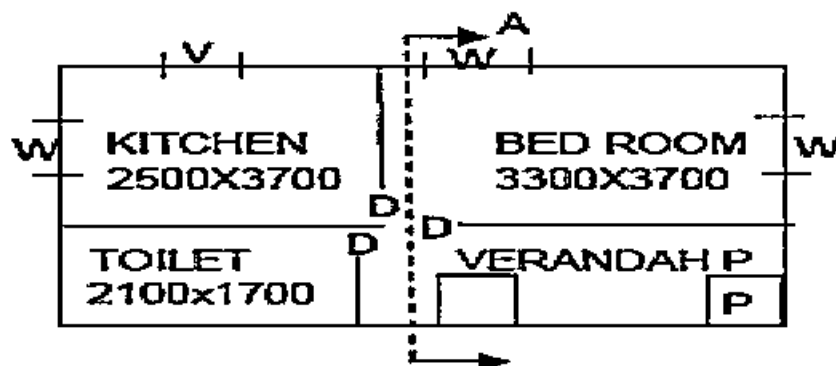
- B)) Figure shows the line drawing of a residential building, draw to a scale of the following. (i) Dimensional plan (ii) Section a long A – A (iii) Front elevation. [24M]

The following specifications are to be adopted. Foundation:- Depth 1000 mm.

C.C.bed 1000 mm X 300 mm. Two footings with an offset of 50 mm and 250 mm

thickness each. Basement: 600 mm high, thickness of wall at this level is 400 mm.

Walls: - Brick masonry in C.M. 1:6, 300 mm thick. Roof:-R.C.C.S lab 120 mm thick. Provide the details of doors, windows, ventilators, and steps etc as per standard dimensions. Assume any data required. All dimensions are in mm (given plan).



Subject Code: R19BEE4TH02

II B.Tech II Semester Supple Examinations, March-2022

PROBLEM SOLVING USING PYTHON

Time: 3 Hours

Program: B.Tech. Max.Marks:60.

Branch:EEE

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

-
1. A) I) What are the different classification of Computers? Explain each of it.
II) Explain the similarities and dissimilarities of system software and application software.
OR
B) I) Explain difference between program and algorithm with an example.
II) Explain memory hierarchy in the computer with a diagram.
2. A) I) What is a flowchart? What are the advantages and limitation of the flowchart?
II) Draw a flowchart to calculate the sum of the first 20 natural numbers.
OR
B) I) Draw the flowchart for the multiplication table.
II) What are different control structures used in the algorithms? Explain each of it with an example.
3. A) I) What is data type? Define different type of data types with example. Why we use different data types in the Python programming language?
II) Write a python program to print all the numbers from 1 to 1000 that are not divisible by 2, 3, 5, 7, 11, 13, 17 and 19.
OR
B) I) Write a python program that determines whether a digit, character was entered.
II)What are the difference between build-in function and user defined functions? Explain with an example.
4. A) I) Make list of first 20 letters of alphabets then using list operations do the following operations (a) Print first 5 letters from created list. (b) Print last 5 letters from created list. (c) Print alternate letters from the created list.
II) Write a Python program to generate and print a dictionary that contains a number (between 1 and n) in the form (x, x*x). Sample Dictionary input: n = 5 Expected Output: {1: 1, 2: 4, 3: 9, 4: 16, 5: 25}
OR
B) I) Write a program to create a list of numbers in the range 1 to 20. Then delete all the numbers from the list that are divisible by 2.
II) What is a file? What are file operations? What are the advantages of file handling?
5. A) I) What is class and class members? Explain with an example. Differentiate between class variable and instance variable.
II) Write a program that has a class Point with attributes as the x and y coordinates. Make two objects of class and find the midpoint of the both the points.
OR
B) I) Explain following terms: (a) inheritance (b) polymorphism
II) Explain how exceptions can be handled in Python with an example. What are the advantages of using it?



II B.TECH -II Semester Supple Examinations, March-2022

MANUFACTURING TECHNOLOGY

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: ME.

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Discuss the steps evolved in casting process? 6M
II) Discuss the defects in casting process along with their remedies. 6M
OR
B) I) Explain briefly about (i) Moulding materials, (ii) Cores 6M
II) Discuss centrifugal casting with its advantages, limitations and applications? 6M

2. A) I) Explain importance of welding process and classify welding processes? 6M
II) Differentiate Gas welding and Gas cutting? 6M
OR
B) I) With neat sketch explain the process of Gas welding? 6M
II) Explain defects in welding process with their causes? 6M

3. A) I) Differentiate spot and seam welding? 6M
II) Discuss about plasma arc welding? 6M
OR
B) I) Differentiate between TIG and MIG welding processes? 6M
II) Discuss about butt welding process? 6M

4. A) I) Discuss the about Hot and Cold working processes? 6M
II) Explain about Open and Closed die forging? 6M
OR
B) I) Differentiate Hot forging and cold forging? 6M
II) Discuss about the importance rolling? 6M

5. A) I) Explain with neat sketches (i) Forward extrusion (ii) Backward extrusion 6M
II) Discuss about types of drawing processes. 6M
OR
B) I) Briefly explain hydrostatic extrusion? 6M
II) Differentiate between extrusion and drawing processes? 6M



1
2312

II.B.TECH -II Semester Supple Examinations, March-2022

Subject Code:19BME4TH03 **METROLOGY & INSTRUMENTATION**

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: ME.

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Explain briefly different types of fits with necessary sketches.
II) Describe interchangeable assembly with suitable example. State its advantages
OR
B) I) Determine limit dimensions for a clearance fit between mating parts of diameter 40 mm, providing a minimum clearance of 0.10 mm with a tolerance on the hole equal to 0.025 mm and on shaft 0.05 mm using both systems.
II) Differentiate between unilateral and bilateral tolerance with examples. Explain the need for providing tolerance on a dimension.
2. A) I) What are slip gauges? Explain Wringing procedure.
II) Explain the procedure of taper angle measurement using sine bar.
OR
B) I) Explain with a neat sketch the construction of a dial gauge.
II) Briefly explain the construction and working of a bevel protractor.
3. A) I) What are limit gauges? Sketch and explain any two types of the limit gauges.
II) Explain the working principle of an autocollimator and explain various parts of it.
OR
B) I) Explain briefly about optical flat with a neat sketch.
II) State the various uses of Tool maker's microscope.
4. A) I) What are the different types of error that cause inaccuracy in the instrument? Explain their causes and remedies.
II) Explain a capacitive liquid level sensor used to measure liquid level.
OR
B) I) What is meant by calibration? Explain with suitable example and also mention the precautions while calibrating any instrument.
II) Explain the working of LVDT with neat sketch.
5. A) I) Explain the principle of working of thermocouples. State the law of intermediate temperatures and intermediate metals for thermocouples.
II) Explain the measurement of pressure using U-tube manometer.
OR
B) I) Explain the Mcleod vacuum gauges used for pressure measurement and its limitations.
II) What is thermistor. Explain the principle of operation with neat sketch.



II B.Tech II Semester Supple Examinations, March-2022

Subject Code: 19BME4TH04

APPLIED THERMODYNAMICS

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: ME.

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 =60M)

-
1. A) Illustrate the constructional details of an I.C engines? Explain briefly about the important Components and its materials?
- OR
- B) I) Explain with a neat sketch, valve timing diagram for a four stroke SI engine
II) With a neat sketch explain the magneto ignition system?
2. A) I) Explain the combustion phenomenon in an S.I engine. 8M
II) How are S.I and C.I engine fuels rated? 4M
- OR
- B) I) Explain the stages of combustion in C.I engine. 8M
II) What is delay period and what are the factors affecting delay period. 4M
3. A) In a test of a four-cylinder, four-stroke petrol engine of 75 mm bore and 100 mm stroke, the following results were obtained at full throttle at a constant speed and with a fixed setting of the fuel supply of 0.082 kg/min.
bp with all cylinders working = 15.24 kW, bp with cylinder number 1 cut-off = 10.45 kW,
bp with cylinder number 2 cut-off = 10.38 kW, bp with cylinder number 3 cut-off = 10.23 kW.
bp with cylinder number 4 cut-off = 10.45 kW
Estimate the indicated power of the engine under these conditions. If the calorific value of the fuel is 44 MJ/kg, find the indicated thermal efficiency of the engine.
Compare this with the airstandard efficiency, the clearance volume of one cylinder being 115 cc.
- OR
- B) I) What is the significance of conducting the Morse Test? Explain in detail.
II) A six cylinder gasoline engine operates on a four stroke cycle. The bore of each cylinder is 80mm and the stroke is 100mm. The clearance volume per cylinder is 70cc. At a speed of 4000rpm the fuel consumption is 20kg/h and the torque developed is 150 Nm. Calculate (i) brakepower (ii) brake mean effective pressure (iii) brake thermal efficiency if the calorific value of the fuel is 43000 kJ/kg.
4. A) I) Write the classification of rotary compressors and explain working principle of roots blower with neat sketch
- II) prove that the volumetric efficiency of single stage compressor is given
- by $\eta_{vol} = 1 + k - k(p_2/p_1)^{1/n}$

OR

B) I) Explain with simple sketch, working of a Lysholm compressor

II) Explain the working principle of Vane sealed compressor.

5. A) I) Explain the working centrifugal compressor with a neat sketch and plot a variation of pressure and velocity of air passing through impeller and diffuser.

II) A centrifugal compressor delivers 0.5 kg of air per second at a pressure of 1.8 bar and 1000C. The intake conditions are 200C and 1 bar. Find the isentropic efficiency of the compressor and the power required to drive it. Take $n = 1.65$ and $C_p = 1 \text{ kJ/kgK}$.

OR

B) I) Explain the working principle of axial flow compressor with neat sketch.

II) An axial flow compressor with compression ratio as 5 draws air at 20°C delivers at 50°C. Assuming 50% degree of reaction. Find the velocity of flow if the blade velocity is 100 m/s. also find the number of stages, take work factor = 0.85, $\alpha = 10^\circ$, $\beta = 40^\circ$, $C_p = 1 \text{ KJ/Kg.k}$



COMPLEX VARIABLES , PROBABILITY & STATISTICS

II B.Tech II Semester Supple Examinations, March-2022

Max.Marks:60.

Time: 3 Hours

Program: B. Tech.

Branch: CE, EEE

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Consider the function $f: C \rightarrow C$ defined by $f(z) = \begin{cases} \frac{z^5}{1-z^4}, & z \neq 0 \\ 0 & z = 0 \end{cases}$. Then

prove that $f(z)$ satisfies Cauchy-Riemann equations at origin, but not differentiable at origin.

II) Determine constant a such that the function $u = e^{3x} \cos(ay)$ is harmonic and hence find its harmonic conjugate.

OR

B) I) Prove that $f(z) = z^{1/3}$ is analytic everywhere except at origin and hence find $f'(z)$.

II) Let a function $f(z)$ is analytic everywhere in a domain D . Prove that if $f(z)$ is real valued for all z in D , then $f(z)$ must be constant throughout D .

2. A) I) Evaluate $\oint_C (z - z_0)^n dz$, where n is the integer, z_0 is the constant, and C is the circle of radius r with center z_0 .

II) Evaluate $\oint_C z e^{x/2} dz$, where C is the ellipse $9x^2 + y^2 = 9$.

OR

B) I) Determine the Laurent's series of the function $f(z) = \frac{z^2 - 4}{(z+1)(z+4)}$, in the regions

(i) $0 < |z| < 1$ (ii) $1 < |z| < 4$ (iii) $|z| > 4$.

II) Evaluate $\int_{-\infty}^{\infty} \frac{\cos x}{x^4 + 1} dx$.

3. A) I) The contents of urns I, II, III are as follows: 1 white, 2 black and 3 red balls; 2 white, 1 black and 1 red balls; 4 white, 5 black and 3 red balls. One urn is chosen at random and two balls drawn. They happen to be white and red. What is the probability that they come from urns I, II or III?

II) For the continuous probability function $f(x) = kx^2 e^{-x}$, $x \geq 0$, find (i) k (ii) Mean (iii) Variance

OR

B) I) Fit a Poisson distribution for the following data and calculate the expected frequencies.

x	0	1	2	3	4	5	6	7	8
$f(x)$	56	156	132	92	37	22	4	0	1

- II) For normal distribution, prove that mean = median = mode.
4. A) The efficiency expert of a computer company tested 40 engineers to estimate the average time it takes to assemble a certain computer component getting a mean of 12.73 minutes and standard deviation of 2.06 minutes.
- (i) If $\bar{x}=12.73$ is used as a point estimate of the actual average time required to perform the task, then determine the maximum error with 99% confidence.
- (ii) Construct 98% confidence intervals for the true average time it takes to do the job.
- (iii) With what confidence can we assert that the sample mean does not differ from the true mean by more than 30 seconds?

OR

- B) A professor's feeling about the mean mark in the final examination in probability of a large group of students is expressed subjectively by normal distribution with mean $\mu_0=67.2$ and standard deviation $\sigma_0=1.5$.
- (i) If the mean mark lies in the interval (65.0, 70.0), then find the prior probability that the professor should assign to the mean mark.
- (ii) Find the posterior mean μ_1 and the posterior standard deviation σ_1 if the examinations are conducted on a random sample of 40 students yielding mean 74.9 and standard deviation 7.4
- (iii) Construct a 95% Bayesian interval for μ .

5. A) D In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat eaters are equally popular in this state at 1% level of significance?

II) Two horses A and B were tested according to the time in seconds to run a particular track with the following results.

Horse A	28	30	32	33	33	29	32
Horse B	29	30	30	24	27	28	28

Test whether the two horses have the same running capacity.

OR

B) D) A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population.

II) A pair of dice are thrown 360 times and the frequency of each sum is indicated below.

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	8	24	35	37	45	62	51	42	26	14	16

Would you say that the dice are fair on the basis of the chi-square test at 0.05 level of significance?

R19
2-2

ELECTRONIC CIRCUIT ANALYSIS
(ECE)

II B.Tech II Semester Supple Examinations, March-2022

Time: 3 Hours

Sub Code: 19BEC4TH01

Max.Marks:60.

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Draw the CE amplifier with un bypassed emitter resistance and derive expression for R_i and A_v .
 II) A CE amplifier is drawn by a voltage source of internal resistance $R_s = 800\Omega$ and load impedance is a resistance $R_L = 1K\Omega$. The h-parameters are $h_{ie} = 1K\Omega$, $h_{fe} = 2 \times 10^4$, $h_{re} = 50$ and $h_{oe} = 25\mu A/V$. Compute A_i , R_i , A_v , R_o using exact analysis. [6+6M]

OR

- B) Derive the expression for the CE short circuit current gain A_{i_s} as a function of frequency. [12M]

2. A) I) Explain the principle of Bootstrapped emitter follower and also explain how it can be used to increase its input impedance? [12M]

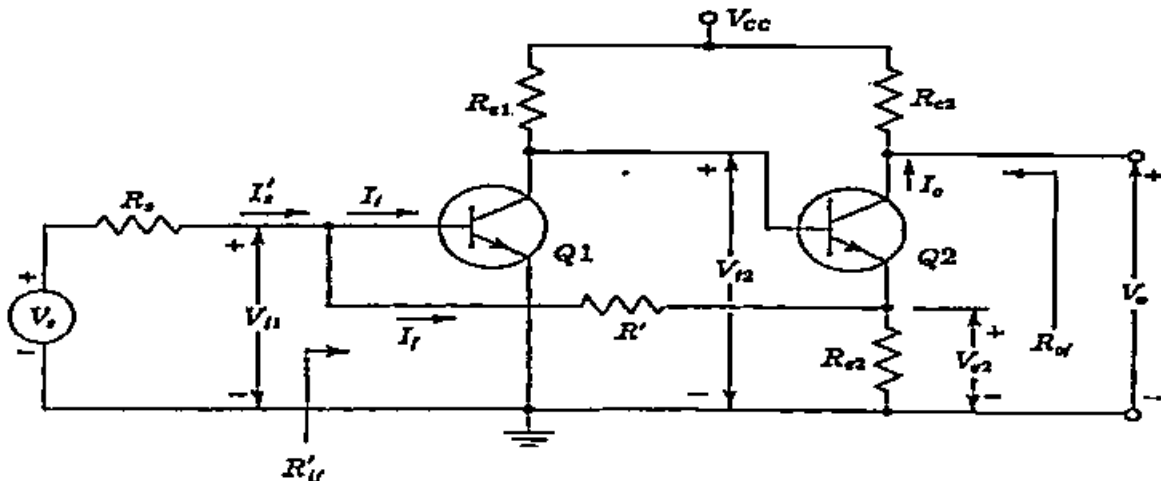
OR

- B) I) Discuss about the different types of distortion possible in amplifiers. [8M]
 II) Write short notes on darling ton pair amplifier. [4M]

3. A) I) Draw the voltage series feedback amplifier with discrete components and derive input impedance, output impedance and gain for it. [8M]
 II) List the advantages of negative feedback. [4M]

OR

- B) Determine A_{v_f} , R_{i_f} , resistance seen by the voltage source and output resistance for the given current shunt feedback amplifier circuit. The parameters of the circuit are $R_{e1} = 5K\Omega$, $R_{e2} = 500\Omega$, $R_{e3} = 50\Omega$, $R' = R_s = 1.2K\Omega$, $h_{re} = 50$, $h_{ie} = 1.1K\Omega$, $h_{fe} = h_{oe} = 0$. [12M]



4. A) I) Explain with a neat diagram Hartley oscillator and Colpitts oscillator as LC oscillator.
II) Derive the expression for frequency of oscillation and condition for sustained oscillation of a Hartley oscillator. [6+6M]

OR

- B) I) Derive the expression for the frequency of oscillation and condition on gain of BJT RC phase-shift oscillator and draw the circuit diagram. [12M]

5. A) I) Describe the operation of Class B push pull amplifier and also explain how the crossover distortion is minimized. [12M]

OR

- B) I) With necessary diagram, explain and derive the expression for efficiency of a Class C tuned amplifier. [8M]
II) Explain about Class A power amplifier. [4M]



Subject Code: 19BEC4TH02

II.B.TECH -II Semester Supple Examinations, March-2022
SWITCHING THEORY AND LOGIC DESIGN

Time: 3 hours

(ECE)

Max Marks: 60

Note: Answer All FIVE Questions.
 All Questions Carry Equal Marks (5 X 12 =60M)

Q.NO	Questions		Marks
Unit-I			
1	A	I) Deduce X from the following? $(BA0.C)_{16} = (X)_8, (10101100)_2 = (X)_{16}, (53.1575)_{10} = (X)_2$	[6M]
		II) Represent +25 and -25 in sign-magnitude, sign-1's complement and sign-2's complement representation.	[6M]
	OR		
	B	I) Construct the BCD code with even parity and odd parity bit for decimal 0 to 9.	[6M]
II) Identify the 12 bit hamming code that corrects and detects single bit error for the given 8bit data word 01001001.		[6M]	
Unit-II			
2	A	I) What are universal gates? Realize AND, OR, NOT, XOR gates using universal gates.	[6M]
		II) Simplify the following Boolean functions to minimum number of literals. (a) $F = ABC + ABC' + A'B$. (b) $F = (A+B)' (A'+B')$.	[6M]
	OR		
	B	I) Simplify the following Boolean function for minimal POS form using K-map and implement Using NOR gates. $F(W, X, Y, Z) = \Sigma(1, 2, 5, 6, 9) + d(10, 11, 12, 13, 14, 15)$	[6M]
II) Identify the dual and complement of the following function: $A'BD'+B'(C+D)'+A'C'$		[6M]	
Unit-III			
3	A	I) Define decoder. Construct 3x8 decoder using logic gates and truth table.	[6M]
		II) Implement the following function $F(A,B,C,D)=\Sigma m(0,1,3,4,7,10,12,14)$ using (a) 16:1 MUX (b) 8:1 MUX	[6M]
	OR		
	B	I) Construct a full-adder with two half-adders and basic gates.	[6M]
II) Design 4x16 decoder using two 3x8 decoders with block diagram.		[6M]	
Unit-IV			
4	A	I) Draw and explain 4-bit universal shift register.	[6M]
		II) Draw the circuit diagram of J-K Flip-Flop with NAND gates with positive edge triggering and explain its operation with the help of truth table. How race around condition is eliminated?	[6M]
OR			

	B	I) Construct a JK flip-flop using D flip-flop, 2x1 multiplexer and an inverter.	[6M]
		II) Draw the state diagram for mod-6 counter using D flipflops	[6M]
Unit-V			
5	A	I) Using PLA logic, implement a BCD to excess 3 code converter. Draw its truth table and logic diagram.	[6M]
		II) Compare and contrast CPLD. and FPGA.	[6M]
	OR		
	B	I) Discuss the comparison between PROM,PLA and PAL.	[6M]
	II) Develop the following four Boolean functions using PAL. $F1(w,x,y,z) = \sum m(1,2,3,7,9,11)$ $F2(w,x,y,z) = \sum m(0,1,2,3,10,12,14)$ $F3(w,x,y,z) = \sum m(4,5,6,7,9,15)$ $F4(w,x,y,z) = \sum m(1,2,3,10,13,15)$	[6M]	

CoS

II B.Tech II Semester Supple Examinations-March-2022

RANDOM VARIABLES & STOCHASTIC PROCESSES

(ECE)

Time: 3 Hours

Subject Code: 19BEC4TH03

Max.Marks:60.

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) A random variable X has a probability density (6M)

$$f_X(x) = f(x) = \begin{cases} \frac{1}{2} \cos(x), & -\frac{\pi}{2} < x < \pi/2 \\ 0, & \text{elsewhere} \end{cases}$$

Find the mean value of the function on $g(x) = 5X^2$

- II) A random variable X is known to be Poisson with $b=0$
(6M)

- a) Plot the density and distribution functions for this random variable.
b) What is the probability of event $\{0 \leq X \leq 5\}$.

OR

- B) I) Discuss the significance of a Gaussian random variable using its probability density and distribution functions. (6M)

II) The life time of a system expressed in weeks is a Rayleigh random variable X with its distribution function $F_X(x) = e^{-\frac{x^2}{400}}$. What is the probability that a system lifetime will exceed one year? (6M)

2. A) I) The random variable X can assume the values 1 and -1 with probability $\frac{1}{2}$ each.
Find (a) the moment generating function, (3M)
(b) the first four moments about the origin. (3M)
II) Find (a) the variance, (3M)
(b) the standard deviation of the sum obtained in tossing a pair of fair dice. (3M)

OR

- B) I) Find the characteristic function of a random variable X having density function $f(x) = ce^{-a|x|}$, $-\infty < x < \infty$, where $a > 0$, and c is suitable constant. (6M)

II) A random variable X has density function given by

$$f(x) = \begin{cases} 2e^{-2x}, & \text{for } x \geq 0, \\ 0, & \text{elsewhere} \end{cases}$$

- a) Find $P\{X - \mu \leq 1\}$. (3M)
b) Use Chebyshev's inequality to obtain an upper bound on $P\{X - \mu \leq 1\}$ and compare with the result in (a). (3M)

3. A) I) Let $(X, Y) f(x, y)$, where

$$f(x, y) = \begin{cases} c & \text{if } x, y \geq 0, \wedge x + y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

a) Find c . (2M)

b) Find $F_Y(y)$ (2M)

c) Find $P\{X \geq 1/2Y\}$ (2M)

II) Throw a dart on a disk of radius r . Probability on the coordinates (X, Y) is described by a uniform pdf on the disk:

$$f_{x,y}(x, y) = \begin{cases} \frac{1}{\pi r^2}, & \text{if } x^2 + y^2 \leq r^2 \\ 0, & \text{otherwise} \end{cases}$$

Find the marginal pdfs. (6M)

OR

B) I) Mention the properties of joint cdf. (6M)

II) Let X and Y be two r.v.s with known pdf $f_{x,y}(x, y)$ and $Z = g(x, y)$ be a function of X and Y . Find $f_z(z)$. (6M)

4. A) I) What is random process? Briefly discuss the classification of random process. (6M)

II) Consider two random processes $X(t)$ and $X(t+\tau)$ at two-time intervals t and $t+\tau$. Define the autocovariance and its coefficient. (6M)

OR

B) I) Briefly discuss the statistical properties of random process. (6M)

II) What is Poisson's random process? Mention its importance with mathematical representation. (6M)

5. A) I) a) Differentiate between PSD and Cross PSD. (3M)

b) Show that real part of $S_{XY}(\omega)$ and $S_{YX}(\omega)$ are even functions of ω . (3M)

II) A random process has the power density spectrum $S_{YY}(\omega) = \frac{6\omega^2}{1+\omega^4}$. Find the average power in the process. (6M)

OR

B) Derive the relationship between cross-power spectral density and cross correlation function. (12M)



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II B.Tech II Semester Supple Examinations, March-2022

Subject Code: 19BEC4TH04

COMMUNICATION SYSTEMS

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: ECE

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

-
1. A) I) Explain generation of AM waves using Square law modulator and switching modulator. [6 M]
II) Compare AM, FM and PM modulation techniques. [6 M]
OR
B) I) Explain external noise, internal noise, SNR and figure of merit. [6 M]
II) Explain detection of AM waves using square law detector and envelope detector. [6 M]
2. A) I) Explain television and radar receivers. [6 M]
II) Explain effect of feedback on performance of AM transmitter. [6 M]
OR
B) I) Explain TRF receiver and its drawbacks. [6 M]
II) Explain FM and PM transmitters. [6 M]
3. A) I) Explain hamming code with example. [6 M]
II) Explain delta modulation and adaptive delta modulation. [6 M]
OR
B) I) Explain PWM and PTM. [6 M]
II) Explain simple parity check and cyclic redundancy check. [6 M]
4. A) I) Explain FSK with waveforms. [6 M]
II) Explain ASK with waveforms. [6 M]
OR
B) I) Compare ASK, FSK, PSK and QAM. [6 M]
II) Explain QPSK and QAM. [6 M]
5. A) I) Define mutual information and its properties. [6 M]
II) Explain channel capacity and channel coding theorem. [6 M]
OR
B) I) Explain Huffman coding. [6 M]
II) Explain entropy and its properties. [6 M]



Subject Code: 19BEC4TH05

II B.Tech II Semester Supple Examinations, March-2022
ELECTRO MAGNETIC WAVES AND TRANSMISSION LINES

Time: 3 Hours

Program: B.Tech.

Max.Marks:60.

Branch: ECE

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) State Gauss's law and find the electric field intensity due to infinite sheet charge using it.
II) Show that the field intensity at point P due to infinite line charge along the z-axis with uniform charge density ρ_L C/m is $\frac{\rho_L}{2\pi\epsilon_0\rho} a_\rho$.

OR

- B) I) For a finite current sheet of uniform current density 'k' A/m, Derive the expression for the magnetic field intensity.

- II) a). State Gauss law for magnetic field. (2M)
b). Write down magnetic boundary conditions. (2M)
c). State Amperes Circuital law. (2M)

2. A) I) Explain in detail the differential form of Maxwell's equations.
Also mention the name of the law associated with each equation.

- II) Prove that displacement current density, $J_d = \frac{\partial D}{\partial t}$

OR

- B) I) What is the Faraday's law of induction? Explain the significance of the terms transformer emf and generator emf.

- II) Discuss in detail the integral form of Maxwell's equations. Specify the name of the law associated with each equation.

3. A) I) Derive the wave equation for a medium with μ , ϵ and σ and solve the same for the propagation constant γ .

- II) State and explain Poynting theorem.

OR

- B) Derive the wave equations for E and H in a conducting medium. (12M)

4. A) I) a) Discuss about Brewster angle.
b) Explain about Poynting vector.

II) Derive the expression for reflection coefficient when a Uniform Plane Wave is incident on a perfect dielectric with Oblique incident for Parallel Polarization case.

OR

B) I) If a plane wave is incident normally from medium 1 to medium 2, derive the reflection and transmission coefficients.

II) Derive the Boundary conditions for the tangential and normal components of Electrostatic fields at the boundary between two perfect dielectrics.

5. A) I) An air line has a characteristics impedance of 70Ω and a phase constant of 3rad/m at 100 MHz . Calculate the inductance per meter and the capacitance per meter of the line.

II) Derive the expression for Γ and VSWR.

OR

B) I) A lossless transmission line with $Z_0 = 50\Omega$ is 30m long and operates at 5MHz . The line is terminated with a load $Z_L = 60 + j40\Omega$. If $u=0.6c$ on the line. Find

- a) The reflection coefficient Γ .
b) The standing wave ratio S
c) The input impedance.

II) Derive the expressions for γ and Z_0 for lossless transmission line.

I B.Tech I Semester Supple Examinations, March-2022

Sub Code: 19BEC1TH09

ENGINEERING GRAPHICS

Time: 3 hours

(ECE)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No.	Questions	Marks
1	Unit-I	
	a Construct Pentagon, hexagon and Octagon with one common side, dimension of 30 mm by general method	[12M]
	OR	
	b The foci of an ellipse are 90 mm apart and the minor axis is 65 mm long. Determine the length of the major axis and draw half the ellipse by concentric-circles method and the other half by oblong method. Draw a curve parallel to the ellipse and 25 mm away from it.	[12M]
2	Unit-II	
	a i) A point A is situated in the first quadrant. Its shortest distance from the intersection point of H.P., V.P. and auxiliary plane is 60 mm and it is equidistant from the principal planes. Draw the projections of the point and determine its distance from the principal planes.	[6M]
	ii) The top view of a 75 mm long line measures 55 mm. The line is in the V.P., its one end being 25 mm above the H.P. Draw its projections.	[6M]
	OR	
	b A line AB, 65 mm long, has its end A 20 mm above the H.P. and 25 mm in front of the V.P. The end B is 40 mm above the H.P. and 65 mm in front of the V.P. Draw the projections of AB and show its inclinations with the H.P. and the V.P.	[12M]
3	Unit-III	
	a The circular plate of negligible thickness and 50 mm diameter appears as an ellipse in the front view, having its major axis 50 mm long and minor axis 30 mm long. Draw its top view when the major axis of the ellipse is horizontal.	[12M]
	OR	
	b Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60° to the V.P., and its surface making an angle of 45° with the H.P.	[12M]
4	Unit-IV	
	a Draw the projections of a square pyramid having one of its triangular faces in the V.P. and the axis parallel to and 40 mm above the H.P. Base 30 mm side; axis 75 mm long.	[12M]
	OR	

b

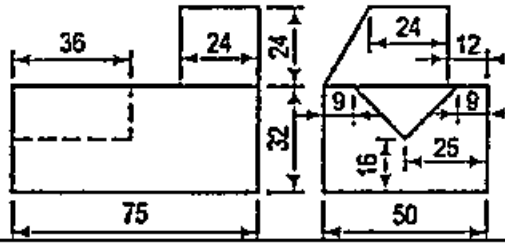
Draw the projections of a cylinder 75 mm diameter and 100 mm long, lying on the ground with its axis inclined at 30° to the V.P. and parallel to the ground.

[12M]

Unit-V

a

Draw isometric view for the given orthographic projections.



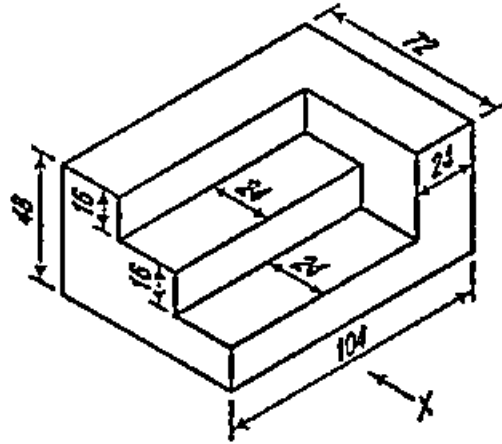
[12M]

OR

5

b

Draw the (i) Front view (ii) Top view and (iii) Side view for the following figure.



[12M]



Narasaraopeta Engineering College (Autonomous)
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DATABASE MANAGEMENT SYSTEMS
II B.Tech II Semester Supple Examinations, March-2022

Subject Code: 19BCI4TH01

Max.Marks:60.

Time: 3 Hours

Program: B.Tech.

Branch: CSE,IT

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) With a neat diagram, discuss the three tier schema architecture for data independence

OR

B) Discuss three different groups of data models with suitable examples.

2. A) Explain the various operations in relational algebra with an example.

OR

B) Construct an ER diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make.

3. A) Explain the aggregate functions in SQL with an example.

OR

B) What is query optimization? Outline the steps in query optimization.

4. A) Give an example of a relation that is in 3NF but not in BCNF. How will you convert that relation into BCNF?

OR

B) Differentiate between foreign key constraints and referential integrity constraints with suitable example. Also, differentiate lossless-join decomposition and dependency preserving decomposition.

5. A) What is concurrency control? Explain the two phase locking protocol with an example. Explain conflict serializability and view serializability.

OR

B) Explain the B+ tree indexes on multiple keys with a suitable examples.



Subject Code: 19BCS4TH03

II.B.TECH -II Semester Supple Examinations, March-2022

DESIGN AND ANALYSIS OF ALGORITHMS

Time: 3 hours

(CSE)

Max Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 =60M)

1. A) i) A) Explain the analysis framework of algorithms. Explain the worst case, best case and average case efficiencies, with an algorithm [6M]
B) Define Big O notation, Big Omega and Big Theta Notation. Depict the same graphically and explain. [6M]

(OR)

- A). Compare the order of growth n , $n(n-1)/2$ and n^2 [6M]
B) Are each of the following true or false? [6M]
(a) $3n^2 + 10n \log n = O(n \log n)$
(b) $3n^2 + 10n \log n = \Omega(n^2)$
(c) $3n^2 + 10n \log n = \Theta(n^2)$
(d) $n \log n + n/2 = O(n)$
(e) $10 \sqrt{n} + \log n = O(n)$
(f) $\sqrt{n} + \log n = O(\log n)$

2. A) Write Binary Search algorithm and determine its time complexity. Explain Strassen's matrix multiplication [12M]

(OR)

A) Write an algorithm to sort a set of N numbers using insertion sort.

(ii) Trace the algorithm for the following set of numbers: 20, 35, 18, 8, 14, 41, 3, 39 [6M]

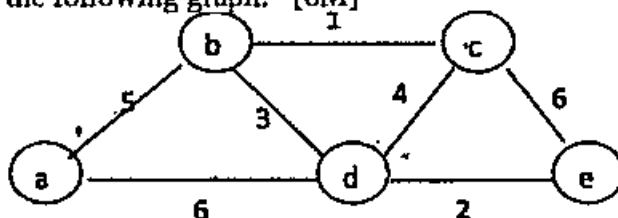
B) Discuss Quick Sort Algorithm and Explain it with example. Derive Worst Case Complexity [6M]

3. A) Consider a set of given jobs as shown in the following table. Find a sequence of jobs, which will be completed within their deadlines and will give maximum profit. Each job is associated with a deadline and profit.

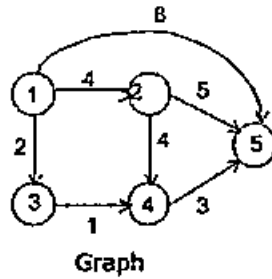
Job	J1	J2	J3	J4	J5
Deadline	2	1	3	2	1
Profit	60	100	20	40	20

[6M]

B) Apply the Kruskal's algorithm Greedy Method to find a minimum spanning tree of the following graph. [6M]



A) Discuss the Dijkstra's single source shortest path algorithm and solve the



following

[12M]

4. A) Solve the following instance of 0/1 knapsack problem using dynamic programming

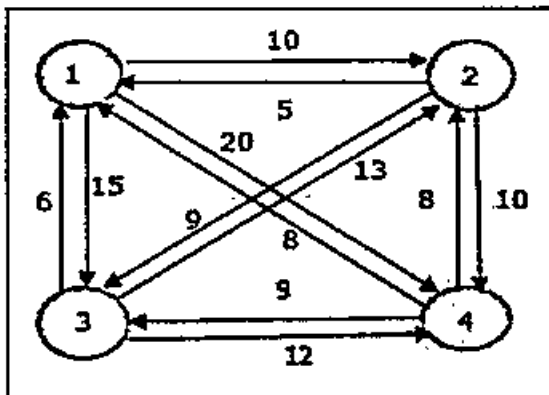
Object:	1	2	3	4
Weight:	4	7	5	3
Profit:	\$40	\$42	\$25	\$12

The capacity of Knapsack is 10

[12M]

(OR)

A) solve the travelling salesman problem.



[12M]

5. A) State N-Queens problem and solve 8-Queens problem using backtracking.

[6M]

B) Apply backtracking technique to solve the following instance of subset sum problem: $S = \{1, 3, 4, 5\}$ and $d = 11$

[6M]

(OR)

A) Consider the instance: $M = 15$, $n = 4$, $(P_1, P_2, P_3, P_4) = (10, 10, 12, 18)$ and $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$. 0/1 knapsack problem solve by using branch and bound technique.

[12M]



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Subject Code: 19BC54TH04

II.B.TECH -II Semester supple Examinations, March-2022

SOFTWARE ENGINEERING

Time: 3 hours

(CSE)

Max Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 =60M)

1. Explain the following software process models

I) Prototype model and II) Spiral model

OR

B) I) Explain the evolution of Software Engineering Methodologies.

II) Write about SDLC phases.

2. A) I) "The functional requirements specification of a system should be both complete and consistent". Substantiate this statement with relevant examples.

II) Explain in detail about prototype analysis?

OR

B) I) Requirements analysis is unquestionably the most communication intensive step in the software engineering process. Why the communication path does frequently breaks down?

II) Define and differentiate Verification & Validation with an example.

3. A) I) Explain about conducting component level design.

II) Write short note on structured design methodologies.

OR

B) I) What is DFD? Explain levels of DFD with an example.

II) Write functional decomposition.

4. A) Explain about the following:

I) Coupling & Cohesion

II) Black box testing & White box testing

OR

B) I) Explain different levels of testing

II) What test plan? Explain with neat diagram.

5. A) I) What is the use of project plan? Describe the different sections of project plan for plan driven development

II) Write about Project Planning activities.

OR

B) Explain about COCOMO model with Example.



II B.Tech II Semester Supple Examinations, March-2022

Subject Code: 19BCI4TH02 FORMAL LANGUAGES AND AUTOMATA THEORY

Time: 3 Hours

Max.Marks:60.

Program: B.Tech.

Branch: CSE,IT

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

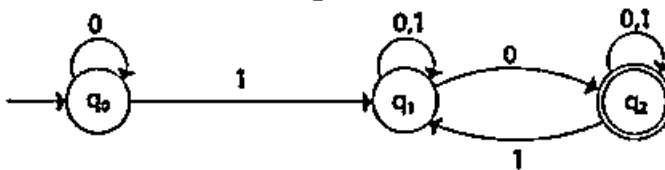
1. A) I) What is the concept of Valid and Invalid Alphabets and discuss the union in FA.
II) Discuss the applications of FSM with advantages and disadvantages.
OR
B) I) What is Chomsky classification? Explain the rules for each type of classification.
II) Differentiate Between (a,b) and (a+b) and also do the comparison between Kleene Star Closure and Plus?

[12 marks]

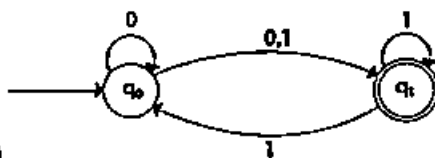
2. A) I) Explain the Concept of Nondeterministic Finite Automaton (nfa)? If a language can be expressed in the form of FA than why it is needed to use NFA?
II) How Moore and Mealy machine works in computer memory? What is the importance of these two in computing? Also, discuss the properties of each in detail.
OR
B) I) Conversion of Mealy to Moore Machine by using the following table also explain each step of conversion.

	Input=0		Input=1	
Present State	Next State	Output	Next State	Output
q0	q1	0	q2	0
q1	q1	0	q2	1
q2	q1	1	q2	0

II) Convert the following two different NFA to DFA



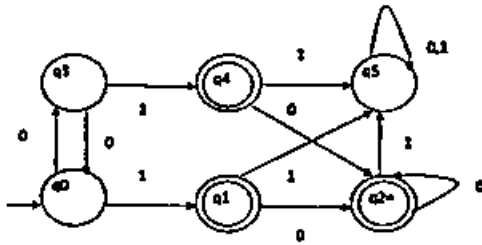
a)



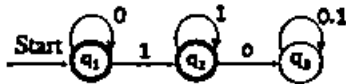
b)

[12 marks]

3. A) I) Consider the given DFA and draw the equivalent minimized (less no of states) DFA with algorithm.



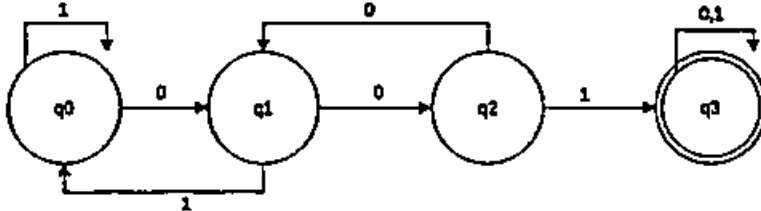
- II) Define Ardens Theorem with proof. Also explain the challenges associated with it. Solve the following by using Ardens theorem.



OR

- B) I) Construct the FA for regular expression 0^*1+10 while explaining each step of conversion.

- II) What is State elimination method? By using following DFA find the regular expression with state elimination method.



[12 marks]

4. A) I) Construct the PDA for $L = \{0^m 1^n 2^m 3^n \mid m, n \geq 0\}$

- II) $S \rightarrow ASB, A \rightarrow aAS \mid a \in \epsilon, B \rightarrow SbS \mid A \mid bb$ convert this grammar from CFG to CNF.

OR

- B) I) Define GNF. Also discuss the difference between Chomsky and GNF.

- II) What are the approaches used for PDA acceptance? Construct a PDA that accepts the language L over $\{0, 1\}$ by empty stack which accepts all the string of 0's and 1's in which a number of 0's are twice of number of 1's.

[12 marks]

5. A) I) Define Halting Problem. What are the conditions required for it?

- II) Construct a TM machine for checking the palindrome of the string of even length.

OR

- B) I) What is undecidable problem? Explain the P and NP class of languages.

- II) Construct a TM for subtraction of two unary numbers $f(a-b) = c$ where a is always greater than b .

[12 marks]



Subject Code: 19BIT4TH03

II B.TECH -II Semester Supple Examinations, March-2022

INTERNET OF THINGS

Time: 3 Hours

Program: B.Tech.

Branch: IT

Max.Marks:60.

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

Q.No	Questions	Marks
Unit-1		
1	A i) What is IoT? Explain components in IoT.	6
	A ii) Explain oneM2M IoT Standardized Architecture with a neat diagram.	6
	B i) Illustrate the challenges of IoT and their impact, with any 1 example.	6
	B ii) Explain in detail the expanded simplified IoT architecture.	6
Unit-2		
2	A i) What is IoT design methodology?	6
	A ii) What are the components of operational view specification?	6
	B i) What are the various service types in IoT methodology?	6
	B ii) How do you create an information model?	6
Unit-3		
3	A i) Which modules attached to IoT devices allows taking action on physical entities in the vicinity of device?	6
	A ii) What are the IoT exemplary devices?	6

	B	i) Why is Raspberry Pi used in IoT?	6
		ii) What are three types of connections in an IoT system?	6
	Unit-4		
4	A	i) What is the difference between Xively data stream and a channel?	6
		ii) What is various communication model & APIs used in IoT explain with suitable example?	6
	B	i) Which protocols are leveraged by Xively cloud to connect IoT devices?	6
		ii) Describe the various Autobahn Cloud services for IOT	6
	Unit-5		
5	A	i) What applications in smart city will use IoT technology?	6
		ii) Explain the steps to develop the Agriculture Domain Specific Application	6
	B	i) What are the features of Smart City?	6
		ii) How is IoT used in a specific application area?	6



II.B.TECH -II Semester Supple Examinations, March-2022

Subject Code:19BIT4TH05 **COMPUTER NETWORKS**

Time: 3 Hours

Max.Marks:60.

Program: B.Tech.

Branch: IT

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12 =60M)

-
1. A) I) Explain TCP/IP reference model with a neat sketch. 6M
II) Differentiate between LAN, MAN and WAN network types. 6M
OR
B) I) Illustrate the process of communication using OSI Network Model. 6M
II) Explain about Novell Networks and Arpanet. 6M
2. A) I) Assume that 101011010101111 is a block of data (D) to be transmitted using the CRC error-checking method. Suppose that the common value of generator, G, is 111010. Using modulo-2 arithmetic, produce the final value that the transmitter sends on the link (D, CRC). 6M
II) Draw and explain in detail about IEEE 802.3 format. 6M
OR
B) I) Explain Framing designing issues of data link layer with example. 6M
II) Illustrate functionality of IEEE 802.11 standard. 6M
3. A) I) Discuss in detail about simplex stop and wait protocol. 6M
II) What is pure ALOHA and slotted ALOHA? Mention the advantages of slotted ALOHA. 6M
OR
B) I) How HDLC protocol works in a data link layer? Explain. 6M
II) Write about channel allocation problems with a solution mechanism. 6M
4. A) I) Differentiate between Connection Oriented and Connection Less Services. 6M
II) Illustrate the steps that are performed in Link state routing algorithm. 6M
OR
B) I) Explain about Distance vector routing with an example. 6M
II) Sketch the header of the IPV4 version 4 and explain its fields in detail. 6M
5. A) I) How the TCP three way hand shake mechanism is performed? Explain. 6M
II) Draw and explain the header format for a user datagram protocol. 6M
OR
B) I) Explain about elements of transport protocols. 6M
II) What is resource record in DNS and explain the look up mechanism for finding address with an example? 6M