



Subject Code: 19BCC4TH01

II B.Tech - II Semester Supple Examinations, May-2023  
COMPLEX VARIABLES, PROBABILITY AND STATISTICS

Time: 3 Hours

Max.Marks:60.

Program: B.Tech.

Branch: CE & EEE

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

1. A) I) Find all the values of  $k$  such that  $f(z) = e^x(\cos ky + i \sin ky)$  is holomorphic.

II) Show that the function  $f(z) = \sqrt{|x|y|}$  is not analytic at the origin, although C-R equations are satisfied at the point.

OR

B) I) Show that an analytic function with constant real part is constant.

II) Show that the function  $f(z) = z^n$ , is differentiable for all values of 'z', where n is positive integer.

2. A) I) Evaluate  $\oint_C \frac{\sin^2 z}{(z - \frac{\pi}{6})^3} dz$  by using Cauchy's integral formula around circle  $|z|=1$

II) Expand Laurent's series for  $f(z) = \frac{z^2 - 6z - 1}{(z-1)(z-3)(z+2)}$  in the region

$$3 < |z+2| < 5$$

OR

B) I) Expand  $f(z) = \sin z$  in Taylor's series about  $z = \frac{\pi}{4}$ ,  $z = \frac{\pi}{2}$

II) Verify Cauchy's theorem for the following functions  $f(z) = 3z^2 + iz - 4$

if  $c$  is the square with the vertices at  $1 \pm i$ ,  $-1 \pm i$

3. A) I) A businessperson goes to hotels X, Y, Z 20%, 50%, 30% of times respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbing. What is the probability that businessperson room having faulty plumbing is assigned to hotel Z?

II) 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random (i) none is defective (ii)  $p(1 < X < 4)$  (iii) one is defective.

OR

B) I) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation.

II) The probability density function of a variate  $X$  is

$X$	0	1	2	3	4	5	6	7
$P(X)$	0	$k$	$2k$	$2k$	$3k$	$k^2$	$2k^2$	$7k^2+k$

Find the value of  $k$  and  $P(0 < X < 5)$ .

4. A) I) If the mean of breaking strength of copper wire is 575 lbs, with a standard deviation of 8.3 lbs. How large a sample must be used in order that there will be one chance in 100 that the mean breaking strength of the sample is less than 572 lbs?

II) The mean and standard deviation of a population are 11.795 and 14.054 respectively. What can one assert with 95% confidence about the maximum error if  $\bar{x} = 11.795$  and  $n = 50$ ? And construct 95% confidence interval for the true mean.

OR

B) A professor's feelings about the mean mark in the final examination in "Probability" of a large group of students is expressed subjectively by normal distribution with  $\mu_0 = 67.2$  and  $\sigma_0 = 1.5$ .

(a) If the mean mark lies in the interval (65.0, 70.0) determine the prior probability the professor should assign to the mean mark.

(b) Find the professor mean  $\mu$  and the posterior S.D  $\sigma$  if the examinations are conducted on a random sample of 40 students yielding mean 74.9 and S.D 7.4. Use  $S = 7.4$  as an estimate  $\sigma$ .

(c) Determine the posterior probability which he will thus assign to the mean mark being in the interval (65.0, 70.0) using results obtained in (b).

(d) Construct a 95% Bayesian interval for  $\mu$ .

5. A) I) The time taken by the workers in performing a job by method I and method II is given below:

Method I	20	16	26	27	23	22	--
Method II	27	33	42	35	32	34	38

Do the data show that the variances of time distribution from population from which these samples are drawn do not differ significantly?

II) The number of auto mobile accidents per week in a certain community are as follows: 12, 8, 20, 2, 14, 10, 15, 6, 9, 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10-week period.

OR

B) I) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard?

II) A sample of 64 students have a mean weight of 70kgs. Can this be regarded as a sample from a population with mean weight 56kgs and standard deviation 25kgs.

Subject Code: 19BCE4TH02

**II B.Tech - II Semester Supple Examinations, May-2023**  
**STRUCTURAL ANALYSIS-I**

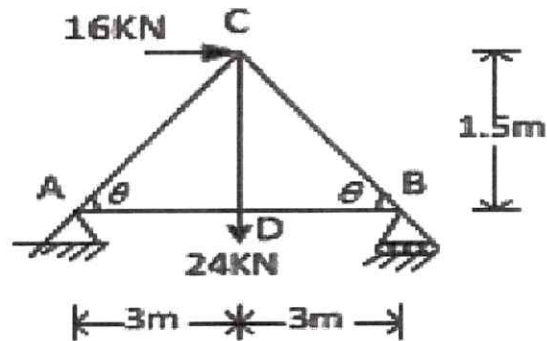
Time: 3 Hours

Max.Marks:60.

Branch:CE

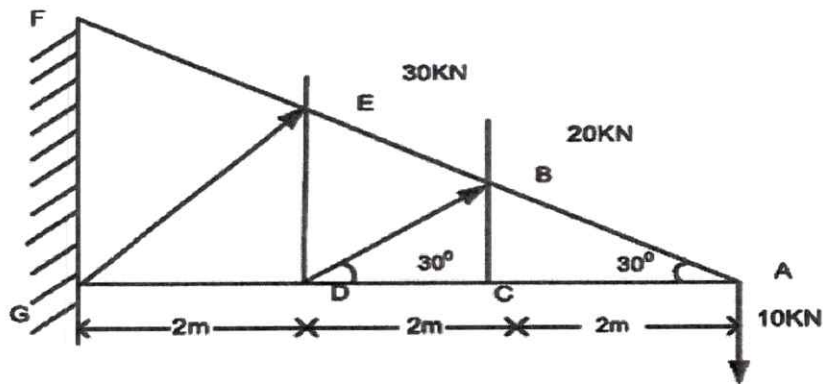
Note: Answer All FIVE Questions.  
 All Questions Carry Equal Marks (5 X 12 =60M)

1.A) I) Find the forces in the members of truss by method of joints as shown in Fig



OR

B) Find the forces in all the members of the cantilever type plane pin jointed truss loaded as shown in fig. Use method of sections

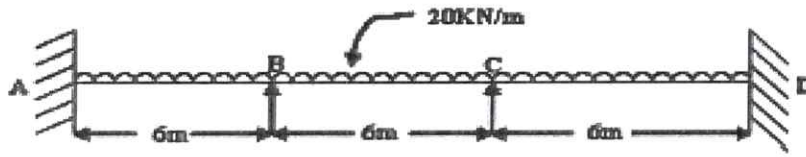


2.I) Apply the moment area method to find the slope and deflection at the free end of a cantilever beam subject to a concentrated load P applied at the free end. Assume the flexural rigidity EI to be constant

II) A simply supported beam of span 6m is subjected to a concentrated load of 45 kN at 2m from the left support. Calculate the deflection under the load point. Take  $E = 200 \times 10^6 \text{ KN/m}^2$  and  $I = 14 \times 10^{-6} \text{ m}^4$ .

OR

2) I) Analyse the continuous beam in figure by slope-deflection method and draw shear force and bending moment diagram.  $EI$  is constant.



3. A) I) A two span continuous beam ABC is fixed at A and C and is continuous over B. The span  $AB=4.3m$  and span  $BC=5.7m$ . The span AB carries a UDL of  $55kN/m$  and span BC carries a central point load of  $42 kN$ .  $EI$  is constant for the whole beam. Find the moments and reactions at all supports and draw the bending moment diagram using strain energy method.

OR

B) Define Strain energy. Derive an expression for strain energy due to bending moment

4 A) A parabolic 3-hinged arch carries a udl of  $30kN/m$  on the left half of the span. It has a span of  $16m$  and central rise of  $3m$ . Determine the resultant reaction at supports. Find the bending moment normal thrust and radial shear at  $xx$ , and  $2m$  from left support

OR

B) A 3 hinged arch of span  $40m$  and rise  $8m$  carries concentrated loads of  $200 kN$  and  $150 kN$  at a distance of  $8m$  and  $16m$  from the left end and an udl of  $50 kN/m$  on the right half of the span. Find the horizontal thrust

5. A) I) A beam CABD is simply supported at A and B and has overhangs on both the supports. Overhang  $CA=2m$ , span  $AB=10m$  and overhang  $BD=2.5m$ . Draw the influence lines for B.M at A,B and at the centre of AB.

OR

B) I) Draw the influence line diagram for B.M at a point  $8m$  from the left abutment on a bridge girder of span  $30m$  and find the maximum B.M at that point due to a series of wheel loads  $80kN$ ,  $160kN$ ,  $160kN$  and  $160kN$  at centre to centre distances of  $4m$ ,  $2.5m$ ,  $2.5m$  and  $2.5m$  respectively. The loads can cross in either directions with the  $80kN$  load leading



**II B.Tech II Semester Supple Examinations, May-2023**  
**BUILDING PLANNING, SERVICE DESIGN AND DRAWING**

Time: 3 Hours

Max.Marks:60.

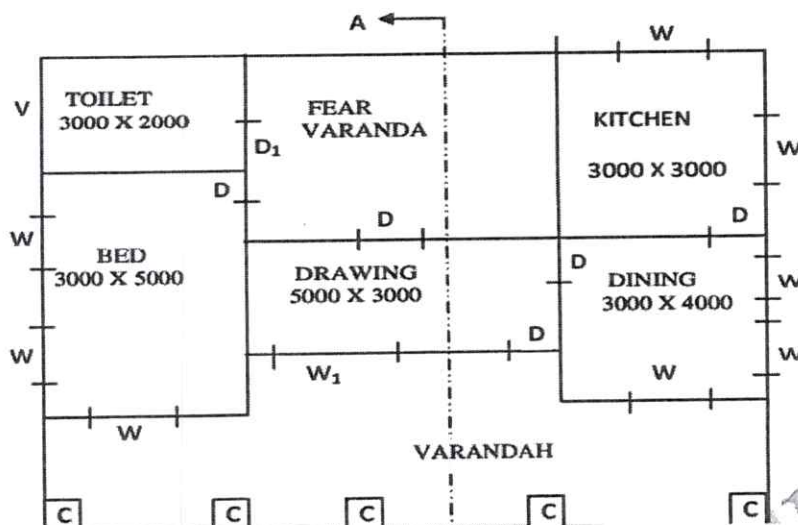
Program: B.Tech.

Branch:CE

Note: Answer All FIVE Questions.

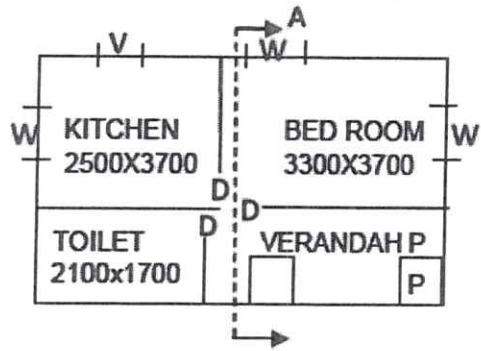
All Questions Carry Equal Marks (5 X 12 =60M)

1. A) I) Write about lightening and ventilation requirements  
II) Write the objectives of building byelaws  
OR  
B) I) Explain about a) floor area ratio b) floor space index  
II) Write about a) open space requirements b) height of buildings
2. A) I) Write the minimum standards for various parts of buildings-  
II) Write the characteristics of various types residential buildings  
OR  
B) I) Write the requirements of different rooms and their grouping  
II) Explain about the Planning of educational institutions
3. A) I) Write on Plumbing fittings and its accessories  
II) Explain about Electrical Installation for Air Conditioning/Heating  
OR  
B) I) Write on Fixing pipes in buildings  
II) Discuss the Causes of fire in buildings
4. A) I) Draw the conventional sign of a)Brick, b)stone, c)plaster, d)sand filling, e)concrete  
II) Draw dog legged stair case,  
OR  
B) I) draw panelled windows II) Draw open well stair case
5. A) Drawing a Plan section and Elevation for the given fig



OR

B) Draw plan section and elevation for fig



Subject Code: 19BCE4TH04

**II B.Tech II Semester Supple Examinations, May-2023**  
**FLUID MECHANICS AND HYDRAULIC MACHINERY**

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)

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1. A) I) State and prove the Pascal's Law.  
II) Explain about U-tube differential manometer and inverted U-tube differential manometer?  
OR  
B) I) Define absolute, vacuum and gauge pressures?  
II) A simple u- tube manometer containing mercury is connected to a pipe in which a fluid of sp.gr.0.8 and having vacuum pressure is flowing. The other end of manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40cm and the height of the fluid in the left from the centre of pipe is 15cm below.
2. A) I) Define Streamline and streak line  
II) Define the equation of continuity. Obtain the expression for continuity equation in three dimensions?  
OR  
B) I) What is metacentric height? Explain how it is calculated  
II) Explain about velocity potential function and stream function?
3. A) I) State Bernoulli's equation? Write the assumptions for such a derivation?  
II) Define momentum equation and derive an expression for force exerted by a flowing fluid on a pipe bend?  
OR  
B) I) Define total energy line and hydraulic gradient line?  
II) List out the minor losses in closed conduit flow and discuss their significance
4. A) I) Derive an expression for the discharge through a channel by Chezy's formula.  
II) Find the velocity of flow and rate of flow of water through a rectangular channel of 6m wide and 3m deep, when it is running full. The channel is having bed slope as 1 in 2000. Take Chezy's constant  $C = 55$ .  
OR  
B) I) What is meant by an economical section of a channel?  
II) Explain the term hydraulic jump. Derive an expression for the depth of hydraulic jump.
5. A) I) Define the term hydraulic similitude.  
II) State Buckingham's pi theorem. Why this theorem is considered superior over the Rayleigh's method for dimensional analysis?  
OR  
B) Define the specific speed of a turbine? Derive an expression for the specific speed. What is the significance of the specific speed?

Subject Code: **19BCE4OE11**

**II B.Tech II Semester Supple Examinations, May-2023**

**PUBLIC HEALTH ENGINEERING**

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)

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1. A) write about quality and characteristics of refuse generated from an Indian town. [12]  
OR  
B) write about collection, conveyance and disposal methods of refuse in detailed [12]
2. A) I) What are the requirements of a successful air-conditioning system? [6]  
II) Define and explain lighting and conditioning in the household system. [6]  
OR  
B) I) What are the general requirements of a good ventilation system? [6]  
II) What are the main components of an air conditioning system? [6]
3. A) I) what are the mosquito characteristics? Explain in detailed. [6]  
II) What type of disease is malaria? What is prevention of malaria? [6]  
OR  
B) I) Trace the mode of transmission of malaria to human beings. [6]  
II) What is the best anti-malarial method to counter its outbreak? [6]
4. A) I) write about bacterial treatment of kitchen utensils in detailed. [6]  
II) What are the different food borne diseases explain in detailed. [6]  
OR  
B) I) Explain the bacteriological contents of milk sanitation [6]  
II) What is pasteurization and write the pasteurization methods explain. [6]
5. A) I) what is air and noise pollution? Write about sources of pollutants. [6]  
II) Name the diseases associated with the physiological effects of air pollution. [6]  
OR  
B) I) what is the effects of pollutants on human health, vegetation and climate. [6]  
II) What measures should be taken to control the pollution problem. [6]



Subject Code: **R19BEE4TH02**

**II B.Tech II Semester Supple Examinations, May-2023**

**PROBLEM SOLVING USING PYTHON**

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)

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1. A) I) Explain the elements in modern computer systems with neat sketch?  
II) What are the types of data representation in computer?  
**OR**  
B) I) Draw and explain the architecture of computer?  
II) Define the following  
a) Algorithm b) Operating system c) Hardware components d) Software components
2. A) I) Discuss all the symbols used in flow chart?  
II) Explain the operators used in python programming language with each one example?  
**OR**  
B) I) Draw the flow chart for finding maximum of three numbers?  
II) Define flow chart? Explain with an example
3. A) I) Explain the different types of loops used in python  
II) Define function? What are the different types of functions used in python?  
**OR**  
B) I) Explain the different types of conditional statements used in python  
II) Define recursive function? Give an example program
4. A) I) Explain the following  
a) Tuple b) List c) String d) Dictionary  
II) Discuss the various operations can done on list with example  
**OR**  
B) I) Define dictionary? Explain with example how adding and removing keys is done?  
II) Explain the difference between list and tuple?
5. A) I) Explain the OOPs concept in python programming language?  
II) Explain the following a) Turtle bar chart b) mouse event  
**OR**  
B) I) Discuss the concept of exception handling  
II) Explain the following  
a) Inheritance b) Polymorphism c) Abstraction

Subject Code: 19BEE4TH03

**II B.Tech II Semester Supple. Examinations, May-2023**

**DIGITAL LOGIC CIRCUITS**

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)

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1. A) I) Perform the subtraction  $(-6) - (-13)$  using signed 2's complement representation.  
II) Design BCD code to Gray code converter.  
OR  
B) I) Explain different methods used to represent negative numbers in binary system.  
II) Given the 8-bit data word 10111001, generate the 12-bit composite word for the Hamming code that corrects and detects signals error.
2. A) I) Derive Boolean expression for a 2input Ex-OR gate to realize with 2 input NAND gates without using complemented variables and draw the circuit.  
II) Simplify the following Boolean function using K –Map method in POS form.  
 $F = \Pi(2,3,4,6,9,11,12,13)$ .  
OR  
B) I) Obtain the simplified expressions in sum of products for the following Boolean functions using Karnaugh-Map.  $F(A, B, C, D) = \Sigma(7, 13, 14, 15)$   
II) Minimize the following Boolean expressions to the required no. of literals  $BC + AC' + AB + BCD$  to four literals
3. A) I) Implement  $64 \times 1$  multiplexer with four  $16 \times 1$  and one  $4 \times 1$  multiplexer (use only block diagram).  
II) Explain the priority encoder with a neat logic diagram.  
OR  
B) I) Realize a 3 to 8 decoder using 2 to 4 decoder and other required gates  
II) Design a 4 bit carry look ahead adder circuit.
4. A) I) What is flip-flop? How can be used in sequential circuit and explain in detail.  
II) Draw the state diagrams of a sequence detector which can detect 101.  
OR  
B) I) The output Z of a fundamental mode, two input sequential circuit is to change from 0 to 1 only when  $x_2$  changes from 0 to 1 while  $x_1=1$ . The output changes from 1 to 0 only when  $x_1$  changes from 1 to 0 while  $x_2=1$ . Find a minimum row reduced flow table.  
II) Explain about Master-slave flip-flop in detail.

5. A) I) Given a 32 x 8 Rom chip with an enable input, show the external connection necessary to construct a 128 x 8 Rom with four chips and a decoder.

II) Explain the merits & demerits of PROM.

OR

B) I) Derive the PLA programming table for the combinational circuit that squares a 3 bit number.

II) For the given 3-input, 4-output truth table of a combinations circuit, tabulate the PAL programming table for the circuit.

Inputs	Output
x y z	A B C D
000	0100
001	1111
010	1011
011	0101
100	1010
101	0001
110	1110
111	0111

Subject Code: 19BEE4TH04

## II B.Tech -II Semester Supple Examinations, May- 2023

### 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) With neat diagram the explain Torque-Slip characteristics of induction motor. [6M+6M]  
 II) A 3-phase, 400 V, 50 Hz induction motor takes a power input of 35 KW at its full load speed of 980 rpm. The total stator losses are 1 KW and the friction and wind age losses are 1.5 KW. Calculate: (i) slip (ii) Rotor ohmic losses (iii) shaft power (iv) shaft torque (v) efficiency.

OR

- B) I) Explain briefly about the tests to be conducted on three phase induction motor to get its equivalent circuit? [8M]  
 II) Explain the working of Induction generator. [4M]

2. A) I) Write short notes on star-delta starter [6M]  
 II) 3-phase Squirrel cage induction motor takes a line current of 100 A when started by direct switching. Calculate the motor-line current and the supply-line current when an auto-transformer with 50% tapping is used. [6M]

OR

- B) I) Briefly discuss the principle of cascade connection of induction machines? [6M]  
 II) Explain the induction motor operation under injection of an e.m.f. into the rotor circuit. [6M]

3. A) I) "A pure single phase motor is not a self starting motor" justify the statement. [6M]  
 II) Why cannot a shaded pole motor be made to rotate in the reverse direction? [6M]

OR

- B) I) Explain the constructional features and working principle of capacitor start induction motor with their applications. [6M]  
 II) Explain the working principle of Hysteresis motor. [6M]

4. A) I) By taking necessary assumptions, derive EMF equation of a synchronous generator?  
 II) Explain the concept of armature reaction in synchronous machines. [6M +6M]

OR

- B) A 6600V alternator gave the following test results: [12M]

Field Current(A)	16	25	37.5	50	70
Open circuit Voltage (Volts)	3100	4900	6600	7500	8300

A field current of 22A is found necessary to circulate full-load current on short-circuit of the armature. Calculate the full-load regulation at 0.8 power factor lagging by: (i) The synchronous impedance method (ii) Ampere-turn method. Comment the two values of regulation obtained by the above methods.

5. A) I) Explain briefly about the tests to be conducted on synchronous motor to get its characteristics? [6M]  
II) Explain the various starting methods of synchronous motor [6M]

OR

- B) I) A 2000V, 3-phase, 4-pole, Y- connected synchronous motor runs at 1500rpm. The excitation is constant and corresponds to an open circuit voltage of 2000V. The resistance is negligible as compared to a reactance of  $3\Omega$  per phase. Determine the power input, power factor and torque developed for an armature current of 200A. [8M]  
II) Explain in detail about the concept of Hunting and how to overcome it in a synchronous motor. [4M]

Subject Code: 19BME4TH01

**II B.Tech - II Semester Supple Examinations, May-2023**  
**KINEMATICS OF MACHINERY**

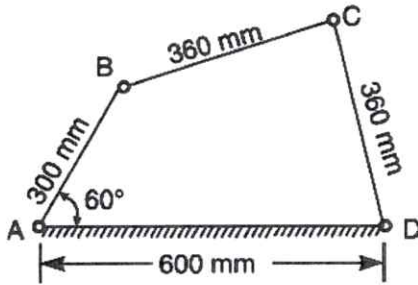
Time: 3 Hours

Max.Marks:60.

Program: B.Tech.

Branch: ME.

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

Q.No	Questions	Marks
<b>Unit - I</b>		
<b>1</b>	A	[6M]
	i) Discuss the various types of constrained motions.	[6M]
	ii) Define Grashoff's law. State how it is helpful in classifying the four link mechanisms into different types?	[6M]
	<b>OR</b>	
<b>B</b>	i) Define the followings: (a) Kinematic link (b) Kinematic pair (c) Kinematic chain	[6M]
	ii) Describe the various inversions of slider crank mechanism and give examples.	[6M]
<b>Unit - II</b>		
<b>2</b>	A	[6M]
	i) Sketch a Paucellier mechanism. Show that it can be used to trace a straight line.	[6M]
	ii) Write a short note on Universal coupling.	[6M]
<b>OR</b>		
<b>B</b>	Distinguish the two main types of steering gears and their relative advantages.	[12M]
<b>Unit - III</b>		
<b>3</b>	A	[12M]
<p>In a pin jointed four bar mechanism, as shown in Fig. 1, AB = 300 mm, BC = CD = 360 mm, and AD = 600 mm. The angle BAD = 60°. The crank AB rotates uniformly at 100 r.p.m. Locate all the instantaneous centres and find the angular velocity of the link BC.</p>  <p style="text-align: center;">Fig.1.</p>		
<b>OR</b>		
<b>B</b>	Derive expressions for the displacement, velocity and acceleration analysis of an inverted slider-crank mechanism.	[12M]

<b>Unit - IV</b>		
<b>4</b>	<b>A</b>	i) Write a short note on cams and followers with neat sketch. <span style="float: right;"><b>[6M]</b></span>
		ii) Define the following terms as applied to cam with a neat sketch <span style="float: right;"><b>[6M]</b></span> (a) Base circle (b) Pitch circle (c) Pressure angle, and (d) Stroke of the follower.
	<b>OR</b>	
	<b>B</b>	Construct the profile of a cam to suit the following specifications : Cam shaft diameter = 40 mm; Least radius of cam = 25 mm ; Diameter of roller = 25 mm; Angle of lift = 120°; Angle of fall = 150°; Lift of the follower = 40 mm; Number of pauses are two of equal interval between motions. During the lift, the motion is S.H.M. During the fall the motion is uniform acceleration and deceleration. The speed of the cam shaft is uniform. The line of stroke of the follower is off-set 12.5 mm from the center of the cam. <span style="float: right;"><b>[12M]</b></span>
<b>Unit - V</b>		
<b>5</b>	<b>A</b>	i) Explain the terms : (a) Module, (b) Pressure angle, and (c) Addendum. <span style="float: right;"><b>[6M]</b></span>
		ii) A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 20° pressure angle, 12 mm module and 10 mm addendum. Find the length of path of contact, arc of contact and the contact ratio. <span style="float: right;"><b>[6M]</b></span>
	<b>OR</b>	
	<b>B</b>	A compound train consists of four gears. The number of teeth on gears A, B, C and D are 54,75,36 and 81 respectively. Gears B and C constitute a compound gear. Determine the torque on the output shaft if the gear A transmits 9 kW at 200 rpm and the train efficiency is 80%. <span style="float: right;"><b>[12M]</b></span>

Subject Code: 19BME4TH02

**II B.Tech - II Semester Supple Examinations, May-2023**

**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)

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1. A) I) Explain the difference between production and manufacturing. 6M  
II) Explain with the help of a neat sketch, the process of centrifugal casting. 6M  
**OR**  
B) I) What are different types of allowances to be considered in Casting? Explain in Detail. 6M  
II) Explain briefly with neat sketches the following patterns. 6M  
a) Loose Piece Pattern b) Skeleton Pattern c) Segmental Pattern
2. A) I) Describe the oxy-acetylene gas welding technique and give the applications. 6M  
II) Classify welding processes and explain the kinds of joints that are normally employed for welding processes? 6M  
**OR**  
B) I) Explain Oxy– Acetylene Gas cutting in detail? 6M  
II) Compare gas welding and arc welding techniques. 6M
3. A) I) Explain the submerged arc welding with a neat sketch. 6M  
II) Distinguish between Soldering and Brazing from the point of view of The Filler Materials used, Applications and The Strength of the Joint obtained. 6M  
**OR**  
B) I) Explain about thermit welding and plasma arc welding with neat sketches? 6M  
II) With a neat sketch, explain the principle, process and applications of MIG welding. 6M
4. A) I) Write the differences of Hot Working and Cold Working. 6M  
II) What are the methods in which the roll-separating force could be reduced in cold rolling. 6M  
**OR**  
B) I) Explain about different types of forging operations with neat sketches. 6M  
II) What are different types of forging defects and give the causes and remedies for forging defects. 6M
5. A) I) Write a short note on impact extrusion. 6M  
II) Describe the wire drawing process with a neat sketch. 6M  
**OR**  
B) I) Explain forward and backward extrusion process with proper sketches. 6M  
II) Describe the tube drawing process with a neat sketch. 6M





Subject Code: 19BME6PE07

**II B.Tech II Semester Supple Examinations, May-2023**

**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) I) Briefly explain about Phases of Operations Research. 6 M (01)

II) Maximize  $Z = 3x + 2y$  using the Graphical method subject to: 6M (01)

$$2x + y \leq 18$$

$$2x + 3y \leq 42$$

$$3x + y \leq 24, \quad x \geq 0, y \geq 0$$

OR

B) I)

12 M

Solve the following LPP using Simplex method. (01)

Maximize  $Z = 10x_1 + 15x_2 + 20x_3$

Subject to  $2x_1 + 4x_2 + 6x_3 \leq 24$

$$3x_1 + 9x_2 + 6x_3 \leq 30$$

$$x_1, x_2, x_3 \geq 0$$

2. A) I) A firm has three plants and four warehouses. The transportation costs (in Rs.), capacities of each plant and demand for each warehouse are given below. Solve the problem to minimize the transportation cost. 12M (02)

Plants	Warehouses				Capacity
	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	
O <sub>1</sub>	20	22	17	4	120
O <sub>2</sub>	24	37	9	7	70
O <sub>3</sub>	32	37	20	15	50
Demand	60	40	30	110	

OR

B) I) Demonstrate Hungarian method to solve assignment problem? 6M (01)

II) How do you convert an Un balanced Transportation problem in to balanced problem? (01)

Explain with suitable example. 6M

3. A) I) 12M

Find the sequence for the following eight jobs that will minimize the total elapsed time for the completion of all the jobs. Each job is processed in the same order CAB. Entities give the time in hrs. on the machines

Job	1	2	3	4	5	6	7	8
A	4	6	7	4	5	3	6	2
B	8	10	7	8	11	8	9	13
C	5	6	2	3	4	9	15	11

OR

B) I) Differentiate PERT and CPM. 6M

II) Write a short note on (a) Free float (b) Total float (c) EST (D) LFT. 6M

4. A) I) The arrival rate of customers at a banking counter follows Poisson distribution with a mean of 45/hr. The service rate of the counter clerk follows exponential distribution with a mean of 60/hr.

(a) What is the probability of having zero customers in the system?

(b) What is the probability of having five customers in the system?

(c) Find  $L_s$ ,  $L_q$ ,  $W_s$ , and  $W_q$ . 6M

ii) Write a short note on Kendall's notation to represent queuing models. 6M

OR

B) I) State and Explain Bellman's Principle of optimality. 8M

II) List out various applications of Dynamic Programming. 4M

5. A) I)

Solve the following game using dominance principle.

		PLAYER B				
		I	II	III	IV	V
PLAYER A	I	2	5	10	7	2
	II	3	3	6	6	4
	III	4	4	8	12	1

OR

B) I)

12 M

The failure rates of 1000 street bulbs in a colony are summarized below

End of week	1	2	3	4	5	6
Probability of failure to	0.0	0.2	0.4	0.6	0.8	1.0
date	5	0	0	5	5	0

The cost of replacing an individual bulb is Rs.60. If all the bulbs are replaced simultaneously it would cost Rs.25 per bulb.

a) What is the best interval between group replacements?

b) Find out the optimal replacement policy i.e., group or individual?

Subject Code: 19BME4TH04

**II B.Tech II Semester Supple Examinations, May-2023**

**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)

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1. A) I) Discuss about the time loss factor occurred in IC engine with a neat sketch.  
II) Mention the methods to improve the volumetric efficiency of IC engine.

OR

- B) I) Compare between Otto and Diesel Cycles.  
II) Discuss the exhaust blow down loss of internal combustion engine with a neat sketch.

2. A) I) Differentiate the working of Four stroke CI engine and SI engine.  
II) Explain the working of splash lubricating system with neat sketch.

OR

- B) I) Differentiate the Four stroke and Two stroke IC engines.  
II) Explain the working of Magneto ignition system with a neat sketch.

3. A) I) What is ignition lag? Discuss the effect of engine variables on ignition lag.  
II) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation.

OR

- B) I) Explain normal and abnormal combustions in SI engine.  
II) Bring out clearly the process of combustion in CI engines and also explain the various stages of combustion.

4. A) The following data was recorded during testing of a 4-stroke cycle gas engine. Diameter= 10 cm, Stroke= 10 cm, Speed= 1200 rpm, Area of the positive loop of the indicator diagram=5.75 cm<sup>2</sup>, Area of the negative loop of the indicator diagram=0.25 cm<sup>2</sup>, Length of the indicator diagram= 55 mm, Spring constant= 3.5 bar/cm. Find the indicated power of the engine.

OR

- B) I) List the different methods used for finding friction power and indicated power of an engine Explain in detail.  
II) Discuss the various methods for measurement of brake power?

5. A) I) Discuss the comparison between centrifugal and reciprocating compressors.  
II) Describe with a neat sketch the construction and working of a single-stage single-acting reciprocating air compressor.

OR

- B) I) A two stage air compressor takes in air at a pressure of 1.013bar and temperature 16°C. The inter-cooling is perfect. The delivery pressure is 19bar. Find the condition for minimum work of compression and also the work input required to compress 1kg of air. Take  $n=1.3$   
II) Derive the work done for a single stage air compressor with and without clearance volume.

Subject Code: 19BEC4TH02

**II B.TECH -II Semester Supple Examinations, May- 2023**  
**SWITCHING THEORY AND LOGIC DESIGN**

Time: 3 Hours

Max.Marks:60.

Program: B.Tech.

Branch: ECE

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

- 
1. A) I) Generate Gray code for the following numbers  $(1001)_2$ ,  $(111001)_2$ ,  $(10000)_2$   
II) A signal generator produced 4-bits of data from MSB to LSB as 1101; Generate Hamming code for the message bits using even parity.  
**OR**
- B) I) Using 10's complement solve:  
(a)  $(197)_{10} - (87)_{10}$       (b)  $(34)_{10} - (43)_{10}$   
II) Solve the following using r-1's complement:  
(a)  $(5AC)_{16} - (1FF)_{16} = (?)_{16}$       (b)  $(17)_8 - (23)_8 = (?)_8$
2. A) I) Develop the Canonical form the given SOP:  $f(A,B,C,D) = AC + AB' + A'D$   
II) Minimize the function using K-Map:  
 $g(p,q,r,s,t) = \sum m(0,1,2,3,8,9,10,11,15,16,17,18,19,24,25,26,27,30) + \sum d(4)$   
**OR**
- B) I) For the given function, obtain the NOR-NOR realization:  $h(a,b,c,d) = (a+b).(c+d')$   
II) Realize EX-OR gate using only five NAND gates.
3. A) I) Implement the following function using 4x16 decoder  $W(A,B,C,D) = A'B + BCD + AC'$ .  
II) Explain with neat schematic and logic diagram, the working of a Carry-look ahead adder.  
**OR**
- B) I) With the help of Full-adders and logic gates, implement 4-bit binary parallel subtractor.  
II) Realize a 64x1 multiplexer, using 16x1 multiplexers and an OR gate.
4. A) I) Convert S-R Flipflop to J-K Flip-flop and realize the same.  
II) Compare any six points between Mealy and Moore machines.  
**OR**
- B) I) Design a 4-bit-asynchronous-up-counter, using negative-edge-triggered D type Flip-flops.  
II) What is race-around-condition in J-K Flip-flop? How is it dealt? Explain.
5. A) I) Compare PROM, PAL and PLA.  
II) Implement the functions:  
 $f(A,B,C) = \sum m(0,1,2,4)$  and  $g(A,B,C) = \sum m(0,5,6,7)$ , using a 4-wide logic PAL.  
**OR**
- B) I) Use a PROM to produce square of given 3-bit number.  
II) Implement full-adder using PLA.



Subject Code: 19BEC4TH04

II B.Tech II Semester Supple Examinations, May-2023  
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) Sketch the PM and FM waves produced by the sawtooth wave shown in Fig. 1(a) as the source of modulation. [6 M]

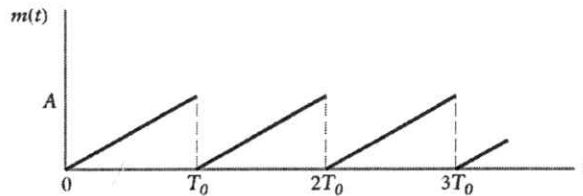


Figure 1(a).

- II) Illustrate and explain the operation of a square-law demodulator in AM. [6 M]  
OR

B) I) The output signal from an AM modulator is  $u(t) = 5 \cos 1800\pi t + 20 \cos 2000\pi t + 5 \cos 2200\pi t$ . Determine the modulating signal  $m(t)$ , the carrier  $c(t)$  and the modulation index. [6 M]

II) Derive the noise in any one type of angle modulation systems. [6 M]

2. A) I) List out all characteristics of radio receivers and brief about each one. [6M+6 M]

II) Including a neat diagram explain the Superhetrodyne receiver and write its operation model.  
OR

B) I) Illustrate and discuss about the phase modulated FM Transmitter. Explain stability in FM transmitters. [6 M]

II) Explain the operating principle of the Tuned radio frequency receiver with a neat block diagram. [6 M]

3. A) I) Write the brief discussion of data communication transmitter and transmission medium. [6 M]

II) Define and describe pulse-position modulation, and explain with waveforms how it is derived from PWM. [6 M]

OR

B) I) Explain the two-dimensional parity check and cyclic redundancy check. [8 M]

II) List out the limitations in PCM. [4 M]

4. A) I) Draw a block diagram and explain the principle of ASK. [6 M]

II) Compare BPSK and QPSK techniques. [6 M]

OR

B) I) Draw a block diagram and explain the working principle of PSK. [6 M]

II) Differentiate between ASK and FSK. Show their block diagrams also. [6 M]

5. A) I) Describe about the linear block codes in error control coding. [6 M]

II) Describe the Shannon-fano coding theorem. [6 M]

OR

B) I) Illustrate the cyclic codes and convolution codes along with their application. [6 M]

II) explain the fundamentals of source coding and indicate the functional requirements. [6 M]

OR

B) I) Differentiate PERT and CPM. 6M

II) Write a short note on (a) Free float (b) Total float (c) EST (D) LFT. 6M

4. A) I) The arrival rate of customers at a banking counter follows Poisson distribution with a mean of 45/hr. The service rate of the counter clerk follows exponential distribution with a mean of 60/hr.

(a) What is the probability of having zero customers in the system?

(b) What is the probability of having five customers in the system?

(c) Find  $L_s$ ,  $L_q$ ,  $W_s$ , and  $W_q$ . 6M

ii) Write a short note on Kendall's notion to represent queuing models. 6M

OR

B) I) State and Explain Bellman's Principle of optimality. 8M

II) List out various applications of Dynamic Programming. 4M

5. A) I)

Solve the following game using dominance principle.

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		I	II	III	IV	V
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	II	3	3	6	6	4
	III	4	4	8	12	1

OR

B) I)

12 M

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The cost of replacing an individual bulb is Rs.60. If all the bulbs are replaced simultaneously it would cost Rs.25 per bulb.

a) What is the best interval between group replacements?

b) Find out the optimal replacement policy i.e., group or individual?

## II B.Tech II Semester Supple Examinations, May-2023

### 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) I) Briefly explain about Phases of Operations Research. 6 M

II) Maximize  $Z = 3x + 2y$  using the Graphical method subject to: 6M

$$2x + y \leq 18$$

$$2x + 3y \leq 42$$

$$3x + y \leq 24, \quad x \geq 0, y \geq 0$$

OR

B) I) 12 M

Solve the following LPP using Simplex method.

Maximize  $Z = 10x_1 + 15x_2 + 20x_3$

Subject to  $2x_1 + 4x_2 + 6x_3 \leq 24$

$$3x_1 + 9x_2 + 6x_3 \leq 30$$

$$x_1, x_2, x_3 \geq 0$$

2. A) I) A firm has three plants and four warehouses. The transportation costs (in Rs.), capacities of each plant and demand for each warehouse are given below. Solve the problem to minimize the transportation cost. 12M

Plants	Warehouses				Capacity
	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	
O <sub>1</sub>	20	22	17	4	120
O <sub>2</sub>	24	37	9	7	70
O <sub>3</sub>	32	37	20	15	50
Demand	60	40	30	110	

OR

B) I) Demonstrate Hungarian method to solve assignment problem? 6M

II) How do you convert an Un balanced Transportation problem in to balanced problem?

Explain with suitable example. 6M

3. A) I) 12M

Find the sequence for the following eight jobs that will minimize the total elapsed time for the completion of all the jobs. Each job is processed in the same order CAB. Entities give the time in hrs. on the machines

Job	1	2	3	4	5	6	7	8
A	4	6	7	4	5	3	6	2
B	8	10	7	8	11	8	9	13
C	5	6	2	3	4	9	15	11



Subject Code: **19BEC4TH01**

**II B.Tech - II Semester Supple Examinations, May-2023**  
**ELECTRONIC CIRCUIT ANALYSIS**

Time: 3 Hours

Max.Marks:60.

Branch: ECE

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

- 
1. A) I) Draw the circuit of Common Emitter Amplifier and its equivalent circuit. List out its characteristics. [6M]
- II) For the emitter follower with  $R_S = 500 \Omega$  and  $R_L = 5 k\Omega$ , Calculate  $A_I, A_V, A_{VS}$  and  $R_o$ . Assume  $h_{fe} = 50, h_{ie} = 1 k\Omega, h_{oe} = 25 \text{ mA/V}$ . [6M]
- OR
- B) I) Discuss in detail about the Validity of hybrid-  $\pi$  model. Also give typical values of hybrid-  $\pi$  conductance and capacitance. [6M]
- II) Give the Analysis of common Source Amplifier circuit at low frequencies. [6M]
2. A) I) Explain three types of coupling methods used in multistage amplifiers. [6M]
- II) With neat sketch explain Boot-strap emitter follower. [6M]
- OR
- B) I) Draw the circuit diagram of Direct Coupled Amplifier and explain its operation in detail. [6M]
- II) Derive the overall current gain and overall input impedance of a Darlington pair amplifier [6M]
3. A) I) Draw the circuit diagram of a current series feedback amplifier, Derive expressions of input & output impedances, Gain, feedback factor. [6M]
- II) If negative feedback with a feedback factor,  $\beta$  of 0.1 is introduced into an amplifier with a gain of 20 and bandwidth of 0.6 MHz, obtain the resulting bandwidth of the feedback amplifier. [6M]
- OR
- B) I) Explain effect of negative feedback on gain, stability, distortion and bandwidth of an amplifier. [6M]
- II) Draw the circuit of voltage shunt feedback amplifier and derive the expressions for  $A_v, R_i, R_o$ . [6M]
4. A) I) Discuss about amplitude & frequency stability in oscillators. [6M]



- II) Derive the expression frequency of oscillation and condition for sustained oscillations of a Colpitts oscillator. [6M]

OR

- B) I) Derive the basic conditions for oscillations and classify oscillators. [6M]  
II) Derive the expression for frequency of oscillation of Hartley oscillator [6M]
5. A) I) Explain the operation of class A push-pull power amplifier. [6M]  
II) Show that the conversion efficiency of a transformer coupled power amplifier is 50%. [6M]

OR

- B) I) Derive the expression for the harmonic distortion in a power amplifier if the relation between input and output currents is nth order. [6M]  
II) What are the advantages and disadvantages of push pull configuration? Show that in class-B push pull amplifier the maximum conversion efficiency is 78.5%. [6M]

Subject Code: 19BEC4TH03

**II B.Tech II Semester Supple. Examinations, May-2023**

**RANDOM VARIABLES & STOCHASTIC PROCESSES**

Time: 3 Hours

Max.Marks:60.

Program: B.Tech.

Branch: ECE

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

- 
1. A) I) There are 3 black & 4 white balls in one bag and 4 black & 3 white balls in second bag. A die is rolled & the first bag is selected if it is 1 or 3 otherwise second bag. Find the probability of drawing a black ball from the selected bag?
- II) Calculate correct & Error transmission probabilities of binary symmetric channel by Baye's theorem by assuming own values?
- OR
- B) I) In a factory there are four machines. The machines produce 10%, 20%, 30%, 40% of an item respectively. The defective items produced by each machine are 5%, 4%, 3% and 2% respectively. Now an item is selected which is to be defective, what is the probability of it being from the second machine?
- II) Define uniform, exponential and binomial density functions.
2. A) I) State and prove the Chebychev's Inequality
- II) Suppose  $X$  is a Poisson random variable with mean  $\lambda$ . Find  $E\left[\frac{1}{1+X}\right]$ .
- OR
- B) Suppose  $X$  and  $Y$  are two independent standard Gaussian random variable. Find the characteristic function of the random variable  $Z = XY$ .
3. A) The joint pdf of  $X$  and  $Y$  is  $f_{X,Y}(x,y) = \frac{1}{4} e^{-|x|-|y|}$
- I) Are  $X$  and  $Y$  statistically independent random variables?
- II) Calculate the probability for  $X \leq 1$  and  $Y \leq 0$ .
- (OR)
- B) I) State central limit theorem.
- II) The joint pdf of  $X, Y$  is given by  $f_{X,Y}(x,y) = k e^{-(x+2y)}$  for  $x > 0$  and  $y > 0$
- Where  $k$  is a constant.      i) Find the value of  $k$ .      ii) Find  $p(X > 1, Y < 1)$ .

4. A) I) Let  $X$  be a W.S.S. random process and let  $Y = X \cos(2\pi f t)$  and  $Z = X \cos(2\pi f t + \theta)$  where  $\theta$  is uniformly distributed in  $[0, 2\pi]$  and independent of  $X$ . Show that  $Y$  and  $Z$  are W.S.S.

II) What is auto correlation function and write its properties.

OR

B) I) The auto correlation function of a stationary random process is  $R_{xx}(\tau) = 36 + \frac{16}{1+8\tau^2}$  Find mean and variance of random process.

II) Explain in detail about Mean Ergodic Processes.

5. A) I) Explain about Power density spectrum, average power and Cross-Power density Spectrum of System response.

II) Find Power density spectrum and average power of the RP  $X(t) = A_0 \cos(\omega_0 t + \theta)$  where  $A_0$  and  $\omega_0$  are real constants and  $\theta$  is a RV uniformly distributed on the interval  $(0, \pi/2)$ .

OR

B) I) Derive and Explain the Relationship between Power spectrum density and auto correlation function.

II) Find PSD of ACF  $R_{xx}(t) = \begin{cases} A \left[ 1 - \frac{|t|}{T} \right]; & -T \leq t \leq +T \\ 0; & \text{Else where} \end{cases}$

Subject Code:19BEC4TH05

## II B.Tech II Semester Supple Examinations, May-2023

### ELECTRO MAGNETIC WAVES AND TRANSMISSION LINES

Time: 3 Hours

Max.Marks:60.

Program: B.Tech.

Branch: ECE

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

1. A) I) Define Electric potential and derive the relationship between electric potential and electric field [6M]  
 II) State Gauss law. Apply Gauss law to calculate the electric field both inside outside of an insulating sphere of radius  $a$ , a uniform charge density  $\rho$  and a total positive charge  $Q$ . [6M]  
 OR  
 B) I) Define Biot-Savart law? How it will useful to derive H? Explain? [6M]  
 II) State Ampere's circuit law? Determine the magnetic flux between the Conductors of a coaxial cable of length 10m. The radius of the inner Conductor is  $a=1$  cm and that of the outer conductor is 2 cm. The current enclosed is 2A [6M]
2. A) I) State and explain Faraday's law of electromagnetic induction [6M]  
 II) Write down the integral and differential forms of Maxwell's equations and write their physical significance [6M]  
 OR  
 B) I) What is inconsistency of Ampere's law? Explain how Maxwell modified this law [6M]  
 II) If the electric field strength,  $E$  of an electromagnetic wave in free space is given by  $E_y=2\cos \omega(t-z/v_0)$  V/m, find H? [6M]
3. A) I) State and prove Poynting theorem. [6M]  
 II) Define uniform plane wave. Prove that uniform plane wave does not have field component in the direction of propagation. [6M]  
 OR  
 B) I) Derive the wave equations for source free regions [6M]  
 II) Given that  $\mathbf{E} = 40 \cos(10^8t - 3x)\mathbf{a}_y$  V/m (a) Determine the direction of wave propagation. [6M]  
 (b) The velocity of the wave and the wavelength
4. A) I) Derive the electric field boundary conditions between dielectric-to-dielectric medium? [6M]  
 II) Derive the expression for surface impedance of a conductor. [6M]  
 OR  
 B) I) Define Brewster angle and derive the expression for Brewster angle when a wave is parallel polarized [6M]  
 II) Explain the concept of critical angle and total internal reflections [6M]
5. A) I) Starting from the equivalent circuit, derive the transmission line equations for  $V$  and  $I$ , in terms of the source parameters [6M]  
 II) What is Smith Chart? How it is used to find the impedance of transmission line? [6M]  
 OR  
 B) I) Explain the significance and utility of  $\lambda/8$ ,  $\lambda/4$  and  $\lambda/2$  lines. [6M]  
 II) A transmission line in which no distortion is present has the following parameters  $Z_0 = 60\Omega$ ,  $\alpha = 20\text{m NP/m}$ ,  $v = 0.7v_0$ . Determine R,L,G,C and wavelength at 0.1 GHz. [6M]

Subject Code: 19BCSTH03

**II.B.TECH -II Semester Supple Examinations, May- 2023**

**DESIGN AND ANALYSIS OF ALGORITHMS**

**Time: 3 hours**

**(CSE)**

**Max Marks: 60**

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

1.A	i).	What is an asymptotic notation? Explain different types of asymptotic notations with examples.	[6M]
	ii)	Discuss the Pseudo code conventions for expressing algorithms	[6M]
OR			
B	i).	What are the different mathematical notations used for algorithm analysis? Explain them.	[6M]
	ii)	What is space complexity? Illustrate with an example for fixed and variable part in space complexity.	[6M]
2.A	i)1.	Explain divide-and-conquer technique; write a recursive algorithm for finding the maximum and minimum element from the list	[6M]
	ii)	Describe binary search in detail and provide time complexity analysis with an example.	[6M]
OR			
B	i).	Write a recursive algorithm for binary search and also bring out its efficiency.	[6M]
	ii)	Illustrate the tracing of quick sort algorithm for the following set of numbers: 25, 10, 72, 18, 40, 11, 64, 58, 32, 9.	[6M]
3.A	i)2.	Solve the following instance of knapsack problem using greedy method. n=7(objects), m=15, profits are (P1,P2,P3,P4,P5,P6,P7)=(10,5,15,7,6,18,3) and its corresponding weights are (W1,W2,W3,W4,W5,W6,W7)=(2,3,5,7,1,4,1).	[6M]
	ii)β.	What is a Minimum Cost Spanning tree? Explain Kruskal's Minimum cost spanning tree algorithm with a suitable example.	[6M]
OR			
B	i).	Explain the general principle of Greedy method and also list the applications of Greedy method.	[6M]
	ii)	What is a Spanning tree? Explain Prim's Minimum cost spanning tree algorithm with suitable example.	[6M]
4.A	i)4.	Explain the methodology of Dynamic programming. Mention the applications of Dynamic programming.	[6M]
	ii)ξ.	Find the all pairs shortest path solution for the graph represented by below adjacency matrix: $\begin{bmatrix} \infty & 6 & 5 & 4 \\ 3 & \infty & 2 & 6 \\ 18 & 6 & \infty & 7 \\ 8 & 12 & 10 & \infty \end{bmatrix}$	[6M]
OR			
B	i).	Write and explain an algorithm to compute the all pairs shortest path using dynamic programming and prove that it is optimal.	[6M]
	ii)	Solve the following instance of 0/1 KNAPSACK problem using Dynamic programming n = 3, (W1, W2, W3) = (2, 3, 4), (P1, P2, P3) = (1, 2, 5), and m = 6.	[6M]
5.A	i)6.	What is a backtracking? Give the explicit and implicit constraints in 8 queen's problem	[6M]
	ii)γ.	Write an algorithm to determine the Hamiltonian Cycle in a given graph using backtracking.	[6M]
OR			
B	i).	State the concept of branch and bound method and also mention its applications.	[6M]
	ii)	Distinguish between backtracking and branch – and bound techniques.	[6M]



Subject Code: 19BCS4TH04

**II B.Tech - II Semester Supple Examinations, May-2023**

**SOFTWARE ENGINEERING**

**Time: 3 hours**

**(CSE)**

**Max Marks: 60**

Note: Answer All FIVE Questions.

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

- 
1. A) I) Write short notes on object oriented software development [6]  
II) Explain in detail about agile process model. [6]  
OR  
B) I) Explain detail about component based development model with neat sketch [6]  
II) What is the significance of iterative model compared with other models? [6]
2. A) I) Differentiate the functional and non-functional requirements. [6]  
II) List the good software requirement specification document and their components. [6]  
OR  
B) I) Discuss about requirement management planning. [6]  
II) What is feasibility study? How it helps in requirement engineering process? [6]
3. A) I) Demonstrate in details about architectural design. [6]  
II) Illustrate any four architectural styles in detail. [6]  
OR  
B) I) Define (a) Abstraction, (b) Information hiding and (c) Modularity. [6]  
II) Describe in details about user interface analysis. [6]
4. A) I) Explain in detail about any one control structure testing. [6]  
II) Summarize top-down and bottom-up integration testing. [6]  
OR  
B) I) Describe the testing objectives and its principles. [6]  
II) What do you mean by boundary value analysis? Give two examples of boundary value testing. [6]
5. A) I) Discuss in detail about the activities involved with project process planning. [6]  
II) Explain the COCOMO II model for software estimation in detail. [6]  
OR  
B) I) What is project metrics? Explain in detail. [6]  
II) Explain in detail about Capability Maturity Model. [6]

Subject Code:19BCI4TH02

## II B.Tech II Semester Supple Examinations, May-2023

### 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) How to represent a FSM? Explain with examples?  
II) What are the Components of FSM? Write a short note on automata in real world

OR

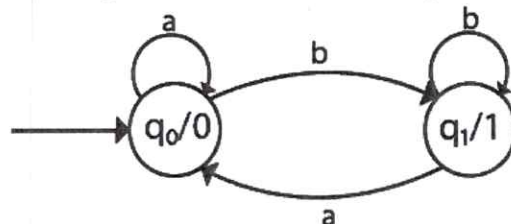
- B) I) What are Generative grammars? Write the components of such grammars?  
II) What is a string? Write operations on strings?

2. A) I) Construct an NFA that accepts the set of all strings over {0,1} that start with 0 or 1 and end with 10 or 01.

- II) Describe the procedure of converting NFA to DFA with a suitable example

OR

- B) I) Explain about Moore and mealy machines with an example  
II) Convert the following Moore machine into its equivalent Mealy machine.

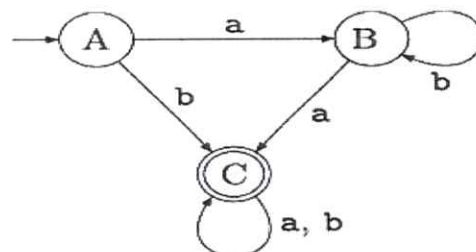


3. A) I) Write the Algorithm for minimizing DFA?

- II) Give a regular expression that generates the language L over the alphabet  $\Sigma = \{a, b\}$  where each b in the string is followed by exactly one or three a's.

OR

- B) I) Construct a Regular expression corresponding to the following finite automata.



- II) Explain Arden's theorem?

4. A) I) What is ambiguous grammar? Explain how to eliminate the ambiguity from the grammar?  
Consider the example grammar from

$E \rightarrow E+E/E-E/E^*E$   $E \rightarrow E/E$   $E \rightarrow (E)/id.$

II) Minimize the following the grammar

$S \rightarrow Aa/B$ ,  $B \rightarrow A|bb$ ,  $A \rightarrow a|bc|B$

OR

B) I) Explain the various ways of determining the acceptability of Pushdown Automata.

II) Find an equivalent grammar in CNF of the following grammar.

$S \rightarrow bA / aB$   $A \rightarrow bAA / aS / a$   $B \rightarrow aBB / bS / b$

5. A) I) What is TM? Draw a transition diagram for turing machine and explain it in detail?

II) Explain types of turing machine?

OR

B) I) Design a Turing Machine to accept the set of all palindrome over  $\{0,1\}^*$ .

Draw the Transition diagram for the same.

II) What are P and NP class of Languages? What is NP Complete and give examples?





Subject Code: **19BIT4TH03**

**II B.Tech - II Semester Supple Examinations, May-2023**

**INTERNET OF THINGS**

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) How does M2M communication work? Explain. 6M  
II) Explain the different characteristics of IoT. 6M  
OR  
B) I) Explain in detail about IoT levels and deployment templates. 12M
2. A) I) Describe the design principles for connected devices. 6M  
II) Briefly explain the steps in IoT design methodology. 6M  
OR  
B) I) Discuss about domain specific applications of IoT for Environment. 6M  
II) How do IoT devices communicate? Explain. 6M
3. A) I) Discuss about components of Arduino UNO board 6M  
II) What are the Building Blocks of IOT Devices? Explain. 6M  
OR  
B) I) What are the different types of Sensors used in IoT Network? 6M  
II) Discuss about components of Raspberry Pi. 6M
4. A) I) Describe different Cloud Service Models. 6M  
II) Explain about Web Application Messaging Protocol (WAMP). 6M  
OR  
B) I) Explain SNMP protocol and its limitations 12M
5. A) I) Which of the devices are used to connect IoT devices to a home network? 6M  
II) How IoT is used in weather monitoring system? 6M  
OR  
B) I) Explain applications of IoT in Home Automation systems. 6M  
II) Design smart city applications in IoT. 6M

## II B.Tech II Semester Supple. Examinations, May-2023

Sub Code: 19BIT4TH05

COMPUTER NETWORKS

Time: 3 hours

(IT)

Max. Marks: 60

Note: Answer All FIVE Questions.

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

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	Illustrate the functionality of various layers present in OSI model with a neat sketch.	K4	CO1	12M
	OR				
	b	What is a Computer network? Explain the differences between Local Area Networks and Wide Area Networks with suitable diagrams.	K2	CO1	12M
2	Unit-II				
	a	i) Explain the design issues of data link layer.	K2	CO2	6M
		ii) Draw and explain the IEEE 802.3 with frame format.	K4	CO2	6M
	OR				
b	What are the different types of error detection methods? Explain the CRC error detection technique with an example	K2	CO2	12M	
3	Unit-III				
	a	Explain the following sliding window protocols. i) Stop and Wait protocol. ii) Selective repeat protocol.	K2	CO3	12M
	OR				
	b	Define ALOHA. Describe the working principle of Carrier sense multiple access with collision Detection (CSMA/CD).	K2	CO3	12M
4	Unit-IV				
	a	i) Explain briefly about store and forward packet switching.	K2	CO4	6M
		ii) Compare and contrast of virtual circuit and datagram networks.	K3	CO4	6M
	OR				
b	Illustrate Distance vector Routing algorithm with suitable example.	K4	CO4	12M	
5	Unit-V				
	a	i) Explain the services provided by the Transport layer.	K2	CO5	6M
		ii) Distinguish between TCP and UDP protocols.	K2	CO5	6M
	OR				
	b	i) What is DNS? Explain Domain Resource Record types.	K2	CO5	6M
	ii) Define HTTP. List out HTTP Message Headers.	K1	CO5	6M	



Subject Code: 19BCC4OE09

**II B.Tech II Semester Supple Examinations, May-2023**

**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) Define a Database. Write the advantages of using a database.  
II) Outline the Database system structure.  
OR  
B) I) Compare the characteristics between a Database and a File system.  
II) Explain the three tier schema architecture for a database system.
2. A) I) Write short notes about integrity constraints in SQL.  
II) Discuss regarding the concepts of Entity, Attribute and Relationship.  
OR  
B) I) Investigate the role of Key constraints for Ternary Relationships and participation constraints with suitable examples.  
II) Discuss the importance of null values in a relational model with appropriate examples.
3. A) I) What are the different data types in SQL? Explain.  
II) What is DML? Explain DML operations with examples.  
OR  
B) I) Illustrate the functionality of nested queries, correlated nested queries in SQL.  
II) Outline the SQL constructs that grant access or revoke access from user or user groups.
4. A) I) Discuss the problems related to decomposition in relational model.  
II) What is Functional dependency? Explain the properties of functional dependency.  
OR  
B) I) Explain about read and write operations in a DBMS transaction with suitable example.  
II) Explain about 2NF, 3NF with suitable examples.
5. A) I) Why concurrency control is needed in a DBMS? Explain.  
II) Explain two-phase locking protocol with an example.  
OR  
B) I) Discuss about secondary indexes with example.  
II) Why recovery from a failure is needed in a DBMS transaction? Explain.

**II B.Tech II Semester Supple. Examinations, May-2023**

**Sub Code: 19BCC4OE11 WEB DEVELOPMENT USING MEAN STACK**

Time: 3 hours

(CSE)

Max. Marks: 60

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

Q.No	Questions	KL	CO	M
<b>Unit - I</b>				
1	a i) Illustrate the procedure to create Angular Service.	3	1	6M
	ii) Define Even Binding with suitable example.	3	1	6M
	OR			
	b i) Define Attribute Directives with suitable example.	3	1	6M
	ii) List a few key parts of Angular8 Architecture.	1	1	6M
<b>Unit - II</b>				
2	a i) Briefly explain the Procedure to configure routes in the application.	3	2	6M
	ii) Define HTTP Client and its benefits.	2	2	6M
	OR			
	b i) Illustrate the procedure to configure Angular Material in Angular application.	3	2	6M
	ii) Briefly explain various CLI commands used in Angular.	2	2	6M
<b>Unit - III</b>				
3	a i) Explain about module in Node.js with suitable example.	3	3	6M
	ii) Illustrate the Usage of the following console methods in Node.Js (a)console. log() (b)console. error() (c) console.warn()	3	3	6M
	OR			
	b i) List any five REPL commands with description.	2	3	6M
	ii) Briefly explain Node.js Module types	2	3	6M
<b>Unit - IV</b>				
4	a i) Demonstrate the simple code to create a new file called test.txt and writes "Hello World" into it.	3	4	6M
	ii) List the advantages of Express.js	2	4	6M
	OR			
	b i) Explain the usage of fs.unlink() method with example.	3	4	6M
	ii) List and explain any Five methods of fs Module.		4	6M
<b>Unit - V</b>				
5	a i) Demonstrate the procedure to connect the local MongoDB database.	3	5	6M
	ii) Demonstrate the code for inserting documents into MongoDB database.	3	5	6M
OR				

	i) Explain the following methods for performing queries in MongoDB. (a)find()                      (b)save()	2	5	6M
	ii) Demonstrate the code for updating or deleting an existing document (records).	3	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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