

# SY-All Branch



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**QUESTION PAPER: (B.Tech/M.Tech/MBA)**

Class: **SY. B.Tech** Dept: **All Branch**

Exam date: / / 20 Paper Quantity:.....

**July-2023**

Course: B. Tech.

Branch : Civil

Semester : IV

Subject Code &amp; Name: BTCVC402/BTCIC402 (Environmental engineering)

Max Marks: 60

Date: 15/07/2023

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

**Q.1 Solve Any Two of the following.**

- A) The population data for a town is given below Estimate population at the end of the year 2020 by arithmetical increase method.

CO1 6

Year	1950	1960	1970	1980	1990
Population	35000	37500	43500	52000	57500

- B) Explain the characteristics of the water in short.

CO1 6

- C) What is water demand and explain various water demand

CO1 6

**Q.2 Solve Any Two of the following.**

- A) Explain the purpose of aeration of water with a neat sketch of cascade type of aerator.

CO2 6

- B) What is the difference between slow sand filter and rapid sand filter

CO2 6

- C) Design a rectangular settling tank to treat 2 MLD of water .

CO2 6

Assume detention time of 3 Hrs and flow through velocity of 7.5cm/min. if the depth of tank is 3m, find the overflow rate and dimensions of the tank.

**Q.3 Solve Any Two of the following.**

- A) Compare between Continuous water supply system and Intermittent water supply system.

CO3 6

- B) Explain the following layout system for water distribution

CO3 6

(a) Dead end system.

(b) Radial system.

- C) Which factors consider in the design of Distribution system

CO3 6

**Q.4 Solve Any Two of the following.**

- A) Explain physical, chemical and biological characteristics of municipal waste water.**
- B) Write a note on sewerage system and explain any one of them in detail.**
- C) Explain E-waste disposal method in short.**

CO4

CO4

CO4

**Q. 5 Solve Any Two of the following.**

- A) What are the effects of lapse rate on plume behaviour.**
- B) State the method of control of particulate matter.**
- C) What are the major sources of air pollution.**

Remember

Remember

Remember

**\*\*\* End \*\*\***



# DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

## Regular Examination Summer 2023

Course: Second Year B. Tech. V (Sem – IV)

Branch: Civil Engineering

Subject Name: Hydraulics - II

Subject Code: BTCVC405

Max Marks: 60

Duration: 3 Hrs.

Date: 22/07/2023

### Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

### Q. 1 Solve Any Two of the following.

- |  |          |    |
|--|----------|----|
| A) Explain classification of flow in open channel and Types of channels.   | Remember | 06 |
| B) Write a note on velocity distribution in open channel and explain pitot tube.   | CO 1     | 06 |
| C) Water flows over a rectangular weir 1.5 m wide at a depth of 160 mm and afterwards passes through a triangular right-angled weir. Taking Cd for the rectangular and triangular weir as 0.62 and 0.59 respectively. Find the depth over the triangular weir. | CO 1     | 06 |

### Q. 2 Solve Any Two of the following.

- |   |          |    |
|---|----------|----|
| A) Define - most economical section of channel and derive conditions for most efficient triangular channel section.   | Remember | 06 |
| B) Show that, for maximum discharge in a rectangular channel, the depth of flow is 2/3 of the specific energy.  | CO 1     | 06 |
| C) A 2.5 m wide rectangular channel has a specific energy of 1.50 m when carrying a discharge of 6.48 m <sup>3</sup> /s. Calculate the alternate depths and corresponding Froude numbers. | CO 1     | 06 |

### Q. 3 Solve Any Two of the following.

- |   |          |    |
|---|----------|----|
| A) State the gradually varied flow assumptions and derive the dynamic equation of gradually varied flow.  | Remember | 06 |
| B) Enlist and give description about types of hydraulic jump.   | CO 2     | 06 |
| C) A jet of water, 10 cm diameter moves with a velocity of 25 m/s and strikes a series of flat plates fixed on the periphery of wheel. If due to impact the wheel rotates at 100 rpm, calculate (i) Force exerted by jet on plate<br>(ii) Work done on the plate/sec<br>(iii) Torque exerted on wheel if the radial distance at which jet strikes the plate and axis of wheel is 1 m. | CO 2     | 06 |

**Q. 4 Solve Any Two of the following.**

- |  |      |    |
|--|------|----|
| A) Classify different types of turbines. Describe main components of Francis Turbine with neat diagram.  | CO 3 | 06 |
| B) Write a note on selection of turbines.  | CO 3 | 06 |
| C) A Pelton wheel turbine has a mean bucket speed of 9 m/s and discharge of 680 lps under a head of 35 m. The bucket deflects the jet through an angle of $165^\circ$ . Calculate power and efficiency of turbine. Assume $C_v=0.97$ and blade's surface to be perfectly smooth. | CO 3 | 06 |

**Q. 5 Solve Any Two of the following.**

- |   |          |    |
|---|----------|----|
| A) Explain 1) Efficiencies of a Centrifugal pump<br>2) Airlift pump and submersible pump  | Remember | 06 |
| B) How centrifugal pumps are classified? Explain in detail working of centrifugal pump.   | CO 3     | 06 |
| C) The impeller of a centrifugal pump runs at 1440 r.p.m. and has a vane curved back at $30^\circ$ . The radial velocity of flow is constant at 3 m/s. If the manometric efficiency is 80% and the manometric head is 25 m, determine<br>(i) the vane angle at inlet<br>(ii) the diameters of the impeller at inlet and exit<br>Assume the ratio of outlet diameter of runner to inlet diameter as 2. | CO 3     | 06 |

----- End -----

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular End Semester Examination – Summer 2023**

**Course: B. Tech.**

**Branch: Civil Engineering**

**Semester: IV<sup>th</sup>**

**Subject Code & Name: BTCVC406 Engineering Geology**

**Max Marks: 60**

**Date: 24/07/2023**

**Duration: 3.00 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Draw a suitable diagram wherever necessary.

**Marks**

**Q. 1 Solve Any Two of the following.**

- |  |   |
|--|---|
| A) Write short notes on: -   | 6 |
| a. Continental crust   |   |
| b. Weathering  |   |
| c. Dendritic river pattern   |   |
| B) Explain the types of volcanoes and their products.                  | 6 |
| C) Write a detailed note on types of mountains with suitable examples. | 6 |

**Q.2 Solve Any Two of the following.**

- |  |   |
|--|---|
| A) Write a short note on: -  | 6 |
| a. Dyke  |   |
| b. Porphyritic texture   |   |
| c. Conglomerate  |   |
| B) Define metamorphism and describe gneissose and schistose textures with neat sketches.                 | 6 |
| C) Give a detailed account of physical properties of minerals useful for the identification of minerals. | 6 |

**Q. 3 Solve Any Two of the following.**

- |  |   |
|--|---|
| A) Write a short note on:-                                     | 6 |
| a. Syncline and anticline                                      |   |
| b. Non-conformity  |   |
| c. Permeability  |   |
| B) Define the term "fault" and describe various types.         | 6 |
| C) What are the types of aquifers with a neat labeled diagram? | 6 |

**Q.4 Solve Any Two of the following.**

- A) Write a short note on: -
  - a. Wash boring
  - b. Auger drilling
  - c. Sampling techniques
- B) Provide a detailed explanation of preservation core lithologs.
- C) Describe the procedure and limitations of Rock Quality Designation method.

**Q.5 Solve Any Two of the following.**

- A) Write a short note on: -
  - a. Sequential Excavation Method (SEM)
  - b. Grouting
  - c. Suspension Bridge
- B) Define a dam and describe various types of dams.
- C) Write a detailed note on various tunnel excavation techniques.

**\*\*\* End \*\*\***



<b>DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE</b> <b>Regular and Supplementary Summer 2023</b> <b>Course: S.Y.B. Tech.                      Branch : Civil                      Semester : IV</b> <b>Subject Code &amp; Name: BTCVC406/BTCIC406/BTCEC406 (Engineering Geology)</b> <b>Max Marks: 60                      Date:24/07/2023                      Duration: 2 pm to 5 pm (3 Hr.)</b>			
<b>Instructions to the Students:</b> 1. All the questions are compulsory. 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question. 3. Use of non-programmable scientific calculators is allowed. 4. Assume suitable data wherever necessary and mention it clearly.			
		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		
A)	Explain the volcanoes. Discuss classification of volcanoes.	CO1	6
B)	Define mountain. Explain the formation of mountain. Describe various types of mountains with suitable examples.	CO1	6
C)	List various erosional and depositional features formed by wind. Describe deflation hollows and armour, Yardangs, Ventifacts, Sand dunes etc.	CO1	6
Q.2	Solve Any Two of the following.		
A)	Explain formation of igneous rock. Describe structures, Textures and classification of igneous rock.	CO2	6
B)	Define mineral. Describe major physical properties for identification of minerals. Give in detail classification of minerals.	CO2	6
C)	Describe detailed classification of sedimentary rocks and metamorphic rocks.	CO2	6
Q. 3	Solve Any Two of the following.		
A)	Explain in detail various types of folds and faults.	CO3	6
B)	Explain artificial recharge of groundwater with respect to percolation tank, Contour bunding, Subsurface dams, Injection method.	CO3	6
C)	Write notes on – (i) Unconformity and its types, Foliation and lineation (ii) Qualities of good building stones (iii) Joint and types of joints.	CO3	6
Q.4	Solve Any Two of the following.		
A)	Explain in brief about rock quality designation (RQD). Explain core size, core recovery and core preservation.	CO4	6
B)	Give a detailed account of type of exploratory drilling methods with its suitability and limitations.	CO4	6



C)	Write a short note on: (i) Topographic maps and scale of topographic maps. (ii) Influence of geological conditions on structures (iii) Primary and secondary survey.	CO4	6
Q. 5	Solve Any Two of the following.		
A)	Explain in detail about applications of tunnel lining and its procedure.	CO5	6
B)	Write a short notes on: (i) Gravity and buttress dams (ii) Tunneling in folded strata and soft ground (iii) Effect of porosity and permeability on reservoir.	CO5	6
C)	Explain in detail the treatment to be given to fracture and dyke crossing dam alignment.	CO5	6
*** End ***			

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular & Supplementary Semester Examination – Summer 2023**

**Course: B. Tech.**

**Branch: Civil Engineering**

**Semester: IV**

**Subject Code & Name: BTCVC404 Water Resource Engineering**

**Max Marks: 60**

**Date: 26/7/2023**

**Duration: 3 Hrs.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO)    Marks

**Q.1 Solve the following.**

**12**

- |   |     |   |
|---|-----|---|
| A) Describe various types of irrigation.  | CO1 | 6 |
| B) A canal has designed to supply the irrigation needs of 1200 hectares land, growing rice in 140 days of base period and 134 cm delta. If the same canal is used to irrigate wheat having 52 cm delta and 120 days base period, calculate the area of land to be irrigated.  | CO1 | 6 |
| C) A stream of 130 liter/second has diverted from canal and 100 liter/second water was delivered to the field having 1.6-hectare area for 8 hours. The runoff losses were 420 m <sup>3</sup> . The variation of depth of penetration was from 1.7 m to 1.1 m at tail. Calculate: 1) Water Conveyance Efficiency ( $\eta_c$ )<br>2) Water Application Efficiency ( $\eta_a$ )<br>3) Water Distribution Efficiency ( $\eta_d$ ) | CO1 | 6 |

**Q.2 Solve Any Two of the following.**

**12**

- |   |     |   |
|---|-----|---|
| A) Name the forces acting on Gravity dam Enumerate any four with sketches wherever necessary.                 | CO2 | 6 |
| B) Explain the various levels in reservoir with suitable diagram.   | CO2 | 6 |
| C) Write down classification of dams according to: a) use<br>b) hydraulic design c) materials of construction | CO2 | 6 |

**Q.3 Solve Any Two of the following.**

**12**

- |   |     |   |
|---|-----|---|
| A) Explain Kennedy's silt theory.   | CO2 | 6 |
| B) Why should lining be provided in canals? What are the merits and demerits of canal lining? | CO1 | 6 |
| C) Explain Bligh's creep theory and state its limitations.                                    | CO2 | 6 |

**Q.4 Solve Any Two of the following.**

**12**

- |   |     |   |
|---|-----|---|
| A) In a watershed 4 non-recording rain gauges have been installed to record rainfall data. The annual rainfall record for one of the years is furnished below. Assuming an error of 10% in the estimation of mean rainfall. Find out the optimum number of non- recording and recording rain-gauges for this watershed. | CO3 | 6 |
|---|-----|---|

Station	A	B	C	D
---------	---	---	---	---

Annual Rainfall (cm)	100	120	140	80
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- B) What are the different types of rain gauges? Describe with neat sketches.  
 C) Explain various components of lift irrigation.

CO1

6

CO3

6

**Q. 5 Solve the following.**

12

- A) Explain the types of tube wells with neat sketches  
 B) What is water logging? What are its ill-effects?  
 C) Illustrate the process of reclamation of land effected by water logging.

CO3

6

CO3

6

\*\*\* End \*\*\*

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular Summer Examination – 2022-23**

**Course: B. Tech.**

**Branch: Civil Engineering**

**Semester: IV**

**Subject Code & Name: BTCVC401 Building Planning & Drawing**

**Max Marks: 60**

**Date: 13/7/2023**

**Duration: 3 Hr.**

**Instructions to the Students:**

1. Use *Drawing Sheet* wherever required.
2. All the questions are compulsory.
3. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
4. Use of non-programmable scientific calculators is allowed.
5. Assume suitable data wherever necessary and mention it clearly.

(Level/CO)    Marks

<b>Q. 1 Solve Any Two of the following.</b>		<b>12</b>
A) Explain factors affecting building planning in India.	CO1	6
B) Draw a plan for a house as per sun wind diagram.	CO1	6
C) Draw elevation and specification for Q. 1B	CO1	6
<b>Q.2 Solve Any Two of the following.</b>		<b>12</b>
A) Draw plan of a G+1 residential building.	CO1	6
B) Illustrate important building bye laws.	CO1	6
C) Explain procedure of obtaining building permission.	CO1	6
<b>Q. 3 Solve Any Two of the following.</b>		<b>12</b>
A) Draw Drainage plan for a house in detail.	CO2	6
B) Write a note on electrification of buildings.	CO2	6
C) Write a note on fire resistance in buildings.	CO2	6
<b>Q.4 Solve Any Two of the following.</b>		<b>12</b>
A) Explain necessity of building ventilation.	CO2	6
B) Explain principles of air conditioning.	CO2	6
C) Discuss materials used in thermal insulation.	CO2	6
<b>Q. 5 Solve Any Two of the following.</b>		<b>12</b>
A) Write a note on building acoustics.	CO3	6
B) Explain Sabine's formula and discuss its scope.	CO3	6
C) Write a note on characteristics of green building.	CO3	6

**\*\* END \*\***



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular & Supplementary Semester Examination – Summer 2023**

**Course: B. Tech.**

**Branch: Civil Engineering**

**Semester: II**

**Subject Code & Name: BTES205/BTES205E Energy and Environment Engg.**

**Max Marks: 60**

**Date: 21/7/2023**

**Duration: 3 Hrs.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
<b>Q.1 Solve the following.</b>		<b>12</b>
A) Explain the working of a Hydro electric power plant with neat diagram.	CO1	6
B) What is the nuclear chain reaction? Explain the importance of moderator and control rods in a nuclear reactor with respect to chain reaction	CO1	6
C) What are the fossil fuels used for generation of conventional power? Explain in detail Steam power plant.	CO1	6
<b>Q.2 Solve Any Two of the following.</b>		<b>12</b>
A) How the wind mills are classified? Sketch the diagram of HAWT, and explain the function of its main components.	CO2	6
B) What is Bio-mass? Write construction and working of bio-gas plant, with a neat diagram. Also write down the advantages of it.	CO2	6
C) Define solar energy. What is flat plate collector? Describe its components with suitable sketch.	CO2	6
<b>Q.3 Solve Any Two of the following.</b>		<b>12</b>
A) What do you mean by energy conservation? Explain the measures to be taken to reduce the energy conservation in domestic activities. List any four measures.	CO2	6
B) What do you understand by maximum energy efficiency in context with energy conservation principle? Discuss with a suitable example.	CO1	6
		6
<b>Q.4 Solve Any Two of the following.</b>		<b>12</b>
A) Define Air Pollution. Write down the different classification of air pollution sources.	CO3	6
B) Explain briefly effect of air pollution on human being and vegetation.	CO1	6
C) What is radioactive pollution? What are its effects? How we can control Radioactive Pollution?	CO3	6
<b>Q.5 Solve the following.</b>		<b>12</b>
A) What are the main causes of water pollution? How can water pollution be controlled?		

**B)** Explain the following terms:

**CO3**

a. Thermal pollution

b. Acid rain

**C)** What are the various methods of safe disposal of solid wastes?

**CO3**

**\*\*\* End \*\*\***

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**Regular / Supplementary End Semester Examination – Summer 2023**

Course: **B.Tech.**

Branch: **Mechanical Engineering**

Semester: **IV**

Subject Code & Name: **BTMPE405B**

**SHEET METAL ENGINEERING**

Max. Marks: **60**

Date: **22/07/23**

Duration: **3.00Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome(CO) on which the question is based is mentioned in()in front of the question.
3. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

**Q.1 Solve Any Two of the following**

- |   |          |   |
|---|----------|---|
| A) Explain the Importance of Sheet metal engineering.                 | Remember | 6 |
| B) Explain Desirable properties of materials in sheet metal products. | Remember | 6 |
| C) Explain materials used in sheet metal engineering.                 | Remember | 6 |

**Q.2 Solve Any Two of the following.**

- |   |          |   |
|---|----------|---|
| A) Differentiate between piercing and blanking.       | Remember | 6 |
| B) Differentiate between piercing and punching.       | Remember | 6 |
| C) Explain the process of piercing with neat diagram. | Remember | 6 |

**Q.3 Solve Any Two of the following.**

- |  |          |   |
|--|----------|---|
| A) Explain shallow drawing of Cylindrical bodies.          | Remember | 6 |
| B) Explain deep drawing of rectangular bodies.             | Remember | 6 |
| C) Differentiate between forming, bending and spring back. | Remember | 6 |

**Q.4 Solve Any Two of the following**

- |   |          |   |
|---|----------|---|
| A) Differentiate between compound dies and progressive dies.      | Remember | 6 |
| B) Differentiate between compound dies and Combination dies dies. | Remember | 6 |
| C) Briefly explain modern development sin press tools.            | Remember | 6 |

**5) Solve the following**

- |   |          |    |
|---|----------|----|
| List out the various case studies for manufacturing of sheet metal products in various engineering applications?(Min 15 points) | Remember | 12 |
|---|----------|----|

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Summer Examination – 2023**

**Course: B. Tech.**

**Branch : MECH**

**Semester :IV**

**Subject Code & Name: BTMPE405ANumerical Methods in Engineering**

**Max Marks: 60**

**Date:22/07/23**

**Duration: 3 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
Q.1 Solve Any Two of the following.		12
A) Write a note on	CO1	6
i) True error      ii) True percent relative error		
iii) Approximate percent relative error		
B) The exponential function can be computed using	CO1	6
$e^x = 1 + x + x^2/2! + x^3/3! + \dots + x^n/n!$		
add terms one at a time to estimate $e^{(0.2)}$ After each new term is added, compute the true and approximate percent relative errors and make a table. Add terms until the absolute value of the approximate error estimate 'ea' falls below a pre specified error criterion 'es' conforming to three significant figures.		
C) Write a note on	CO1	6
i) Truncation error and Taylor series ii) Machine epsilon, iii) Accuracy and Precision		
Q.2 Solve Any Two of the following.		12
A) The velocity $v$ of a falling parachutist is given by	CO2	6
$v = gm/c(1 - e^{-(g/m)t})$		
where $g = 9.8 \text{ m/s}^2$ . For a parachutist with a drag coefficient $c = 15 \text{ kg/s}$ , compute the mass 'm' so that the velocity is $v = 35 \text{ m/s}$ at $t = 9 \text{ s}$ . Determine 'm' to a level of $\epsilon_s = 0.1\%$ . Using Newton Raphson		
B) You are designing a spherical tank to hold water for a small village in a developing country. The volume of liquid it can hold can be computed as	CO2	6
$V = \pi h^2(3R - h)/3$ , where $V$ = volume [ $\text{m}^3$ ], $h$ = depth of water in tank [ $\text{m}$ ],		





and  $R$  = the tank radius [m]. If  $R = 3$  m, to what depth must the tank be filled so that it holds  $30 \text{ m}^3$  Use Bisection method

- C) Write a note on i) Stopping criteria ii) Error propagation iii) Significant digits

Q. 3 Solve Any Two of the following.

- A) Given the system of equations

$$-3x_2 + 7x_3 = 2$$

$$x_1 + 2x_2 - x_3 = 3$$

$$5x_1 - 2x_2 = 2$$

(a) Compute the determinant.

(b) Use Cramer's rule to solve for the  $x$ 's.

- B) For the following set of simultaneous equations

$$100a + T = 519.72$$

$$50a - T + R = 216.55$$

$$25a - R = 108.27$$

Solve for acceleration  $a$  and the tensions  $T$  and  $R$

- C) The following system of equations was generated by applying the mesh current law to the circuit

$$60I_1 - 40I_2 = 200$$

$$-40I_1 + 150I_2 - 100I_3 = 0$$

$$-100I_2 + 130I_3 = 230$$

Solve for  $I_1$ ,  $I_2$ , and  $I_3$ .

Q.4 Solve Any Two of the following.

- A) Evaluate the following integral:

$$\int_{-2}^{2} (x^2 - 1) e^{-x^2} dx$$

(a) analytically; (b) single application of the trapezoidal rule;

(c) multiple-application trapezoidal rule, with  $n = 2$  and  $4$ ; For each of the numerical estimates (b) through (c), determine the percent relative error based on (a)

- B) Suppose that the upward force of air resistance on a falling object is proportional to the square of the velocity. For this case, the velocity can be computed as

$$v(t) = \sqrt{\frac{16g}{c}} \tanh\left(\sqrt{\frac{16g}{c}} t\right)$$

where  $c_d$  = a second-order drag coefficient. (a) If  $g = 9.8 \text{ m/s}^2$ ,  $m = 68.1 \text{ kg}$  and  $c_d = 0.25 \text{ kg/m}$ , use analytical integration to determine how far the object falls in 10 s. (b) Make the same evaluation, but evaluate the integral with the multiple-segment trapezoidal rule. Use a sufficiently high  $n$  that you get three significant digits of accuracy

- C) The following data was collected for the distance traveled

CO4 6

versus time for a rocket:

t, s	0	25	50	75	100	125
y, km	0	32	58	78	92	100

Use numerical differentiation to estimate the rocket's velocity and acceleration at each time

- Q. 5 Solve Any Two of the following.

12

- A) An object is suspended in a wind tunnel and the force measured for various levels of wind velocity. The results are tabulated below.

CO5 6

v, m/s	10	20	30	40	50	60	70	80
F, N	25	70	380	550	610	1220	830	1450

Use least-squares regression to fit this data with (a) a straight line, (b) a power equation based on log transformations, and (c) a power model based on nonlinear regression. Display the results graphically

- B) Use least-squares regression to fit a straight line to

CO5 6

x	1	2	3	4	5	6	7	8	9
y	1	1.5	2	3	4	5	8	10	13

- C) Explain the basic structure of a C program with suitable example.

CO5 6

\*\*\* End \*\*\*

<b>DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE</b> <b>Summer Examination - 2023</b> <b>Course: S. Y. B. Tech,      Branch : Mechanical Engineering      Semester : IV</b> <b>Subject Code &amp; Name: BTMPE405C Fluid Machinery</b> <b>Max Marks: 60      Date:      Duration: 3 Hr.</b>			
<b>Instructions to the Students:</b> 1. All the questions are compulsory. 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question. 3. Use of non-programmable scientific calculators is allowed. 4. Assume suitable data wherever necessary and mention it clearly.			
		(Level/CO)	Marks
Q.1	Solve Any Two of the following.		12
A)	Obtain an expression for force exerted and work done by the jet of water on the curved plate when the plate is moving in the direction of the jet.	Understanding/ CO1	6
B)	Water is flowing through a pipe at the end of which a nozzle is fitted. The diameter of the nozzle is 100 mm and the head of water at the center nozzle is 100 m. Find the force exerted by the jet of water on the fixed vertical plate. The coefficient of velocity is given as 0.95.	Applying/CO1	6
C)	A jet of water of diameter 75 mm moving with a velocity of 25 m/s strikes a fixed plate in such a way that the angle between the jet and plate is $60^\circ$ . Find the force exerted by the jet on the plate i) In the direction normal to the plate and ii) In the direction of the jet.	Applying/CO2	6
Q.2	Solve Any Two of the following.		12
A)	With a neat sketch explain construction and working of Francis turbine.	Understanding/ CO2	6
B)	Define the following terms i) Jet Ratio ii) Speed Ratio iii) Flow Ratio	Understanding/ CO3	6
C)	Two jets strike the buckets of Pelton wheel, which is having shaft power as 15450 kW. The diameter of each jet is given as 200 mm. If the net head on the turbine is 400 m, find overall efficiency of the turbine. Take $C_v = 1.0$ .	Applying/CO4	6



Q. 3	Solve Any Two of the following.		12
A)	Which factor affects during the selection of a Hydraulic turbine?	Understanding/ CO5	6
B)	What are the characteristics curves of a turbine? Explain main characteristics curve for reaction turbine.	Understanding/ CO3	6
C)	Enlist the names and explain the different safety devices in governing of turbines.	Understanding/ CO4	6
Q.4	Solve Any Two of the following.		12
A)	What is priming? Why is it necessary?	Understanding/ CO3	6
B)	What are the effects of cavitation? Give the necessary precaution against cavitation?	Understanding/ CO4	6
C)	The outer diameter of an impeller of a centrifugal pump is 400 mm and outlet width 50 mm. The pump is running at 800 r.p.m and is working against a total head of 15 m. The vanes angle at outlet is $40^\circ$ and manometric efficiency is 75%. Determine; i) Velocity of flow at outlet, ii) Velocity of water leaving the vane, and iii) Angle made by the absolute velocity at outlet with the direction of motion at outlet.	Applying/CO6	6
Q. 5	Solve Any Two of the following.		12
A)	Explain construction and working of vane type pump and give its advantages and disadvantages.	Understanding/ CO6	6
B)	What are the steps to installation of pumps?	Understanding/ CO7	6
C)	Classify special purpose pumps and write its applications.	Understanding/ CO6	6
*** End ***			

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular & Supplementary Summer – 2023

Course: B. Tech.

Branch: Mechanical Engineering

Semester : IV

Subject Code & Name: BTMES404 -Strength of Materials

Max Marks: 60

Date: 26/07/2023

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level Marks  
/CO)

Q.1 Solve Any Two of the following.

12

A) Derive from the fundamental, the relation for the deformation of a body, when it is subjected to

R/CO-1

6

- a) A tensile force
- b) Its own weight.

B) A steel bar of  $600 \text{ mm}^2$  cross sectional area is carrying loads as shown in fig. No. 1

U/CO-1

6

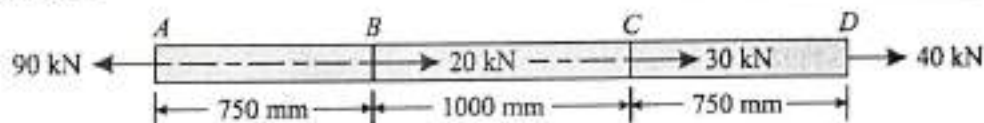


Fig. No. 1

C) An element in strained body is subjected to a tensile stress of 150 MPa and shear stress of 50 Mpa tending to rotate the element in and anticlockwise direction. Find (i) the magnitude of the normal and shear stresses on a section inclined at  $40^\circ$  with the tensile stress and (ii) The magnitude and direction of maximum shear stress that can exist on the element.

A/CO-1

6

Q.2 Solve Any Two of the following.

12

A) A vertical round steel rod, 1.82 m long is securely held at its upper end and a weight sliding freely on the rod falls on to a stop at the lower end of the rod. When the weight falls from a height of 30 mm the maximum stress is reached in the rod is estimated to be  $157 \text{ N/mm}^2$ . Determine the stress if the load had been gradually applied and also the maximum stress if the load has fallen from a height of 45 mm. take  $E = 2 \times 10^5 \text{ N/mm}^2$ .

U/CO-2

6

B) Derive the equation for Strain energy for

R/CO-2

6

- i) Gradually applied load
- ii) Suddenly Applied load.



- C) A rectangular strut 200 mm wide and 150 mm thick carries a load of 60 kN at an eccentricity of 20 mm in a plane bisecting the thickness. Find the maximum and minimum intensities of stress in the section. Also draw stress distribution diagram. A/CO-3

Q. 3 Solve Any Two of the following.

- A) State the assumptions made in the theory of pure bending. R/CO-4
- B) An I sections with rectangular ends, has the following dimensions: Flanges 150 mm x 20 mm, web 300 mm x 10 mm. Find the maximum shearing stress developed in the beam for a shear force of 50 kN. U/CO-4
- C) A solid steel shaft has to transmit 100 kW at 160 r.p.m. taking allowable shear stress as 70 Mpa, find the suitable diameter of the shaft. The maximum torque transmitted in each revolution exceeds the mean by 20 %. A/CO-4

Q.4 Solve Any Two of the following.

- A) State and explain the relation between  
i) The load and Shear force  
ii) The Shear force and Bending moment. R/CO-5
- B) A simply supported beam of span 3 m carries two-point loads of 5 kN each at 1 m and 2 m from the left-hand support. Draw shear force and bending moment diagrams for the beam. U/CO-5
- C) The intensity of loading on a simply supported beam of 6 m span increases gradually from 800 N/m run at one end to 2000 N/m run at another end as shown in fig. No. 2. Find the position and amount of maximum bending moment. Also draw the shear force and bending moment diagram. A/CO-5

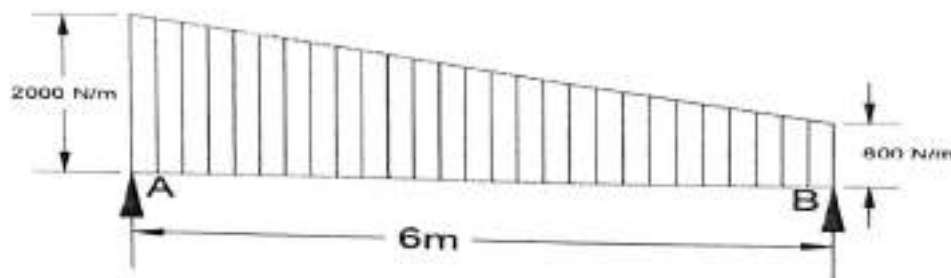


Fig. No. 2

Q. 5 Solve Any Two of the following.

- A) Derive the equation for the slope and deflection for the beam subjected to pure bending. R/CO-6

- B) A simply supported beam AB of Span 5 m is carrying a point load of 30 kN at a distance 3.75 m from the left end A. Calculate the slopes at A and B and deflection under the load. Take  $EI = 26 \times 10^7 \text{ N-mm}^2$ . U/CO-6 6
- C) Determine slope and deflection at the free end and at point C, 2 m from fixed end A for the cantilever beam shown in fig. No. 3 using moment area method. A/CO-6 6



Fig. No. 3

\*\*\* End \*\*\*



<b>DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE</b> <b>Regular End Semester Examination – Summer 2023</b> <b>Course: B. Tech.                      Branch: Mechanical Engineering                      Semester: IV</b> <b>Subject Code &amp; Name: BTMC401 /Manufacturing Processes – I</b> <b>Max Marks: 60                      Date:13/07/2023                      Duration: 3.00 Hr.</b>			
<b>Instructions to the Students:</b> 1. All the questions are compulsory. 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question. 3. Use of non-programmable scientific calculators is allowed. 4. Assume suitable data wherever necessary and mention it clearly.			
		(Level/CO)	Marks
<b>Q.1</b>	<b>Solve Any Two of the following.</b>		
A)	Define pattern? State any four types of patterns.	Remember	6
B)	What are the major types of sand moulds? What are their characteristics?	Understand	6
C)	Why is the investment-casting process capable of producing fine surface details on casting?	Understand	6
<b>Q.2</b>	<b>Solve Any Two of the following.</b>		
A)	Define roll gap, neutral point, and draft.	Remember/ Understand	6
B)	What is the difference between cold, warm, and hot forging.	Understand	6
C)	What is forgeability? Explain with neat diagram	Understand	6
<b>Q.3</b>	<b>Solve Any Two of the following.</b>		
A)	What is SMAW? What are the advantages and applications of SMAW?	Understand	6
B)	What is the purpose of flux? Why is it not needed in gas tungsten-arc welding?	Remember	6
C)	Explain the principle involved in MIG welding?	Understand	6
<b>Q.4</b>	<b>Solve Any Two of the following.</b>		
A)	What are the components of a lathe?	Understand	6
B)	What do you mean by tool geometry? How single point turning tool geometry is specified?	Remember	6
C)	Find the time required to drill 4 holes in a cast iron flange each of 2 cm depth, if the	Analysis	6



	hole diameter is 2 cm. Assume cutting speed as 21.9 m/min. and feed as 0.02 cm/rev.		
<b>Q. 5</b>	<b>Solve Any Two of the following.</b>		
A)	Describe the different types of cutters used in milling operations and give an example of each one.	Understand	6
B)	Define broaching. Explain the geometric features of broach with their functions.	Remember	6
C)	Why do machined gears have to be subjected to finishing operations?	Remember	6
	*** End ***		

**Supplementary Summer Examination – 2023**

**Course: T.E.**

**Branch : Mechanical Engineering**

**Semester :VI**

**Subject Code & Name: BTMC601/Manufacturing Processes -II**

**Max Marks: 60**

**Date: 13 July 2023**

**Duration: 3 Hrs.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
<b>Q.1 Solve Any Two of the following.</b>		<b>12</b>
A) What is grinding? Explain various types of grinding wheels with suitable sketch.	Apply	6
B) Explain Design Consideration for Grinding.	Understanding	6
C) What is grinding wheel wear? Explain the mechanisms of wheel wear.	Apply	6
<b>Q.2 Solve Any Two of the following.</b>		<b>12</b>
A) Explain Merchant's Circle Diagram.	Apply	6
B) Describe various angles of single point cutting tool showing angles on figure.	Understanding	6
C) Differentiate between Orthogonal and Oblique Cutting.	Analyze	6
<b>Q.3 Solve Any Two of the following.</b>		<b>12</b>
A) What is meant by tool life? Which factors affects tool life?	Apply	6
B) Write short notes on – ( i ) Cubic Boron ( ii ) Nitride Coated Tools	Remember	6
C) Explain properties and types of cutting fluid.	Remember	6
<b>Q.4 Solve Any Two of the following.</b>		<b>12</b>
A) State limitations and advantage of Powder Metallurgy process.	Apply	6
B) What is sintering? Explain three stages of sintering.	Understanding	6
C) Explain mechanical method of powder production.	Apply	6
<b>Q.5 Solve Any Two of the following.</b>		<b>12</b>
A) Discuss some of the defects that can occur in plastic injection molding.	Evaluate	6
B) What are the different strengthening techniques of glass? Explain any 2 in details	Apply	6
C) What is (a) Parison, (b) Plastisol, and (c) Prepreg?	Understanding	6

**\*\*\* End \*\*\***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Summer Examination – 2023

Course: B. Tech.

Branch: Computer Engineering

Semester: IV

Subject Code & Name: BTCOC402 Operating System

Max Marks: 60

Date: 15.07.2023

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level)	Marks
<b>Q.1 Solve Any Two of the following.</b>		<b>12</b>
A) Describe memory layout of multiprogramming operating system. State its advantages.	Understand	6
B) Discuss design goals, policies and implementation of a typical operating system.	Understand	6
C) Explain Virtual Machine (VM) based structure of operating system.	Remember	6
<b>Q.2 Solve Any Two of the following.</b>		<b>12</b>
A) Describe the contents of Process Control Block (PCB).	Remember	6
B) Explain the role of long term, short term and middle term scheduler in process scheduling.	Analyze	6
C) Consider the following set of processes to be executing on uniprocessor system.	Apply	6

Processes	AT	BT
A	0	3
B	2	6
C	4	4
D	7	2

Draw the Gantt Chart and calculate average turnaround time and average waiting time for

- i) SJF Non-preemptive
- ii) SJF Preemptive

<b>Q.3 Solve Any One of the following.</b>		<b>12</b>
A) Explain the use of Resource Allocation Graph (RAG) in deadlock detection.	Analyze	6
B) Write a pseudocode of Swap instruction used for process synchronization.	Understand	6
C) Examine banker's algorithm for following snapshot of the system, there are 3 processes, P1, P2 and P3. And 3 resource types, R1, R2 and R3.	Apply	6

There are 12 instances of resource type R1, 11 instances of resource type R2 and 20 instances of resource type R3.



At time T<sub>0</sub>, the situation is as follows-

Processes	Allocated Resources			Maximum resources		
	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8
P2	2	0	3	4	3	3
P3	1	2	4	3	4	4

State-

- Contents of matrix Need.
- Is the system in a safe state at T<sub>0</sub>?

**Q.4 Solve Any Two of the following.**

- A) Consider the page reference string-  
4, 7, 6, 1, 7, 6, 1, 2, 7, 2.

Apply

If there is there is three-page frames, calculate page faults for following algorithms-

- FIFO page replacement
- LRU page replacement
- Optimal page replacement

- B) Explain paging mechanism with neat diagram. State the importance of offset in it.

Understand

- C) Discuss the need of page replacement. Differentiate between local and global page replacement.

Analyze

**Q. 5 Solve Any One of the following.**

- A) Explain the concept of file. State various file operations.

Remember

- B) Discuss linked and index disk space allocation methods with neat sketch.

Understand

- C) Write a note on free space management.

Understand

\*\*\* End \*\*\*

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular/Supplementary End Semester Examination – 2023**

**Course: B. Tech.**

**Branch :CSE(AI&DS)/AI&DS**

**Semester :IV**

**Subject Code & Name: (BTHM403)Basic Human Rights**

**Max Marks: 60**

**Date:18/07/2023**

**Duration: 3 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

**Q.1 Solve Any Two of the following.**

**12**

- A) Write short note on American bill of rights.
- B) Write cause and effects of French revolution
- C) State interrelationship between society, religion & culture.

CO1 6  
CO1 6  
CO1 6

**Q.2 Solve Any Two of the following.**

**12**

- A) What is social harmony? How it is maintained in the society
- B) Explain causes of rural poverty.
- C) What is social structure? State its impact on human behavior.

CO2 6  
CO2 6  
CO2 6

**Q.3 Solve Any Two of the following.**

**12**

- A) Define terms state & individual liberty.
- B) Describe freedom & democracy in your word with illustration.
- C) What are the problems faced by migrant worker?

CO3 6  
CO3 6  
CO3 6

**Q.4 Solve Any Two of the following.**

**12**

- A) What are silent feature of Indian constitution?
- B) What are the fundamental duties of Indian citizen?
- C) Illustrate the fundamental rights in the Constitution of India?

CO4 6  
CO4 6  
CO4 6

**Q.5 Solve Any Two of the following.**

**12**

- A) Discuss the Directive Principles of State Policy.
- B) What is difference between constitution and law?
- C) What is UDHR, what are its provisions in India?

CO5 6  
CO5 6  
CO5 6

**\*\*\* End \*\*\***

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Winter Examination – 2022**

**Course: B. Tech.**

**Branch : Computr Engg/ CSE**

**Semester :IV**

**Subject Code & Name: BTES405 Digital Logic Design & Microprocessor**

**Max Marks: 60**

**Date:**

**Duration: 3 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q.1	Solve Any Two of the following.		12
A)	Differentiate between analog vs digital signal.	Analyzing	6
B)	Which gates are known as universal gates? Justify using examples.	Understanding	6
C)	State and prove any two theorems of Boolean algebra.	Applying	6
Q.2	Solve Any Two of the following.		12
A)	How will you implement Full adder circuit? Draw the circuit diagram and derive equation for sum and carry.	Understanding	6
B)	Using K map, simplify Boolean equation for the following logic equation expressed by min terms? $Y=F(A,B,C,D)=\sum m(7,9, 10, 11, 12, 13, 14, 15)$	Applying	6
C)	Differentiate between combinational and sequential logic circuit.	Analyzing	6
Q.3	Solve Any Two of the following.		12
A)	Differentiate between synchronous and asynchronous counter.	Analyzing	6
B)	Explain SR Flip flop in detail.	Understanding	6
C)	Draw and explain serial in serial out shift register in detail.	Understanding	6
Q.4	Solve Any Two of the following.		12
A)	Differentiate in between 8085 & 8086 microprocessors.	Analyzing	6
B)	Draw & explain architecture of DMA controller.	Understanding	6
C)	Draw & explain 8086 block diagram.	Understanding	6
Q.5	Solve Any Two of the following.		12
A)	Classify different instruction set of 8086.	Analyzing	6
B)	Explain different addressing modes of 8086.	Understanding	6
C)	Explain assembly language programming tools.	Understanding	6
*** End ***			



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Summer Examination – 2023**

**Course: SY B.Tech.**

**Branch : Computer Science and Allied Engineering**

**Semester**

**:IV**

**Subject Code & Name: Probability and Statistics**

**BTBSC404**

**Max Marks: 60**

**Date:26/07/2023**

**Duration: 3 Hrs.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks														
Q. 1	Solve Any Two of the following.																
A)	State and Prove "Addition theorem of Probability".	CO1	12														
B)	If A & B are two possible outcomes of a random experiment such that $P(\bar{A}) = 0.6$ , $P(A \cup B) = 0.7$ and $P(B) = k$ , then find value of "k" if (i) A & B are mutually exclusive (ii) A & B are independent		6														
C)	The factory $F_1$ produces 1000 articles, 20 of them being defective; the factory $F_2$ produces 4000 articles, 40 of them being defective and the $F_3$ produces 5000 articles, 50 of them being defective. If one article is chosen from all these articles put in one stockpile and is found to be defective, find the probability that it is from the factory $F_1$ .		6														
Q.2	Solve Any Two of the following.	CO2	12														
A)	A random variable X has the following distribution: <table><tr><td>X:</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>P(X):</td><td>2k</td><td>4k</td><td>6k</td><td>8k</td><td>10k</td><td>12k</td></tr></table> Determine (i) k (ii) $P(X < 4)$ (iii) $P(2 \leq X < 5)$	X:	1	2	3	4	5	6	P(X):	2k	4k	6k	8k	10k	12k		6
X:	1	2	3	4	5	6											
P(X):	2k	4k	6k	8k	10k	12k											
B)	Fit the Binomial Distribution to the following data <table><tr><td>X:</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>F:</td><td>28</td><td>62</td><td>46</td><td>10</td><td>4</td></tr></table>	X:	0	1	2	3	4	F:	28	62	46	10	4		6		
X:	0	1	2	3	4												
F:	28	62	46	10	4												
C)	In a sample of 1000 students, the mean and standard deviation of marks Obtained by the students in a certain test are 14 and 2.5. Assuming the distribution to be normal find the number of students getting marks (i) between 12 and 15, (ii) above 18, (iii) below 8 [Given: For a S.N.V. z area between $z = 0$ to $z = 0.4$ is 0.1554, between $z = 0$ to $z = 0.8$ is 0.2881, that between $z = 0$ to $z = 1.6$ is 0.4452, between $z = 0$ to $z = 2.4$ is 0.4918]		6														
Q. 3	Solve Any Two of the following.	CO3	12														



A)	Define "Karl Pearson's Correlation Coefficient". Also show that $-1 < r < +1$ .																																	
B)	For the following data, <table border="1"><tr><td>X:</td><td>6</td><td>8</td><td>12</td><td>15</td><td>18</td><td>20</td><td>24</td><td>28</td><td>31</td></tr><tr><td>Y:</td><td>10</td><td>12</td><td>15</td><td>15</td><td>18</td><td>25</td><td>22</td><td>26</td><td>28</td></tr></table> Calculate (i) Karl Pearson's coefficient of correlation (ii)Standard Error (S.E) (iii)Probable Error(P.E)										X:	6	8	12	15	18	20	24	28	31	Y:	10	12	15	15	18	25	22	26	28				
X:	6	8	12	15	18	20	24	28	31																									
Y:	10	12	15	15	18	25	22	26	28																									
C)	Obtain Rank Correlation Coefficient ( $\rho$ ), for the following data, <table border="1"><tr><td>X</td><td>68</td><td>64</td><td>75</td><td>50</td><td>64</td><td>80</td><td>75</td><td>40</td><td>55</td><td>64</td></tr><tr><td>Y</td><td>62</td><td>58</td><td>68</td><td>45</td><td>81</td><td>60</td><td>68</td><td>48</td><td>50</td><td>70</td></tr></table>										X	68	64	75	50	64	80	75	40	55	64	Y	62	58	68	45	81	60	68	48	50	70		
X	68	64	75	50	64	80	75	40	55	64																								
Y	62	58	68	45	81	60	68	48	50	70																								
Q.4	Solve Any Two of the following.										CO4	1																						
A)	Obtain the equation of the regression lines form the following data, <table border="1"><tr><td>X</td><td>91</td><td>97</td><td>108</td><td>121</td><td>67</td><td>124</td><td>51</td><td>73</td><td>111</td><td>57</td></tr><tr><td>Y</td><td>71</td><td>75</td><td>69</td><td>97</td><td>70</td><td>91</td><td>39</td><td>61</td><td>80</td><td>47</td></tr></table>										X	91	97	108	121	67	124	51	73	111	57	Y	71	75	69	97	70	91	39	61	80	47		
X	91	97	108	121	67	124	51	73	111	57																								
Y	71	75	69	97	70	91	39	61	80	47																								
B)	At the time of estimation of the regression equations of the two variables x and y ,the following results were obtained : $\bar{x} = 90$ ; $\bar{y} = 70$ ; $n = 10$ ; $\sum x^2 = 6360$ ; $\sum y^2 = 2860$ , $\sum xy = 3900$ , where x and y are the deviations from the respective means. Obtain the equations.																																	
C)	Determine which one of the following is the regression line of y on x; $4x - 5y + 30 = 0$ ; $20x - 9y - 107 = 0$ . Also, find $r_{xy}$ and $\sigma_y$ when $\sigma_x = 3$																																	
Q. 5	Solve Any Two of the following.										CO5	1																						
A)	A coin was tossed 200 times and the head turned up 108 times. Test the hypothesis that the coin is unbiased at 5% level of significance.																																	
B)	A sample of 100 electric bulbs produced by manufacturer A showed a mean life time of 1190 hours and a standard deviation of 90 hours. A sample of 75 bulbs produced by manufacturer B showed a mean life time of 1230 hours with the standard deviation of 120 hours. Is there a difference between the mean life time of two hands is significance i) at 5% level of significance ii) at 1% level of significance																																	
C)	In a city A, 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B, 18.5 of a random sample of 1600 school boys had the same defect. is the difference between the proportion significance?																																	
*** End ***																																		

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## DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Winter Examination – 2022

Course: B. Tech.

Branch : Computer Engineering Semester : II

Subject Code &amp; Name: BTCOC401 Design and Analysis of Algorithms

Max Marks: 60

Date: 13/07/2023

Duration: 3 Hr.

*Instructions to the Students:*

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		12
A)	Write down properties of algorithms.	CO1	6
B)	Explain any three asymptotic notations.	CO2	6
C)	What is max heap? Explain with example.	CO1	6
Q.2	Solve Any Two of the following.		12
A)	Explain Binary Search with its time complexity.	CO2	6
B)	Write down quick sort algorithm with its time complexity.	CO1	6
C)	Explain strassen's matrix multiplication with its performance analysis.	CO2	6
Q. 3	Solve Any Two of the following.		12
A)	Explain four queen problems and draw its state space tree.	CO2	6
B)	What is graph coloring problem? Explain with example.	CO3	6
C)	Differentiate between backtracking and branch and bound.	CO4	6
Q.4	Solve Any Two of the following.		12
A)	What is optimal merge pattern?	CO3	6
B)	Explain Huffman coding with a suitable example.	CO2	6
C)	Solve knapsack problem by greedy method where capacity of knapsack is 15kg, profits of seven object are (P1,P2,P3,P4,P5,P6,P7) (10,5,15,7,6,18,3) and weights (w1,w2,w3,w4,w5,w6,w7)(2,3,5,7,1,4,1).	CO5	6
Q. 5	Solve Any Two of the following.		12
A)	Write down characteristics of dynamic programming.	CO1	6
B)	Explain different applications of dynamic programming.	CO2	6
C)	What is complexity class P?	CO3	6



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE****Summer Examination – 2023****Course: B. Tech.****Branch : Electrical Engg.****Semester :4th****Subject Code & Name: Power System, BTEEC402****Max Marks: 60****Date:****Duration: 3****Hr.****Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
<b>Q. 1</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
<b>A)</b>	<b>Draw the schematic diagram of Thermal power plant and explain function of its main component.</b>	<b>L2/CO1</b>	<b>6</b>
<b>B)</b>	<b>Explain the major equipments used in electrical substation of power plant.</b>	<b>L2/CO1</b>	<b>6</b>
<b>C)</b>	<b>Draw the schematic diagram of Nuclear power plant and Explain function of it's main component.</b>	<b>L2/CO1</b>	<b>6</b>
<b>Q.2</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
<b>A)</b>	<b>Write a short note on transposition of power lines.</b>	<b>L2/CO2</b>	<b>6</b>
<b>B)</b>	<b>Explain the concept of self GMD for evaluating inductance of transmission lines.</b>	<b>L2/CO2</b>	<b>6</b>
<b>C)</b>	<b>Write a short note on Skin Effect, Ferranti Effect, Proximity Effect.</b>	<b>L2/CO2</b>	<b>6</b>
<b>Q. 3</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
<b>A)</b>	<b>Explain various types of conductor.</b>	<b>L1/CO3</b>	<b>6</b>
<b>B)</b>	<b>Discuss the advantage and disadvantages of (i) Pin-type insulators (ii) Suspension type insulators.</b>	<b>L2/CO3</b>	<b>6</b>
<b>C)</b>	<b>Why are insulators used with overhead lines? Discuss the desirable properties of insulators.</b>	<b>L2/CO3</b>	<b>6</b>
<b>Q.4</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
<b>A)</b>	<b>Discuss the terms voltage regulation as applied to transmission line.</b>	<b>L2/CO4</b>	<b>6</b>
<b>B)</b>	<b>Explain different types of medium transmission line.</b>	<b>L2/CO4</b>	<b>6</b>
<b>C)</b>	<b>Explain the classification of lines based on their length of transmission.</b>	<b>L2/CO4</b>	<b>6</b>

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Q. 5	Solve Any Two of the following.		
A)	Write short notes on the following:(i) Distribution Transformers (ii) D.C. distribution.	L2/CO5	
B)	What are the design consideration of distribution system? Explain.	L2/CO5	
C)	What are the advantages and disadvantages of d.c. transmission over a.c. transmission.	L2/CO5	
	*** End ***		

The grid and the borders of the table will be hidden before final printing.

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE****Summer Examination – 2023****Course: B. Tech.****Branch :Electrical****Semester :IV****Subject Code & Name: BTEEC403****Subject: Electrical Machine-II****Max Marks: 60****Date:18/07/2023****Duration: 3 Hr.****Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q.1	Solve Any Two of the following.	CO1	12
A)	Explain the principal operation of 3-phase induction Motor.	CO1	6
B)	With neat sketches discuss the construction of synchronous Motor.	CO1	6
C)	Discuss a brief note on Construction of 3- phase induction Motor.		6
Q.2	Solve Any Two of the following.		12
A)	Define the following terms 1. Conductor 2. Coil 3. Turns	CO2	6
B)	Explain Full pitch winding and short pitch winding with the help of Diagram.	CO2	6
C)	What is pitch factor or a coil span factor (Kp or Kc)	CO2	6
Q.3	Solve Any Two of the following.		12
A)	State the necessity of parallel operation of an alternator. List the condition For parallel operation.	CO3	6
B)	Draw the Equivalent circuit and phasor diagram of a synchronous generator.	CO3	6
C)	A 3-phase, 1500 KVA star connected 50 hz 2300 V alternator has a resistance per phase of $0.12 \Omega$ . A field current of 70 A produces a short circuit current equal to full load current of 376 A in each line . The same field current produces an emf of 700 V on open circuit. Determine the Synchronous reactance and its full load regulation at a 0.8 P.F lagging.	CO3	6
Q.4	Solve Any Two of the following.		12





A)	Explain why 3-phase Induction motor never runs at synchronous Speed.	CO4	6
B)	Explain in brief production of rotating magnetic field in 3-phase induction motor.	CO4	6
C)	A 746 kw, 3-phase, 50 hz, 6 pole induction motor has a rotor impedance of $(0.02+j 0.15) \Omega$ at standstill . Full load torque is obtained at 360rpm. Calculate 1. The ratio of maximum to full load torque. 2. The speed at maximum torque. 3. Rotor resistance to be added to get maximum starting torque.	CO4	6
			12
Q. 5	Solve Any Two of the following.	CO5	6
A)	Explain the phenomenon of Double field revolving theory.	CO5	6
B)	Draw the circuit diagram of shaded pole motor and explain its working.	CO5	6
C)	Demonstrate the principle of operation and application of Permanent magnet motor.	CO5	6
*** End ***			

<b>DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE</b> <b>Regular &amp; Supplementary Summer Examination – 2023</b> <b>Course: B. Tech.</b> <b>Semester : IV</b> <b>Subject Code &amp; Name: Analog &amp; Digital Electronics (BTBS404)</b> <b>Max Marks: 60</b> <b>Branch : Electrical Engineering</b> <b>Date: 26/07/23</b> <b>Duration: 3 Hr.</b>			
<b>Instructions to the Students:</b> 1. All the questions are compulsory. 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question. 3. Use of non-programmable scientific calculators is allowed. 4. Assume suitable data wherever necessary and mention it clearly.			
<b>Q. 1</b>	<b>Solve Any Two of the following.</b>	<b>(Level/CO)</b>	<b>Marks</b>
A)	Explain the h-parameter model of CE amplifier & state the typical values of h-parameter for the same.	CO1	12 6
B)	Draw two stage RC coupled amplifier explain its working?	CO1	6
C)	How transistor its used as an amplifier. Prove it?	CO1	6
<b>Q.2</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Draw and explain the differential amplifier with three OP-AMP ?	CO2	6
B)	Draw & explain the voltage follower using OP-AMP?	CO2	6
C)	State the De-Morgan's first & second theorem prove it?	CO3	6
<b>Q. 3</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Convert the following decimal number into binary, octal, hexadecimal and BCD equivalent $(120)_{10}$ ?	CO3	6
B)	With sketch realize the expression $Y = AB + CD$ by 1. NAND Gate only 2. NOR Gate only	CO3	6
C)	Perform following BCD subtraction using 10's complement method. 3. $(28)_{10} - (16)_{10}$ 4. $(12)_{10} - (32)_{10}$	CO3	6
<b>Q.4</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Draw the circuit of a TTL NAND gate and explain its working?	CO4	6
B)	Draw the divide by 7 asynchronous UP counter using T flip-flop. Write truth table draw the timing diagram?	CO4	6

C)	Draw the block diagram & circuit of SIPO shift register and explain its working.	CO4	6
Q. 5	Solve Any Two of the following.		12
A)	Minimize the following expression and realize using basic gates $Y = \sum m (0,2,5,6,7,8,10,13,15)$	CO5	6
B)	State working principle of de-multiplexer. Explain 1 to 8 line demultiplexer with a neat diagram.?	CO5	6
C)	Draw a block diagram of full adder. Write a truth table. Draw logic diagram of it?	CO5	6
*** End ***			

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**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

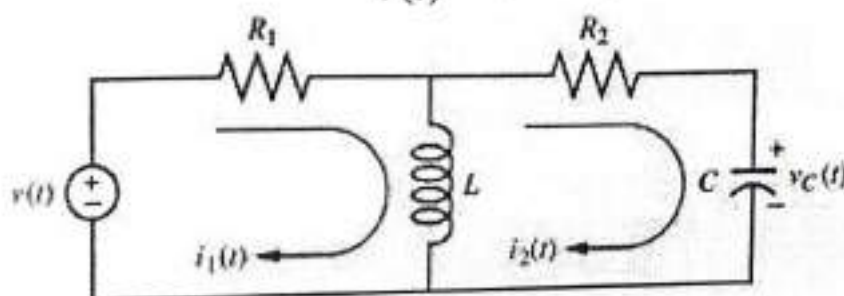
**Q.1 Solve Any Two of the following.**

A) Define sensitivity? Explain the effect of feedback gain on sensitivity.

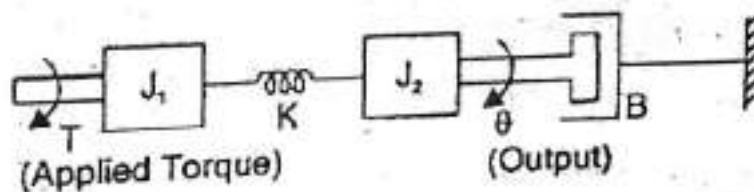
(Level/  
CO)

Marks

B) Obtain transfer function  $\frac{I_2(s)}{V(s)}$  of given system.

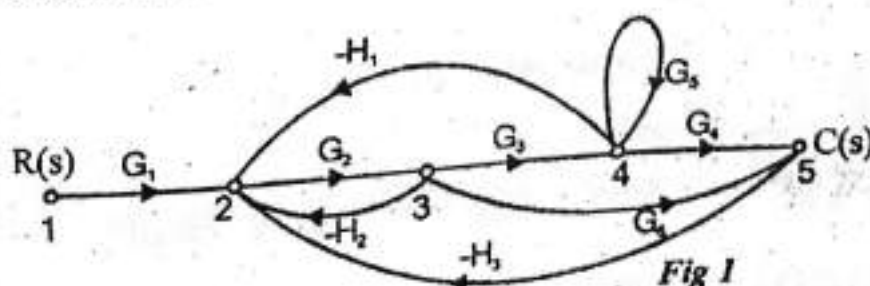


C) Obtain Transfer Function of given mechanical rotational system



**Q.2 Solve Any Two of the following.**

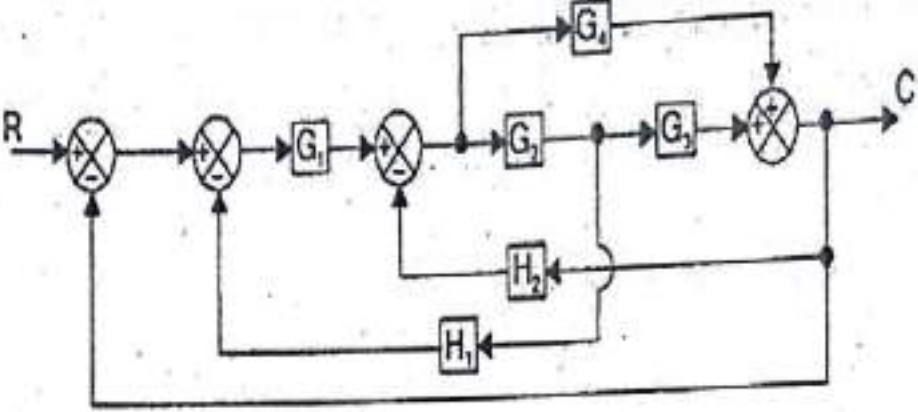
A) Determine transfer function using signal flow graph.



B) Explain open loop system and closed loop control system with example.

L2

6

C)	<p>Obtain transfer function of given system.</p> 	L2	6
<b>Q. 3 Solve Any Two of the following.</b>			12
A)	Define order and Type of the system? Explain response of first order system for unit step input.	L3	6
B)	<p>Find the steady state error for unit step, unit ramp and unit acceleration inputs for the following systems.</p> $TF = \frac{10}{S(0.1S + 1)(0.5S + 1)}$	L1	6
C)	<p>Determine delay time, rise time, peak time, settling time and maximum overshoot of the given system</p> $TF = \frac{10}{(S + 2)(S + 5)}$	L2	6
<b>Q.4 Solve Any Two of the following.</b>			12
A)	Explain PI Controller and PD Controller with its advantages and disadvantages.	L1	6
B)	<p>Sketch bode plot of given equation and determine phase margin and gain margin.</p> $G(S) = \frac{75(1 + 0.2 S)}{S(S^2 + 16 S + 100)}$	L3	6
C)	<p>Determine stability of given characteristics equation using Routh array Criterion.</p> $Characterstics eq = S^4 + 8S^3 + 18S^2 + 16 S + 5 = 0$	L3	6
<b>Q. 5 Solve Any Two of the following.</b>			12
A)	<p>Sketch root locus of given open loop transfer function.</p> $G(S) = \frac{K}{S(S^2 + 4S + 13)}$	L3	6

B)	Derive expression for transfer function equation using state space equation formula.	L2	6
C)	<p>Verify controllability and observability of control system which is represented in state space model.</p> $\dot{x} = \begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & -1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} [u]$ $Y = [0 \quad 1] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$	L3	6
*** End ***			



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular/Supplementary Summer – 2023**

**Course: B. Tech.**

**Subject Code & Name:**

**Branch :**

**Semester :**

**Max Marks: 60**

**Date:**

**Duration: 3 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
<b>Q.1</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	What are the considerations to be made while designing a electrical machines?	CO1	6
B)	Explain different types of Electrical Engineering Materials	CO1	6
C)	Explain important properties of Insulating materials.	CO1	6
<b>Q.2</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Describe the functions of motor starter.	CO2	6
B)	Classify the insulating material on the basis of their permissible temperature rise.	CO2	6
C)	Explain standard Rating of Electrical Machines.	CO2	6
<b>Q.3</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Describe Design of Squirrel cage Rotor.	CO4	6
B)	Explain the factors on which selection of rotor slots depends.	CO4	6
C)	Derive output equations of Induction motors.	CO3	6
<b>Q.4</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	What are the different types of leakage fluxes in an induction motor also mentioned the derivation based on.	CO3	6
B)	What are the cooling methods of transformer describe in detail.	CO5	6
C)	Drive the relationship between mechanical overload ratio and heating overload ratio.	CO5	6
<b>Q.5</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Compare between Distribution Transformer and Power Transformer	CO6	6
B)	Derive Output Equation of Transformer	CO6	6
C)	Calculate approximate overall dimensions for a 200 KVA, 6600/440 volt, 50 Hz, 3ph core type transformer. The following data may be assume, emf per turn=10V, Max. flux density=1.3 wb/m <sup>2</sup> , Current density=0.5 amp/mm <sup>2</sup> , window space factor=0.3, Overall height=overall width, stacking factor 0.9. use a 3 stepped core. For a 3 stepped core width of largest stamping=0.9D and net iron are =0.6d <sup>2</sup> where D is the diameter of circum scrabing circle.	CO6	6
<b>*** End ***</b>			

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**ESE July 2023**

**Subject Name:** Signals & Systems.  
**Date :-** 22/07/2023

**Course:** S.Y (Electrical Engg) (Sem-II)

**Subject Code:** BTEEPE405B

**Time :-** 2.00 am - 5.00pm.

**Max. Marks:** 60

**Instructions to students :**

1. All questions are compulsory
2. Write all the answers with neat labelled diagram.
3. Figures to the right indicates full marks

		(CO/BL)	Marks
<b>Q.1</b>	<b>Solve any two of the following.</b>		
(A)	Define & sketch the following signals?  i) DT Unit impulse signal ii) DT Exponential growing signal iii) CT Unit Step signal	6*2 =	12
		CO1/BL3	
(B)	Check the following signal for periodicity? If periodic, compute fundamental period?  $x(n) = \sin(4\pi n/3)$	CO1/BL4	
(C)	Check the following signal is energy or power signal ?  $x(t) = (e^{-3t}) * u(t)$	CO1/BL4	
<b>Q. 2</b>	<b>Solve any two of the following.</b>	6*2 =	12
(A)	State the properties of discrete time system?	CO1/BL2	
(B)	What is stability of the system? Check the following DT system for stability?  $h(n) = (1/2)^n u(n)$	CO1/BL4	
(C)	Check the following systems for linearity, Causality and time invariance?  $y(t) = t * x(t)$	CO1/BL4	
<b>Q. 3</b>	<b>Solve any two of the following.</b>	6*2 =	12
(A)	Obtain the convolution integral of the following two CT signals?  $x(t) = 2, \text{ for } -2 \leq t \leq 2;$ $= 0, \text{ elsewhere}$  $h(t) = 4, \text{ for } 0 \leq t \leq 2;$ $= 0, \text{ elsewhere}$	CO3/BL3	
(B)	Obtain the convolution Sum of the following two DT sequences?  $x(n) = u(n);$ $h(n) = (0.5)^n * u(n)$	CO3/BL3	
(C)	Obtain the transfer function of the system described by the differential equation as  $d^2y(t)/dt^2 + 3dy(t)/dt + 5y(t) = dx(t)/dt$ Realize the system by using integrators in direct form I.	CO2/BL3	

		6*2 =	12
<b>Q. 4</b>	<b>Solve any two of the following.</b>	<b>CO2/BL3</b>	
(A)	Find the Laplace transform of the following signal? $x(t) = \sin \omega t \cdot u(t)$		
(B)	Find the inverse Laplace transform of the following? $X(s) = 2/S \cdot (S+1) \cdot (S+2)^2$	<b>CO2/BL3</b>	
(C)	Find the Z transform of the following and state the region of convergence? i) $x(n) = a^n$ , for $0 \leq n \leq N-1$ $= 0$ , elsewhere ii) $x(n) = \{3 \ 2 \ 1 \ 5 \ 3 \ 4 \ 1 \ 2\}$ , index n is from -2 to 6	<b>CO2/BL3</b>	
		6*2 =	12
<b>Q. 5</b>	<b>Solve any two of the following.</b>	<b>CO4/BL2</b>	
(A)	State and explain the sampling theorem? Explain the effect of under sampling on reconstruction of original signal from its samples?		
(B)	The analog signal x(t) is given as $x(t) = 5 \cdot \cos(50 \cdot \pi \cdot t) + 2 \cdot \sin(300 \cdot \pi \cdot t)$ The signal x(t) is sampled at the rate of 200 samples/sec. Find i) Nyquist Sampling rate ii) Folding frequency iii) Resulting discrete time signal	<b>CO4/BL3</b>	
(C)	i) Find the Discrete Fourier Transform (DFT) of the following signal? $x(n) = \{0 \ 1 \ 2 \ 3\}$ ii) Find the DiscreteTimeFourier Transform (DTFT) of the following signal ? $x(n) = (0.5)^n \cdot u(n) + (2)^n \cdot u(-n-1)$	<b>CO2/BL3</b>	

**\*END\***



DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,  
LONERE- RAIGAD-402 103  
Semester Examination Winter-2022

Branch: Electrical Engg

Sem.: - 2nd

Subject with Subject Code:- Power System Operation and Control (BTEEC701) Marks: 60

Date:-

Time:- 3Hr.

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagrammatic., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

(Marks)

Q.1(a). Define

a) Plant use factor. b) Maximum Demand c) Spinning Reserve

(06)

b) State any two necessities to put alternators in parallel ?

(06)

Q.2. a) What are the assumptions made in dynamic response of uncontrolled case ? (06)

b) Where are synchronous condensers installed ?

(06)

Q.3. a) Define the following terms.?

(a) Hot Reserve.

(b) Cold Reserve.

(c) Spinning Reserve.

(d) State Estimation

(06)

Q.4. a) What is the function of load frequency control ?

(06)

b) What is meant by FLAC ?

(06)

Q.5. a) What are the function of SCADA ?

b) What are the various functions of Excitation system?

(06)

(06)

Q.6. Solve any four of the following:

a) State any two necessities to put alternators in parallel?

(4x3)

b) Where are synchronous condensers installed ?

(06)

c) What are the different type of static VAR compensators?

d) Define restorative state?

e) What are the objectives of automatic generation control ?



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Summer Examination – 2023**

Course: B. Tech.      Branch : E&TC/ ECE / Electronics Engineering

Subject Code & Name: Signal & System (BTETC402/BTEXC402)      Semester : IV

Max Marks: 60

Date:15/07/2023

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
<b>Q.1 Solve Any Two of the following.</b>		<b>12</b>
A) Sketch the following signal	CO 01	6
i) $x(t) = 3 * r(t) - 3 * u(t-3)$		
ii) $x[n] = \delta[n] + \frac{1}{2}\delta[n-1] + (\frac{1}{2})^2\delta[n-2] + (\frac{1}{2})^3\delta[n-3]$		
B) Derive the expression for relationship between input and output of LTI system in time domain	CO 02	6
C) Determine if the following systems are time-invariant, linear, causal	CO 01	6
i) $Y(t) = t * (X(t))$		
ii) $Y[n] = X[n] + n * X[n+1]$		
<b>Q.2 Solve Any Two of the following.</b>		<b>12</b>
A) Explain the Even and odd signal with example. Also show that sum of even part and odd part of signal is equal to original signal.	CO 01	6
B) Prove the following statements : i) The convolution of an odd and even function is odd. ii) The convolution of an even and even function is even. iii) The convolution of an odd and odd function is odd.	CO 02	6
C) Find the Fourier series coefficients $C_k$ for the signal $x(t) = (1/2) + (1/3) * \cos(t) + (1/2) * \cos(2t)$ Also find the FSC of following    i) $X(-t)$ ii) $X(t/2)$ iii) $x(t-2)$	CO 03,04	6
<b>Q.3 Solve Any Two of the following.</b>		<b>12</b>
A) Let $x(n) = \delta(n+2) - \delta(n+1) + 2 * \delta(n) - \delta(n-1) - \delta(n-2)$ with discrete time Fourier transform $X(e^{j\omega})$ . Evaluate the following functions of $X(e^{j\omega})$ without computing the transform itself: (i) $X(e^{j0})$ (ii) $X(e^{j\pi})$ (iii) $\int_{-\pi}^{\pi} X(e^{j\omega}) d\omega$ (iv) $X(e^{j\pi})$ (v) Magnitude and phase of $X(e^{j\omega})$	CO 03	6

- B) If  $X(e^{j\omega})$  is the Fourier Transform of a real sequence  $x[n]$  then, show the following: CO 03 6
- (i)  $X(e^{j\omega})$  is conjugate symmetric
  - (ii) phase of  $X(e^{j\omega})$  is anti-symmetric and Phase Spectrum is odd function
  - (iii) magnitude of  $X(e^{j\omega})$  is symmetric and Magnitude Spectrum is even function
- C) Find Laplace transform of function:  $f(t) = 4t^2 - 3\cos t + 5e^{-t}$  with  $0 \leq t < \infty$ : CO 04 6

**Q.4 Solve Any Two of the following.**

- A) Perform the inverse Laplace transform of the following expression: CO 04 12  
 $F(s) = (3s + 7) / (s^2 - 2s - 3)$  6
- B) Determine the z transform and ROC for the signal CO 04  
 $x[n] = [3(2^n) - 4(3^n)] \cdot u(n)$
- C) Find Fourier transform of signal  $x(t) = e^{at} \cdot u(-t)$  Also draw Amplitude and Phase Spectrum. CO 03 6

**Q.5 Solve Any Two of the following.**

- A) Prove that energy in Continuous Domain and Energy in Fourier Domain remains Unchanged CO 03 12 6
- B) Compute the inverse z-transform of signal  $x(z) = (z+2) / (2z^2 - 7z + 3)$  if ROCs are CO 04 6  
 i)  $|z| > 3$  ii)  $|z| < 1/2$  iii)  $1/2 < |z| < 3$
- C) Determine the DTFS of  $x[n] = \{1, 2, 1, 0\}$  with period  $N=4$ . CO 03,04 6



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

Summer Examination – 2023

Course: B. Tech.

Branch : E & TC Engineering

Semester : IV

Subject Code & Name: Electromagnetic Field Theory (BTEEPE405A)

Max Marks: 60

Date: 22/07/2023

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		12
A)	Derive expression for electric field intensity due line charge using gauss law.	Understand	6
B)	State and prove divergence theorem.	Understand	6
C)	The electric flux density inside the sphere $r \leq 5\text{m}$ is given as $10r^3 \hat{a}_r$ C/m <sup>2</sup> then, (i) What is the volume charge density at $r = 4\text{ m}$ ? (ii) What is the electric flux density at $r = 4\text{ m}$ ? (iii) How much the electric flux leaves the sphere $r = 4\text{ m}$ ? (iv) How much charge is contained within the sphere $r = 4\text{ m}$ ?	Understand	6
Q.2	Solve Any Two of the following.		12
A)	Derive the boundary condition at an interface between two magnetic medium?	Understand	6
B)	State and explain the ampere's circuital law.?	Understand	6
C)	If cylindrical conductor having radius $\rho = 6\text{ mm}$ with negligible thickness forms the inner conductor of a co-axial line. The outer conductor has radius $15\text{ mm}$ . This cylinder carries equal and opposite total current $50\text{ A}$ . so determine magnitude of force acting to split outer cylinder apart longitudinally.	Understand	6
Q. 3	Solve Any Two of the following.		12
A)	Write down Maxwell's equation for time varying fields.	Understand	6

B)	Find the displacement and conduction current density of a material for which $\sigma = 10 \text{ mho/m}$ and $\epsilon_r = 1$ , the electric field intensity is, $E = 400 \sin (20 \times 10^9 - 0.64x) a_x \text{ v/m}$ .	Understand	6
C)	State and prove pointing theorem and interpret them.	Understand	6
Q.4	Solve Any Two of the following.		12
A)	Write a short on : (i) Reflection coefficient (ii) VSWR	Understand	6
B)	Explain the input impedance of short-and open-circuited line?	Understand	6
C)	A transmission line cable has following primary constants. $R=78\Omega/\text{km}$ $G= 62\mu \text{ moh/km}$ . $L= 1.75\text{mH/km}$ and $C=0.0955\text{v}\mu\text{F/km}$ .vi. At a signal of 1 kHz, calculate i. characteristic impedance ii. attenuation constant iii. Phase constant iv. wavelength v. velocity of signal in km/ sec. vi. Time taken by signal to travel 200 km along line	Understand	6
Q. 5	Solve Any Two of the following.		12
A)	Define the following term with mathematical expression i. intrinsic impedance ii. depth of penetration iii. velocity of propagation	Understand	6
B)	State and explain the Snell's law		
C)	Comparison of circuit theory at low and field at high frequency	Understand	6
	*** End ***	Understand	6

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**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Summer Examination – 2023**

**Course: B. Tech.      Branch: Electronics and Tele-communication Engineering      Semester: IV**

**Subject Code & Name: BTETPE405E Python Programming**

**Max Marks: 60**

**Date: 22/07/2023**

**Duration: 3 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
<b>Q. 1 Solve Any Two of the following.</b>		<b>12</b>
A) Who is the creator of Python, and in which year was it first introduced? What are some key features of Python that make it a popular programming language?	CO01	6
B) What is a REPL, and how does it work in Python programming? How do you access REPL?	CO01	6
C) What are keywords in Python, and why are they significant in programming? Give a few examples of Python keywords and explain their purposes. Can you use keywords as variable names in Python? Explain why or why not.	CO01	6
<b>Q. 2 Solve Any Two of the following.</b>		<b>12</b>
A) Write a Python program to Convert Decimal to Binary Using Recursion	CO02	6
B) Explain in detail with example (a) Arithmetic Operator and (b) Comparison Operator.	CO01	6
C) Explain the concept of sets in Python and provide examples of set operations such as union, intersection, and difference.	CO01	6
<b>Q. 3 Solve Any Two of the following.</b>		<b>12</b>
A) Explain (with appropriate example(s)) the concept of variable scope in Python functions and how it determines the accessibility of variables.	CO01	6
B) Define fruitful functions in Python and explain their role in returning values to the caller.	CO01/02	6
C) A cashier has currency notes of denominations 10, 50, 100 and 200. If the amount to be withdrawn is input through the keyboard, write a program to find the minimum number of total currency notes of each denomination the cashier will have to give to the withdrawer.	CO02	6



<b>Q.4</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	What is a class in Python, and how does it act as a blueprint for creating objects with similar attributes and behaviors? Explain the significance of the self-variable in class methods and how it refers to the instance of the class.	<b>CO01/02</b>	<b>6</b>
B)	Define inheritance in object-oriented programming and explain (with example) how it allows a class (subclass) to inherit attributes and behaviors from another class (superclass).	<b>CO01/02</b>	<b>6</b>
C)	What is exception handling in Python, and how is it achieved using the try-except block (with example)?	<b>CO01/02</b>	<b>6</b>
<b>Q. 5</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Explain the concept of multithreading in Python and its role in achieving concurrent execution of tasks.	<b>CO03</b>	<b>6</b>
B)	What is Turtle Graphics in Python? Explain how to draw basic shapes, such as lines, squares, circles, and triangles, using Turtle Graphics in Python.	<b>CO03</b>	<b>6</b>
C)	Write a python program to check if a number is prime or not. (Use a flag variable)	<b>CO02</b>	<b>6</b>

**\*\*\* End \*\*\***

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Regular & Supplementary Semester Examination – Summer 2023**

**Course: B. Tech.**

**Branch : E&TC and allied**

**Semester :IV**

**Subject Code & Name: BTBS 404/ Probability Theory and Random Processes**

**Max Marks: 60**

**Date:26/07/2023**

**Duration: 3 Hr.**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks														
<b>Q. 1</b>	<b>Solve Any Two of the following.</b>		<b>12</b>														
<b>A)</b>	For a certain binary communication channel probability that transmitted '0' received as '0' is 0.95 and probability that transmitted '1' received as '1' is 0.9. if probability that '0' transmitted is 0.4. Find the probability that 1) A '1' is received  2) A '1' is transmitted given that '1' was received.	L2/CO1	6														
<b>B)</b>	State and explain Theorem of Total Probability. Also state Bayes' Theorem.	L1/CO1	6														
<b>C)</b>	From 6 positive and 8 negative numbers. 4 numbers are chosen at random (without replacement). What is the probability that product is positive.	L2/CO1	6														
<b>Q.2</b>	<b>Solve Any Two of the following.</b>		<b>12</b>														
<b>A)</b>	What are PDF and CDF. State and explain properties of CDF	L1/CO2	6														
<b>B)</b>	Suppose the density function of X& Y is given by $F(x,y) = 6xy(2-x-y) \quad 0 < x < 1, \quad 0 < y < 1$ $= 0 \text{ otherwise}$ Compute condition expectation of X given that Y=y where $0 < y < 1$ .	L2/CO2	6														
<b>C)</b>	Calculate the correlation coefficient between X& Y from following data <table border="1" style="margin: 10px auto;"> <tr> <td>X</td> <td>10</td> <td>14</td> <td>18</td> <td>22</td> <td>26</td> <td>30</td> </tr> <tr> <td>Y</td> <td>18</td> <td>12</td> <td>24</td> <td>6</td> <td>30</td> <td>36</td> </tr> </table>	X	10	14	18	22	26	30	Y	18	12	24	6	30	36	L2/CO2	6
X	10	14	18	22	26	30											
Y	18	12	24	6	30	36											
<b>Q. 3</b>	<b>Solve Any Two of the following.</b>		<b>12</b>														
<b>A)</b>	State and prove Tchebycheff Inequality.	L1/CO3	6														
<b>B)</b>	Bus arrived at a specific stop at 15 min interval starting from 7AM. That is they arrive at 7, 7.15, 7.30, 7.45 and so on. If passenger arrives at a stop at random time that is uniformly distributed between 7 and 7.30 AM Find the probability that he waits a) Less than 5 mins for a bus	L2/CO3	6														

	b) At least 12 mins for the bus		
C)	State and Explain properties of Covariance matrix	L1/CO3	6
Q.4	Solve Any Two of the following.		12
A)	Explain in detail with proof central limit theorem	L1/CO4	6
B)	Distinguish between WLLN and SLLN in detail.	L1/CO4	6
C)	How to determine convergence in Probability. Elaborate in brief	L1/CO4	6
Q. 5	Solve Any Two of the following.		12
A)	<p>A random process is given by</p> $X(t) = A \cos w_0 t + B \sin w_0 t$ <p>Where <math>w_0</math> is constant, A &amp; B are independent random variables having values -1 and 2 with probabilities 2/3 and 1/3 respectively. Find mean and auto-correlation function.</p>	L2/CO5	6
B)	Explain in brief Strict Sense Stationary process (SSS) and Wide Sense Stationary (SSS) Process	L1/CO5	6
C)	Explain power spectral density function with its properties.	L1/CO5	6
	*** End ***		



**Instructions to the Students:**

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3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

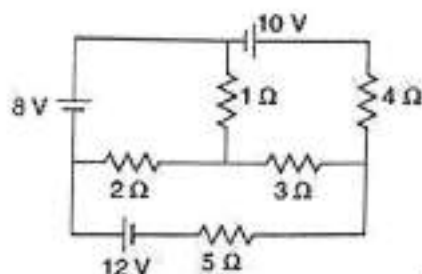
**Q.1 Solve Any Two of the following.**

12

- A) State Kirchhoff's laws and Determine the current through the  $5\ \Omega$  resistor of the network shown

CO1

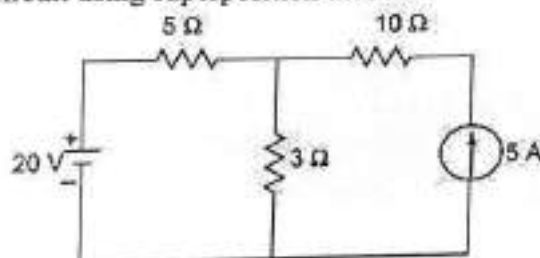
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- B) State superposition theorem and find the current passing through the  $3\ \Omega$  resistor in the circuit using superposition theorem.

CO1

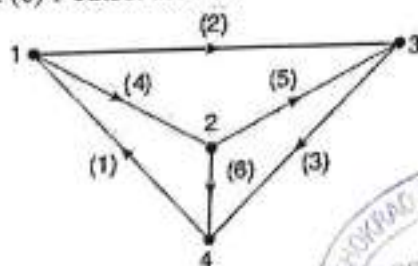
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- C) The graph of a network is shown in Fig. Write the (a) incidence matrix, (b) tieset matrix, and (c) f-cutset matrix.

CO1

6



**Q.2 Solve Any Two of the following.**

12

- A) What are initial conditions? Explain the initial conditions for Resistor, capacitor and inductor

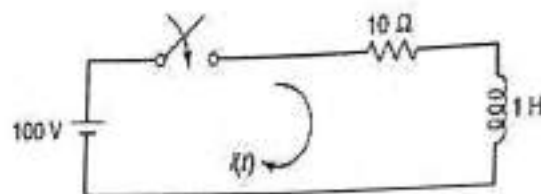
CO1, CO3

6

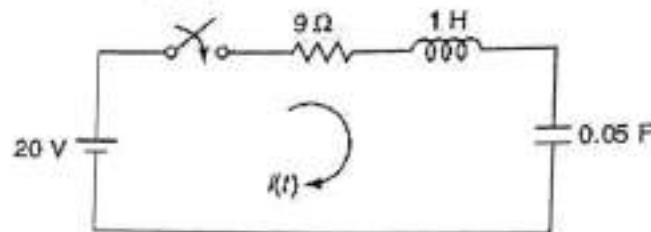
- B) In the given network of Fig., the switch is closed at  $t = 0$ . With zero current in the inductor, find  $i$ ,  $di/dt$  and  $d^2 i/dt^2$  at  $t = 0^+$ .

CO1, CO3

6

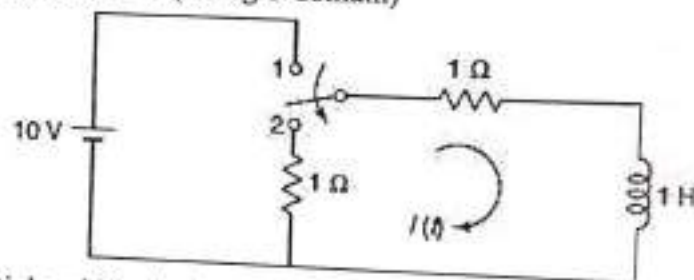


- C) In the network of Fig. shown, the switch is closed at  $t = 0+$ . Obtain the expression for current  $i(t)$  (use time domain approach) CO1, CO3 6



**Q.3 Solve Any Two of the following.**

- A) In the network of Fig. 7.12, the switch is moved from the position 1 to 2 at  $t = 0$ , steady-state condition having been established in the position 1. Determine  $i(t)$  for  $t > 0$  (Using S-domain) CO1 12 6



- B) To find Initial and Final values if they exist of the signal with L.T. CO1 6

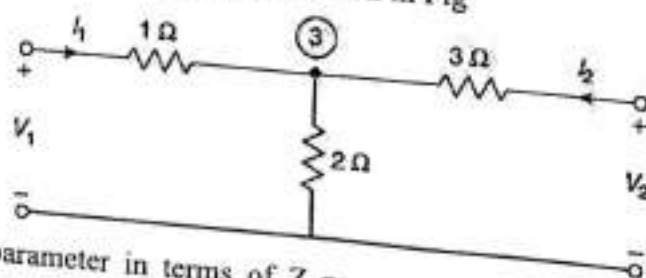
(a)  $F(s) = \frac{7s^2 + 63s + 134}{(s+3)(s+4)(s+5)}$  (b)  $F(s) = \frac{4s^2 + 7s + 1}{s(s+1)^2}$

(c)  $F(s) = \frac{40}{(s^2 + 4s + 5)^2}$

- C) Find Laplace Transform of various standard time domain functions CO1 6

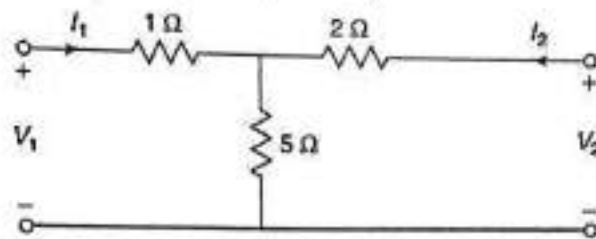
**Q.4 Solve Any Two of the following.**

- A) Define the terms: Driving-point Impedance Function, Driving-point Admittance Function CO1, CO4 12 6  
Find Y-parameters for the network shown in Fig



- B) Derive h-parameter in terms of Z parameter, Y-parameter and ABCD parameter CO1, CO4 6

- C) Find the transmission or general circuit parameters for the circuit shown in Fig. Comment on reciprocity and symmetry CO1, CO4 6



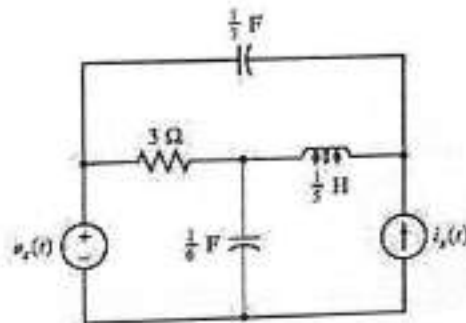
Q. 5 Solve Any Two of the following. 12

- A) Explain about classification of filters. Draw the characteristics of Low-pass and High-pass filters. CO1, CO3 6

- B) Realise the following function in Foster-I and Foster-II forms CO1, CO3 6

$$Z(s) = \frac{3(s+2)(s+4)}{s(s+3)}$$

- C) Obtain the normal-form equations for the circuit of Fig. shown, a four-node circuit containing two capacitors, one inductor, and two independent sources CO1, CO3 6



\*\*\* End \*\*\*