Hall Ticket Number :

Code: 19A337T

II B.Tech. I Semester Supplementary Examinations June 2024
Fluid Mechanics and Hydraulic Machinery
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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Marks

UNIT–I

1. a) Distinguish between :
   (i) Steady and Unsteady flow (ii) Laminar and Turbulent flow
   (iii)Compressible and Incompressible flow   7M
   b) Define manometer and list out its classification.   7M

OR

2. a) The dynamic viscosity of an oil used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4 m and rotates at 190 r.p.m. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of oil film is 1.5 mm.   7M
   b) Explain the phenomenon of Surface Tension.   7M

UNIT–II

3. a) Derive an expression for rate of flow through orifice meter   7M
   b) An orifice meter with orifice diameter 10cm is inserted in a pipe of 20 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter gives the readings of 19.62 N/cm^2 and 9.81 N/cm^2 respectively. Coefficient of discharge for the orifice metre is given as 0.6. Find the discharge of water through pipe.   7M

OR

4. a) Explain the TEL and HGL with neat sketch.   7M
   b) Explain the minor losses in pipes briefly.   7M

UNIT–III

5. A jet of water having a velocity of 15 m/sec strikes a curved vane which is moving with a velocity of 5 m/sec. The vane symmetrical and is so shaped that the jet is deflected through 120^0. Find the angle of jet at inlet of vane so that there is no shock. What is the absolute velocity of the jet at outlet in magnitude and direction and work done per unit weight of water? Assume the vane to be smooth.   14M

OR

6. Explain the elements of hydroelectric power station with neat sketch.   14M

UNIT–IV

7. a) A turbine is to operate under a head of 25 m at 200 r.p.m. The discharge is 9 cumec. If the efficiency is 90%, determine: i) specific speed of the machine ii) power generated iii) type of turbine.   8M
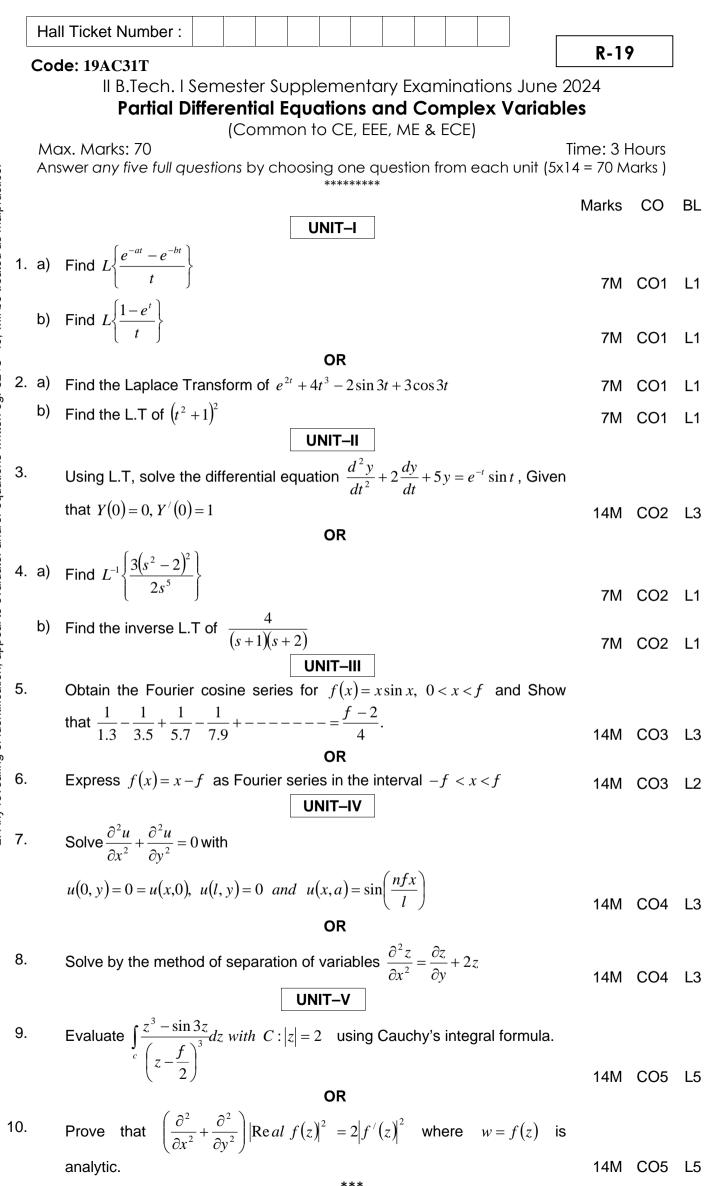   b) Define the various types of efficiencies of hydraulic turbines.   6M

OR

8. a) A Pelton wheel has a mean bucket speed of 10m/sec with a jet water flowing at the rate of 700 liters per second under a head of 30 meters. The bucket deflects the jet at angle of 160^0. Calculate the power given by the water to the runner and the hydraulic efficiency of the turbine. Assume coefficient of velocity as 0.98. 7M

b) Explain the various parts of Kaplan turbine and its working with the neat sketch 7M

UNIT–V

9. a) A single-acting reciprocating pump, running at 50 r.p.m. delivers 0.00736 m^3 /s of water. The diameter of the piston is 200 mm and stroke length 300 mm. The suction and delivery heads are 3.5 m and 11.5 m respectively. Determine: (i) Theoretical discharge, (ii) Co-efficient of discharge, (iii) Percentage slip of the pump, and (iv) Power required to run the pump. 8M

b) Explain about the various losses in the centrifugal pumps. 6M

OR

10. a) Explain the characteristic curves of the centrifugal pumps. 7M

b) Describe the meaning of NPSH and derive an expression for it. 7M

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Code: 19AC31T

II B.Tech. I Semester Supplementary Examinations June 2024
Partial Differential Equations and Complex Variables
(Common to CE, EEE, ME & ECE)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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		Marks	CO	BL

UNIT–I

1. a) Find $L\left\{\dfrac{e^{-at} - e^{-bt}}{t}\right\}$ 7M   CO1   L1

   b) Find $L\left\{\dfrac{1 - e^t}{t}\right\}$ 7M   CO1   L1

OR

2. a) Find the Laplace Transform of $e^{2t} + 4t^3 - 2\sin 3t + 3\cos 3t$ 7M   CO1   L1

   b) Find the L.T of $\left(t^2 + 1\right)^2$ 7M   CO1   L1

UNIT–II

3. Using L.T, solve the differential equation $\dfrac{d^2 y}{dt^2} + 2\dfrac{dy}{dt} + 5y = e^{-t}\sin t$, Given that $Y(0) = 0, Y'(0) = 1$ 14M   CO2   L3

OR

4. a) Find $L^{-1}\left\{\dfrac{3\left(s^2 - 2\right)^2}{2s^5}\right\}$ 7M   CO2   L1

   b) Find the inverse L.T of $\dfrac{4}{(s+1)(s+2)}$ 7M   CO2   L1

UNIT–III

5. Obtain the Fourier cosine series for $f(x) = x\sin x,\ 0 < x < f$ and Show that $\dfrac{1}{1.3} - \dfrac{1}{3.5} + \dfrac{1}{5.7} - \dfrac{1}{7.9} + - - - - - - - = \dfrac{f - 2}{4}$.   14M   CO3   L3

OR

6. Express $f(x) = x - f$ as Fourier series in the interval $-f < x < f$ 14M   CO3   L2

UNIT–IV

7. Solve $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} = 0$ with

$u(0, y) = 0 = u(x, 0),\ u(l, y) = 0\ and\ u(x, a) = \sin\left(\dfrac{nfx}{l}\right)$ 14M   CO4   L3

OR

8. Solve by the method of separation of variables $\dfrac{\partial^2 z}{\partial x^2} = \dfrac{\partial z}{\partial y} + 2z$ 14M   CO4   L3

UNIT–V

9. Evaluate $\displaystyle\int_c \dfrac{z^3 - \sin 3z}{\left(z - \dfrac{f}{2}\right)^3} dz\ with\ C : |z| = 2$ using Cauchy's integral formula.   14M   CO5   L5

OR

10. Prove that $\left(\dfrac{\partial^2}{\partial x^2} + \dfrac{\partial^2}{\partial y^2}\right)\left|\text{Re}al\ f(z)\right|^2 = 2\left|f'(z)\right|^2$ where $w = f(z)$ is analytic.   14M   CO5   L5

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II B.Tech. I Semester Supplementary Examinations June 2024
Switching Theory and Logic Design
(Electrical and Electronics Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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UNIT–I

1. a) Distinguish between weighted and non-weighted codes with examples.
    b) Represent +25 and -25 in sign magnitude, sign 1's complement and sign 2's complement representation.

OR

2. a) Represent the Decimal number 8620 in i) BCD ii) Excess 3 iii) Gray Codes.
    b) Draw the symbols and truth tables of all logic gates and explain.

UNIT–II

3. a) What is the difference between canonical form and standard form? Which form is preferable while implementing a Boolean function with gates?
    b) What is K-map? State advantages and limitations of K-map?

OR

4. a) Implement EX-NOR Gate using only NAND Gates.
    b) Simplify the following Boolean function for minimal SOP form using K-map and implement using NAND gates. $F (W X Y Z) = (1,3,7,11,15) + d(0, 2,5)$

UNIT–III

5. a) Compare Programmable logic devices.
    b) Draw and explain the block diagram of n-bit parallel adder.

OR

6. a) Design 2x4 decoder using NAND gates.
    b) What is encoder? Design octal to binary encoder.

UNIT–IV

7. a) Explain clocked sequential circuits with an example.
    b) Compare Synchronous and asynchronous sequential circuits.

OR

8. a) Explain the operation of twisted ring counter with the help of logic diagram and its timing diagrams.
    b) Explain the operation of D Flip-Flop.

UNIT–V

9. a) Discuss mealy and Moore machine models of sequential machines.
    b) Explain the salient features of ASM chart.

OR

10. a) What are the rules to convert Mealy to Moore model?
    b) List the capabilities and limitations of finite state machines.

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II B.Tech. I Semester Supplementary Examinations June 2024
Electrical Machines – I
(Electrical and Electronics Engineering)

Max. Marks: 70　　　　　　　　　　　　　　　　　　　　Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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		Marks	CO	BL

UNIT–I

| 1. | a) | Discuss any two methods to minimize the effect of armature reaction. | 6M | 1 | 2 |
| | b) | Derive the EMF equation of DC generator. | 8M | 1 | 2 |

OR

| 2. | a) | A 410V, 6-pole D.C. generator as 720 lap wound conductors. It is given a brush lead of 2.5 degrees (Mech.) from the geometric neutral. The current through the armature is 600A. Calculate the cross and demagnetizing turns per pole. | 8M | 1 | 3 |
| | b) | Comment on the use of inter poles and compensating winding in a DC machine | 6M | 1 | 1 |

UNIT–II

| 3. | | Explain the load characteristics of following generator with suitable graphs.
(i) Shunt Generator　　(ii) Series Generator | 14M | 2 | 2 |

OR

| 4. | | What is separately excited DC generator? Discuss its load characteristics with neat diagrams. | 14M | 2 | 1 |

UNIT–III

| 5. | a) | Explain the voltage build-up process in DC shunt generators with neat diagram. | 7M | 3 | 2 |
| | b) | Explain with diagram the brake test on a DC motor. | 7M | 3 | 2 |

OR

| 6. | | What is the necessity of testing DC machines? Describe the method of testing DC Series machines. Bring out the advantages and disadvantages of the test. | 14M | 3 | 2 |

UNIT–IV

| 7. | a) | Explain the effect of variations of frequency and supply voltage on core losses. | 7M | 4 | 2 |
| | b) | Explain the losses that occur in Transformers | 7M | 4 | 1 |

OR

| 8. | | Explain how will you pre determine the efficiency and regulation by conducting OC & SC tests on a single phase transformer with neat circuit diagrams. | 14M | 4 | 2 |

UNIT–V

| 9. | a) | Derive the equation for copper material saving in auto transformer compare to two winding transformer. | 8M | 5 | 2 |
| | b) | Write a short note on tertiary winding. | 6M | 5 | 2 |

OR

| 10. | a) | Outline the necessity for parallel operation of transformers and describe the necessary conditions for parallel operation. | 6M | 5 | 1 |
| | b) | Explain the working principle of Auto transformer with neat diagram. | 8M | 5 | 2 |

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