Code No:14040/BL

FACULTY OF ENGINEERING
B.E. 2/4 (I.T.) I-Semester (Backlog) Examination, October 2021

Subject: Micro Electronics

Time: 2 hours **Max. Marks: 75**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1 Define Min Terms and Max Terms.
2 Demonstrate by means of truth table of identify x + yz = (x + y) (x + z).
3 Define Shannon's theorem.
4 What is advantage of LUT? Give one example.
5 Give the functionally of gated SR latch.
6 Explain about ring counter.
7 Differentiate between Moore and Mearly machines.
8 Define multiplexer.
9 What is dynamic hazards?
10 Define clock skew.

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11 (a)Minimize the following expression using K map into SOP form. Realize them with NAND gates only F(A, B, C, D) = Σm(2, 3, 5, 6, 7, 10, 13, 14)
(b)Find the compliments of f = (x + y′ + z)(x′ + z′)(x + y)

12 (a)With neat block diagram explain the FPGA architecture.
(b) Design and implement a full added using decoder.

13 (a)Explain the operation positive type master Slave edge trigged D flip flop.
(b)Design a 3 bit down counter. Draw the timing diagram.

14 Explain state table reduction and state assignment problem with an example. Assume a suitable state table as required.

15 (a)Explain the operation of a basic SR latch and write its truth table.
(b)Design 4 bit shift register.

16 Explain the ASM chart and data path circuit for "Divider Control Operation".

17 Write notes on the following:
(a) Use of CAD tools in digital design
(b) Differentiae flip flop, Truth table and excitation table

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FACULTY OF ENGINEERING

B.E. (CIVIL) III-Semester (CBCS) (Backlog) Examination, October 2021

Subject: Fluid Mechanics -- I

Time: 2 hours **Max. Marks: 70**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1 Differentiate between fluids and solids.
2 The atmospheric pressure head is _____ of water.
3 Define Stream line, path line and write the equation for streamline.
4 Differentiate between free vortex and forced vortex.
5 What are the forces acting in Navierstoke's equation and Reynold's equation.
6 Differentiate between local acceleration and convective acceleration.
7 Differentiate between large orifice and small orifice.
8 Define velocity of approach. How does the velocity of approach affect the discharge over a weir?
9 Define Mach number and write its significance.
10 What do you mean by Compressibility correction factor?

PART – B

Answer any four questions. **(4x15=60 Marks)**

11 a) Derive an expression for Newton's law of viscosity. Explain the importance of Viscosity in fluid motion. What is the effect of temperature on viscosity of water and that of air?

b) A cubical tank has side of 1.5 m. It contains water for the lower 0.6 m depth. The upper remaining part is filled with oil of specific gravity 0.9. Calculate for one vertical side of the tank i) Total pressure, and ii) Position of the centre of pressure.

12 In 2D incompressible flow show that the flow rate per unit width between two stream lines is equal to the difference between the values of stream function corresponding tothese stream lines.

13 a) Derive Euler's equation of motion in 3D form force potential concept. State the assumptions made.

b) An oil of relative density 0.8 is flowing through a pipe of length 400 m laid on a downward grade of 1 in 100. The rate of flow of oil in the pipe is 1.75 m^3/s. The diameter of the upper end of the pipe is 1.2m and it is 0.6 m at the lower end. (i) If the pressure at the higher end is 80 K Pa. Assume loss of energy between two sections as 0.5 m of oil. (ii) Draw a schematic sketch of the pipeline set up showing clearly the hydraulic gradient line and energy line. Mark salient points of this figure.

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14 a) Differentiate between Venturi meter and Orifice meter. Derive expression for discharge through ventimeter.

b) A 135^0 bend cum reducer has 350 mm at inlet 200 mm at outlet carrying discharge of 0.4 m^3/s of water, the pressure at inlet is 200 KPa. The head loss in the bend can be taken as 2.0 m. the bend is in vertical Z plane and the centre of exit plane is 1.50 m above the centre of inlet section. The amount of water in the bend between the inlet and exit section is estimated as 1.53 liters. Determine the force exerted by the fluid flow on the bend.

15 a) Derive an expression for velocity of sound for an isothermal process and adiabatic process.

b) Air of mass 3 Kg expands from initial state pressure equal to 1000 KPa and temperature 250^0C to a final state of 200 KPa. Find the initial volume, final volume, temperature and the work done in (i) Isothermal and (ii) Isentropic expansion. Take K = 1.4 and R = 287 J/(Kg ^{0}K)

16 a) Explain the phenomenon of capillarity. Obtain an expression for capillary rise and fall of a liquid.

b) The 3 Dimensional incompressible fluid, the velocity components are $u = x^2+z^2+5$; $v = y^2+z^2-3$
(i) Determine the third component of velocity (ii) Is the flow irrotational?

17 a) Differentiate between small orifice and large orifice. Obtain the expression for discharge through large orifice.

b) Define Mach number and explain the Mach cone with neat sketch.

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Code No. 14528/CBCS/BL

FACULTY OF ENGINEERING

B. E. III – Semester (CBCS) (EE/Inst.) (Backlog) Examination, October 2021

Subject: Electro Magnetic Fields

Time: 2 hours **Max. Marks: 70**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1. Name the various coordinate systems.
2. Write the point form of Ohm's law.
3. State the boundary conditions at the interface between two perfect dielectrics.
4. Derive the expression for the capacitance between two parallel plates.
5. Explain Faraday's law of electromagnetic induction.
6. Define Ampere's circuital law.
7. Distinguish between displacement current density and conduction current density.
8. The flux through each turn of a 100 turn coil is (t^3-2t)m Wb, where t is in seconds. Find the induced emf at t=2s.
9. Find the skin depth at frequency of 1.6MHz in aluminium, where σ=38.2 MS/m and $\mu_r=1$.
10. Mention the properties of uniform plane wave.

PART – B

Answer any four questions. **(4x15=60 Marks)**

11. (a) State and explain Gauss's law for electrostatic fields.

    (b) Verify the potential field $V=2x^2-3y^2+z^2$ satisfy Laplace's equation.

12. (a) What is Dipole? Derive the expression for potential and field intensity due to a dipole.

    (b) Give the solution of Laplace's equation in one dimension.

13. (a) State Biot-Savart's law and derive magnetic field intensity.

    (b) A solenoid with N_1=1000, r_1= 1 cm and l_1=50 cm is concentric with in a second coil of N_2=2000, r_2=2 cm and l_2=50 cm. Find the mutual inductance assuming free space conditions.

14. Derive the Maxwell's equation for free space in integral and point forms explain.

15. (a) Show that the intrinsic impedance for free space is 120π. Derive the necessary equation.

    (b) Derive the wave equation for free space.

16. (a) State and explain Coulomb's law.

    (b) Planes z = 0 and z = 4 carry current $\overline{K}=-10\overline{a}_x A/m$ and $\overline{K}=10\overline{a}_x A/m$ respectively. Determine $\overline{H}$ at (i) (1,1,1) (ii) (0,-3,10).

17. (a) Write in detail the analogy between electrical and magnetic circuits.

    (b) Obtain the magnetic boundary conditions.

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Code No. 14534/CBCS/BL

FACULTY OF ENGINEERING
B.E. (ECE) III-Semester (Backlog) Examination, October 2021

Subject: Switching Theory and Logic Design

Time: 2 hours **Max. Marks: 70**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions. **(5x2 = 10 Marks)**

1 Represent $(63.75)_8$ into Decimal and Binary.
2 Define cyclic code with an example.
3 Design XOR gate with minimum number of NOR gates.
4 Explain prime implicant and essential prime implicant.
5 Design a function F =Σm(2,4,5,6) using 74138.
6 Implement 3-bit even parity generator circuit.
7 What is Race around condition?
8 Write SR-Flip Flop Truth table and its Excitation table.
9 Differentiate between combinational and sequential circuits.
10 Show the difference between Moore and Mealy state diagrams.

PART – B

Answer any four questions. **(4x15 = 60 Marks)**

11 (a) Convert the function $(\bar{A}+B)(\bar{A}+B+\bar{C})$ into canonical POS.
(b) Simplify $F=(A\bar{B}C+B+B\bar{D}+AB\bar{D}+\bar{A}C)$ using Boolean theorems.

12 Obtain the minimal expression for F =Σm(6,7,8,9)+d(10,11,12,13,14,15) using Quine-Mc Cluskey method.

13 Perform BCD addition on 679 + 536 and implement its adder circuit.

14 (a) Give State Table, State Diagram, characteristic equation and excitation table f J K Flip Flop.
(b Convert SR Flip Flop into T Flip Flop.

15 Designmod-10Synchronous up counter using T Flip Flop.

16 (a) Define universal gate and prove that NAND gage is universal gate.
(b) Minimize the expression F = Πm(1,3,5,7,8,9,12,13)+d (14,15) using K-map method.

17 Write any **two** of the following:
(a) Design of 2 bitcomparator
(b) J-K Flip Flop Race Around condition how it can avoid
(c) IC 7490 counter

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Code No: 14538 /CBCS/BL

FACULTY OF ENGINEERING

BE III-Semester (CBCS) (Civil) (M/P) (Backlog) Examination, October 2021

Subject : Fluid Mechanics

Time: 2 Hours **Max marks: 70**

Missing data, if any, may be suitably assumed

PART - A

Note: **Answer any Five questions**. **(5x2=10 Marks)**

1. Differentiate ideal and real fluid fluids?
2. Differentiate compressible and incompressible flow
3. State Discharge or Rate of flow?
4. What do you understand by Magnus effect?
5. Define Mach number and state its significance?
6. State how Moody's chart is useful in Fluid Mechanics?
7. What do you understand by stagnation pressure?
8. Define boundary layer thickness?
9. Differentiate between friction drag and pressure drag?
10. What is the use of piezometer?

PART - B

Note: Answer any Four questions. **(4x15=60 Marks)**

11. Derive Euler's equation of Motion & educe Bernoulli's equation from it What are the assumptions made in Bernoulli's theorem.

11. Derive Darcy's Equation for friction factor and state various assumptions made?

12. A horizontal venturimeter with inlet dia 30cm and throat dia 20cm is used to measure the flow of oil of specific gravity 0.7 discharge is 70lit/sec. find oil mercury differential manometer reading. Take Cd=0.9

14. Water is flowing through a pipe of dia 300mm & 200mm at section 1&2 respectively. The rate of flow through the pipe is 85 lit/sec, Section 1is 10m, section 2 is 6m above datum line. If he pressure at section 2 is 3500kN/m^2. find Pressure at section 1?

15. What do you mean by boundary layer separation? What is the product of pressure gradient on the boundary layer separation?

16. a) Derive the continuity equation for one dimensional compressible flow in differential form?
    b) What do you mean by compressibility correction factor? Find an expression for compressibility factor.

17. Find the Mach number when an aeroplane flying at 1000km/h through still air having a pressure of 7N/cm^2 temperature of -5^oC. Take R = 287.14J/KgK. Calculate the pressure and temperature of air at stagnation point. Take k=1.4

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Code No.14543/CBCS/BL

FACULTY OF ENGINEERING

B.E. III – Semester (CBCS) (AE) (Backlog) Examination, October 2021

Subject: Automotive Engineering Drawing

Time: 2 Hours **Max.Marks: 70**

Note: Answer all questions from Part-A & Part-B

PART – A (4x2 1/2 = 10 Marks)

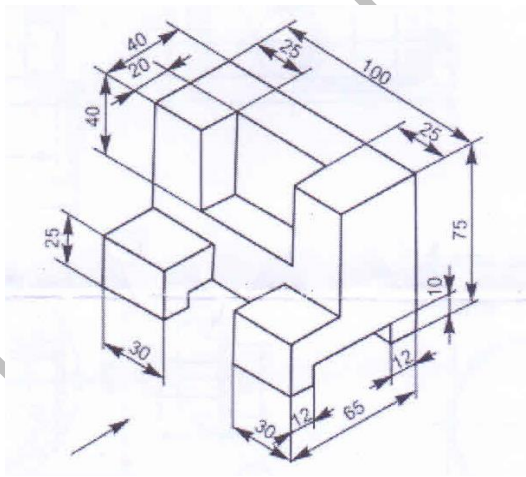
1. Sketch the conventional representation of the following materials:

   (a) Liquids (b) Wood and (c) Steel

2. Sketch a hexagonal bolt and nut with by taking D=24mm and L=80mm.

3. What is a knuckle joint and where is it used?

4. Sketch front view, side view and top view of the component given in figure.1



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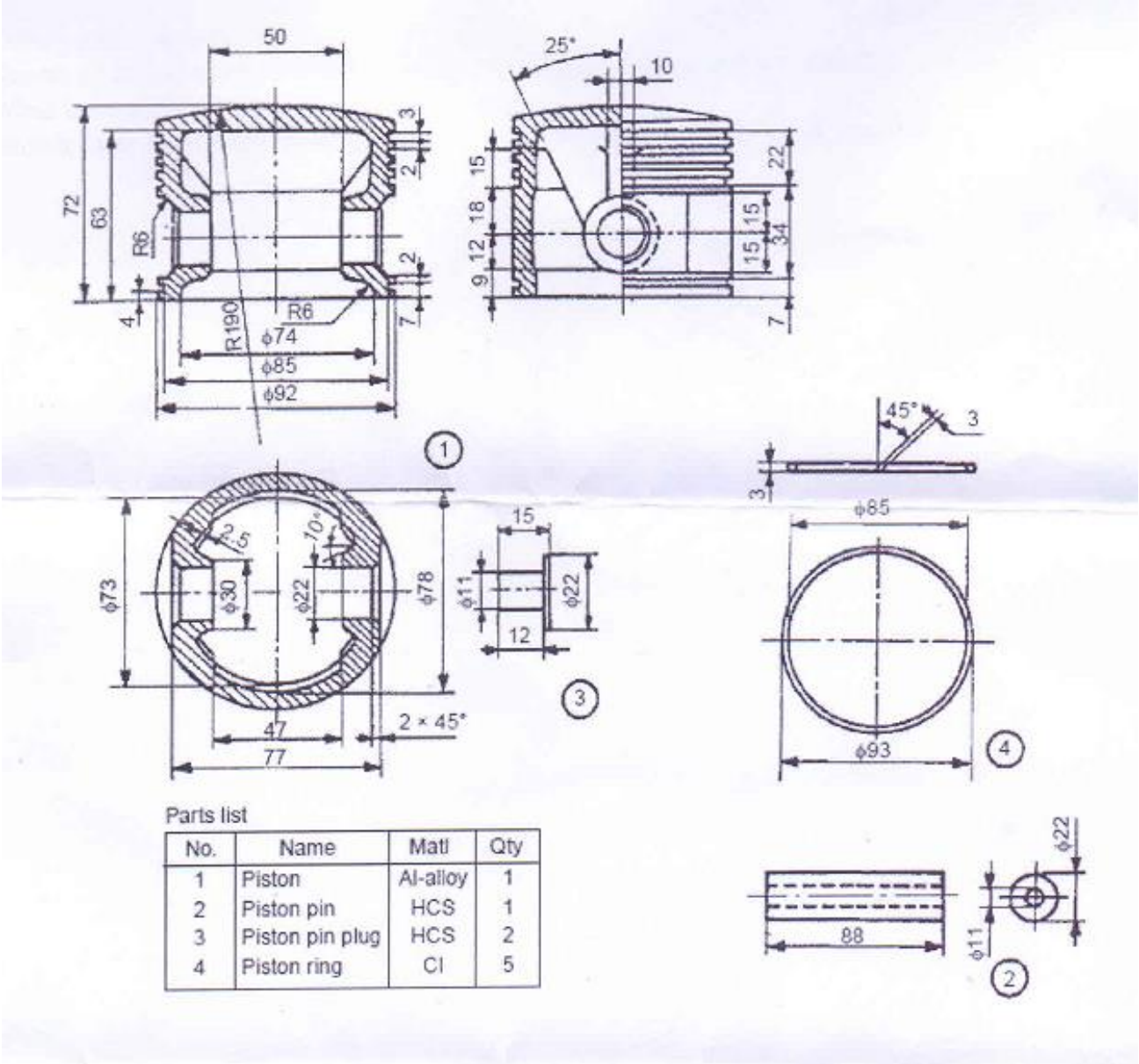
PART – B (60 Marks)

5. Assemble all the components shown in figure 2 to form piston assembly and draw.

   a) Full section front view
   b) Top view



Parts list

No.	Name	Matl	Qty
1	Piston	Al-alloy	1
2	Piston pin	HCS	1
3	Piston pin plug	HCS	2
4	Piston ring	CI	5

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