Code No. 2520/CBCS/BL

FACULTY OF ENGINEERING

B.E. III Semester (CBCS)(Civil) (Backlog) Examination, October 2020

Subject: Fluid Mechanics-I

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

PART – A

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

1. Differentiate between bulk modulus of elasticity and compressibility.
2. Define Mach number and explain how it differs for sub sonic, sonic and supersonic flows.
3. Water is rotated in a container of radium 10 cm at an RPM of 600. What is the centrifugal head developed?
4. What is the principle of functioning of a pitot static tube?
5. What is approach velocity? How is it incorporated in the discharge equation of a rectangular notch?
6. 0.01 m^3/s of water is flowing in a pipe of radius 50 mm under a pressure of 50 KPa. Compute the total energy head on the pipe centerline.
7. If $\psi = 2xy$ is the stream function, find the magnitude of velocity vector at (2,-2).
8. State any two properties of flow net.
9. Differentiate between dynamic viscosity and kinematic viscosity and also give their units in the SI system.
10. Explain what is meant by hydrostatic pressure distribution.

PART – B

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

11 a) What is the cause of capillarity? Derive an expression for the pressure difference between the inside and outside of a liquid jet.

b) A tube of internal diameter 2 mm is dipped vertically into a vessel containing mercury. The lower end of the tube is 2 cm below the mercury surface. Estimate the pressure of air inside the tube required to blow a hemispherical bubble at the lower end. Surface tension of mercury is 0.4 N/m.

12. a) Starting from the basics, derive the condition for irrotational flow in XY plane about Z axis.

b) Prove that the streamlines and equipotential lines are orthogonal. Why should the stream lines meet the boundary at right angles?

13. a) Distinguish between body forces and surface forces and identify some of them with reference to fluid flow.

b) Two points A and B are located in along 20 cm diameter pipe. When the downstream valve is completely closed the difference in pressure between B and A is 100 KPa. When the valve is open and a discharge of 70 liter/s of water is flowing, the pressure difference between A and B is 50 KPa. Calculate the head loss between A and B.

14. a) Derive the equation for acceleration in terms of (x,y,z,t) and bring out the local and convective acceleration terms in the equations.//

b) A 40 cm diameter pipe is reduced uniformly to 20 cm diameter in a length of 0.5 m. If the steady discharge of water through this pipe is 100 liter/s, determine the acceleration at 10 cm and 20 cm diameter end when the flow is (i) steady (ii) increasing at a rate of 600 liter/s.

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15 a) Derive the expression for discharge through a triangular notch by assuming suitable nomenclature for relevant parameters.

b) A 45^{o} deflection angle reducing bend lies in the horizontal plane and tapers from 60 cm diameter to 30 cm diameter at the outlet. The pressure at the inlet is 15 KPa and the flow through the bend is 0.5 cumecs. Assuming friction loss of 20% of kinetic energy at the inlet, compute the magnitude and direction of the resultant force exerted by the water on the bend.

16 a) Draw a net sketch of the pitot static tube and explain its working. Also derive the equation for velocity in terms of stagnation and static pressure.

b) A rectangular weir 0.75 m high and 1.5 m long is to be used for discharging water from a tank under a head of 0.5 m. Estimate the discharge when it is used as a contracted weir with a coefficient of discharge equal to 0.661.

17 a) Derive the Bernoulli's equation for adiabatic process.

b) Air flows in a duct under isentropic conditions. At section 1, the velocity, pressure and temperature are 125 m/s, 200 KPa absolute and 300 K respectively. If at a downstream section the velocity is 220 m/s, calculate the Mach number, temperature and pressure at section 2. Also calculate the densities at sections 1 and 2.

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Code No.2528/CBCS/BL

FACULTY OF ENGINEERING

B. E. (EE/Inst.) (CBCS) III – Semester (Backlog) Examination, October 2020

Subject: Electro Magnetic Fields

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

PART – A

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

1. What are the limitations of Coulomb's Law?
2. What are the properties of potential functions?
3. What do you mean by electrostatic field and how can you say it is conservative?
4. Determine the force between two charges $3x10^{-4}C$ at P(1,2,3) and $(-10^{-4}C)$ at Q(2,0,5) in vacuum.
5. State Biof-Savart's Law.
6. State Amper's Law.
7. Derive Maxwell's third equation.
8. Write field equations in Vector forms.
9. Define the reflection co-efficient as the ratio of reflected to incident intensities @ Z = 0.
10. Define the transmission co-efficient as the ratio of transmitted to incident intensities @ Z = 0.

PART – B

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

11. (a) Deduce the expression for due to an electric dipole.
    (b) Determine the potential at a(0,0,4) on caused by a total charge $10^{-8}C$ distributed uniformly along a disc of radius 4M lying in the Z = 0 plane and centered at origin.
12. (a) Using gauss Law, drive an expression for electric field intensity at any point inside and outside of a sphere of radius 'a' due to a uniform spherical charge distribution of volume charge density of 'p'.
    (b) Explain the Laplace and Poission's equations for electrostatic fields.
13. (a) What is the Magnetic field (H) in Cartesian co-ordinates due to Z-directed current element? Find 'J' if I=2A.
    (b) What is meant by Curl? Give its significance.
14. (a) Find the inductance of solenoid.
    (b) Derive the continuity equation.
15. (a) Explain how the electromagnetic wave propagates in a Linear Media.
    (b) Explain the reflected 'EM' plane wave (in medium-1).

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16. (a) Derive the expressions for co-efficient of coupling and equivalent inductance for various connections of Magnetic Circuits.

    (b) If a coil of 800 μH is magnetically coupled to another coil of 200μH, the co-efficient of coupling between two coils is 0.05. Calculate the inductance, if two coils are connected in (a) series aiding (b) series opposition (c) parallel aiding and (d0 parallel opposing.

17. (a) What are the boundary conditions for conductors and perfect dielectric materials?

    (b) A conductor of length 100 cm moves at right angles to uniform field of strength 1000 lines per cm^2 with a velocity of 50 m/s. Calculate emt induced in it, when the conductor moves at an angle of 30^0 to the direction of field.

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Code No. 2534/CBCS/BL

FACULTY OF ENGINEERING

B.E. (ECE) III-Semester (CBCS) (Backlog) Examination, October 2020

Subject : Switching Theory and Logic Design

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

PART – A

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

1 Convert the decimal number "127" to equivalent i) BCD and ii)Excess-3 codes.
2 Use Boolean algebra to find the most simplified SOP expression for F = ABD + CD + ACD + ABC + ABCD
3 Simplify the following Boolean functions, using K-Map to a minimum POS form F(A,B,C)= πM(0,1,2,7,12,13,14,15)
4 Design a Half adder circuit and implement it with minimum number of 2-input NAND gates.
5 Implement an EXOR gate with the help of a 4:1 Mux.
6 Differentiate between a latch and a Flip-Flop.
7 Draw the circuit diagram of T FF and derive its characteristic equation.
8 Distinguish between Synchronous and Asynchronous Counter.
9 List the applications of Shift registers.
10 What are static hazards? Explain with a suitable example.

PART – B

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

11 (a) Determine the minimum-cost SOP and equivalent POS expressions for the function given below using the K-Map method

f(A, B, C, D) = ∑m(4, 6, 7, 8, 10, 11, 12, 15) + d(3, 5, 9).

(b) Design a 4-bit Binary to Gray code converter and implement the circuit using Ex-OR gates

12 Use the Quine Mcklusky's Tabular method to simplify the following function: f(A,B,C,D)=∑m(0,1,5,7,8,10,14,15) +d(11)

13 (a) Explain the principle of operation of Carry Look Ahead adder. Design and implement a 4 bit Carry Look Ahead Adder.
(b) Design a 1 bit magnitude comparator. Implement a 3 bit magnitude comparator using 1-bit comparators.

14 (a) Convert a D Flip Flop to a J-K Flip Flop showing all design steps.
(b) Design a 2:4 decoder with active -low outputs and an enable input. Implement an 3:8 decoder using the above 2 : 4 decoder blocks and minimum extra logic.

15 (a) Design synchronous counter using JK flip flops for the following count sequence: 0 – 2 – 4 – 5 – 7 – 3 – 1 – 0 – 2 **……**
(b) Design a Mod 99 counter using two cascaded Decade counter ICs 7490.

16 (a) Implement Full adder circuit using 4:1 Muxes and minimum extra logic.
(b) Design and implement a Mealy sequence detector to detect overlapping sequence "1101".
17 (a) Design a 4-bit Parity generator/checker circuit for odd parity and single error detection capability.
(b) Design and realize a Modulo 5 ripple counter and draw the output waveforms.

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Code No. 2538/CBCS/BL

FACULTY OF ENGINEERING

B.E. (M/P) III – Semester (CBCS) (Backlog) Examination, October 2020

Subject: Fluid Mechanics

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

PART – A

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

1. Differentiate ideal and real fluid.
2. For a fluid of kinematic viscosity $4x10^{-4}$ stokes and mass density equal to 0.9 gm/cm^3. Find the dynamic viscosity.
3. State the working principle of venturimeter used for measuring discharge in pipes.
4. For a 3-Dimensionalflow field described by V = $(y^2+z^2)i + (x^2+z^2)j + (x^2+y^2)k$. Determine the velocity components at point (1,2,3).
5. Write the equation for the total energy head and explain each term in it.
6. A flat plate 1m x 1m moves at 6.5 m/s normal to its plane. Compute the drag force on the plate when the surrounding fluid is air with density 1.2 Kg/m^3.
7. Define chord length and angle of attack for an airfoil.
8. Derive the continuity equation in differential form for a compressible flow.
9. Determine the Mach number for a projectile which travels in air of pressure 0.8 Kg/cm^2 at -10^0C at a speed of 1200 Km/hr. Take k = 1.4 and R = 287 J/Kg K.
10. Explain significance of Reynold's number.

PART – B

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

11. (a) Explain the classification of fluid flows.

    (b) The velocity potential function Φ is given by $\Phi = x^2 - y^2$. Find the magnitude of velocity components at the point (2,1). Also show that Φ represents a possible case of fluid flow.

12. (a) Define Impulse momentum principle. Derive an expression for the force exerted by a moving fluid on a bend.

    (b) A 300 X 150 mm venturimeter is inserted in vertical pipeline carrying oil of specific gravity 0.8, in which the flow is upwards. A differential mercury manometer connected to the inlet and throat shows a reading of 300mm. Compute the discharge assuming C_d for venturimeter as 0.98.

13. (a) Explain the working of a micro manometer using a sketch.

    (b) A pipe of diameter 200mm converges to a diameter of 100mm. The pipe conveys water, the pressure intensities being 400 KPa and 250 KPa at the

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larger and smaller sections respectively. Ignoring energy losses, determine discharge.

14. (a) Derive Hagen Poisuille's equation for laminar flow.

    (b) A 10 cm diameter pipe conveys oil of specific gravity 0.85 and viscosity 0.04 NS/m^2 with a Reynold's number of 1900. Find the shear stress on the boundary and velocity at a distance of 6cm from the pipe wall.

15. (a) Explain the development of boundary layer on a flat plate and write the salient features of boundary layer flow.

    (b) A supersonic plane flies at 2000 Km/hr in air having a pressure of 32.5 KPa and density of 0.5 Kg/m^3. Calculate the following parameters of air at a stagnation point on the nose of the plane. (i)Temperature (ii) Pressure (iii) Density.

16. (a) Explain the propagation of elastic waves due to disturbance in fluid.

    (b) The pressure, velocity and temperature at a section of pipe carrying air are 28 KN/m^2, 18 m/s and 150^0C. At a downstream section, the velocity is 120 m/s. Find the pressure and temperature at the latter section assuming isentropic flow. Take k = 1.4 and gas constant as 287 J/Kg K.

17. Write short notes on the following:

    (a) Pitot Tube.

    (b) Magnus effect.

    (c) Velocity potential and stream function.

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Code No. 2543/CBCS/BL

FACULY OF ENGINEERING

BE III Semester (CBCS) (Backlog) Examination, October 2020

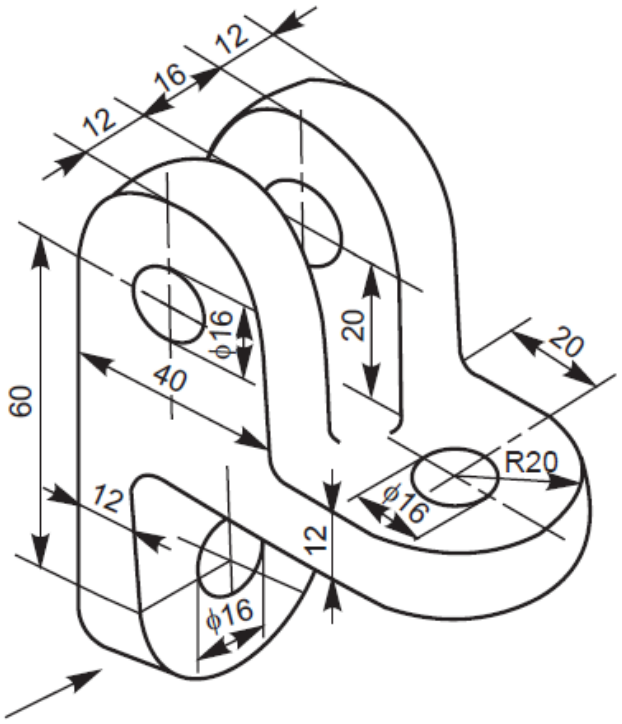
Subject: Automotive Engineering Drawing

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

PART – A

Note: Answer any two questions from figure1. **(2x5 = 10 Marks)**

1. What do you understand by, (*a*) scale = 5:1 and (*b*) scale = 1:10?
2. Draw two views of the double riveted butt joint by taking t=10mm,d=20mm.
3. Sketch two views of a knuckle joint for connecting two 40mm diameter rods.
4. Sketch sectional front view, side view and top view of the component given in figure .1.



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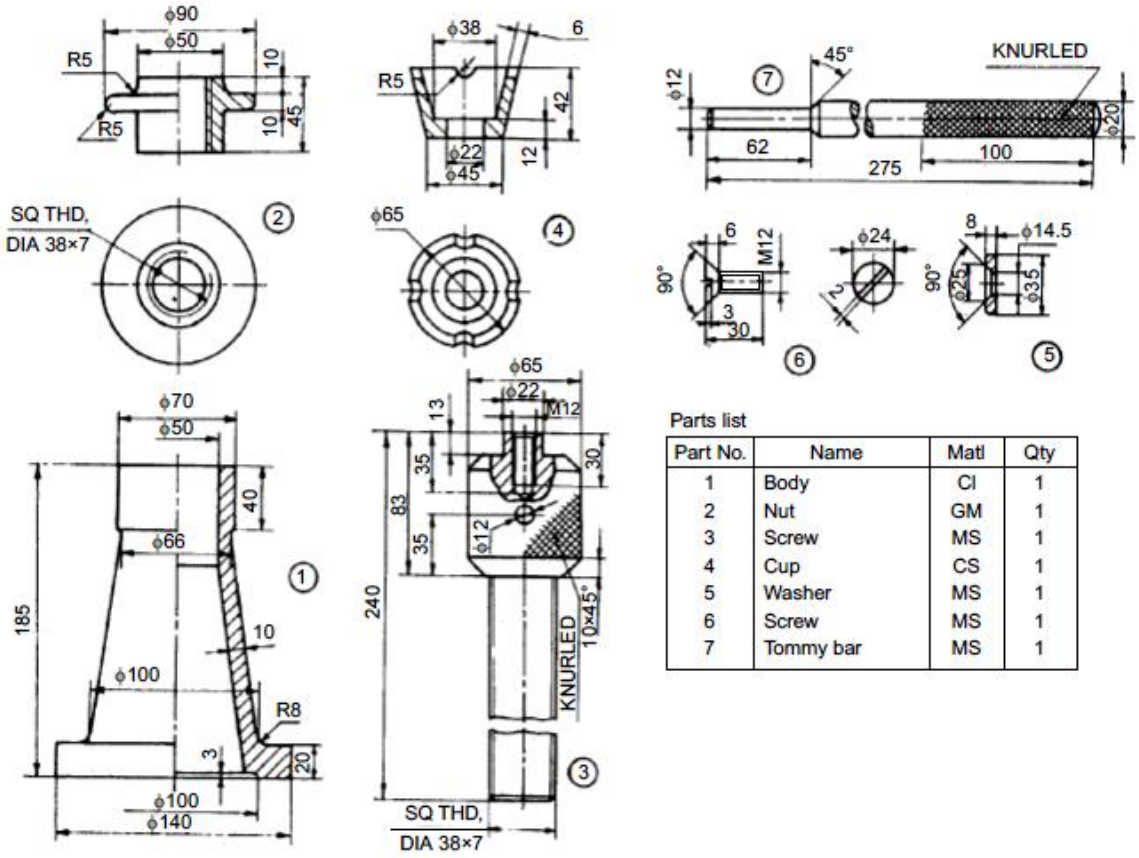
PART – B

Note: Answer any two questions from figure 2 . **(2x30=60 Marks)**

5. Assemble all the components shown in figure 2 to form screw jack assembly and draw
   (a) Full sectional front view (30)
   (b) Top view (30)
   (c) Side view (30)



Parts list

Part No.	Name	Matl	Qty
1	Body	CI	1
2	Nut	GM	1
3	Screw	MS	1
4	Cup	CS	1
5	Washer	MS	1
6	Screw	MS	1
7	Tommy bar	MS	1

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Code No.2546/CBCS/BL

FACULTY OF ENGINEERING

B. E. (CSE) III – Semester (CBCS) (Backlog) Examination, October 2020

Subject: Logic and Switching Theory

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

PART – A

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

1. Convert the function into other canonical form

   F(X,Y,Z) = Σm(0,3,4,6)

2. List the Huntington postulates.
3. Implement F=x′y+xy′+z using NOR gates.
4. Write the Boolena expression and logic symbol for the given truth table.

x	y	F
0	0	0
0	1	1
1	0	1
1	1	0

5. Draw the full adder circuit using two half adders and logic gates.
6. Implement the function F(x,y,z)=Σm(0,2,3,6) using 2:1 MUX.
7. Show that Tff can be converted to a Dff.
8. Write the applications of PAL.
9. Differentiate mealy and moore machine.
10. Write about sequence detector.

PART – B

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

11. (a) Simplify the expressions using Boolean algebra.

    (i) (A+B) (A+B′) (A′+C) (ii) xyz′+x′yz+xyz+x′yz′

    (b) Prove that the dual of XOR is also its complement.

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12. With the help of Karnaugh map simplify the function F(a,b,c)=Σm(0,2,8,9,10,15) using don't care function d(a,b,c,d)= Σm(1,3,6,7). Simplify the problem with sum of products and product of sums.
13. Simplify the function using Quine McClusky method F(A,B,C,D)= Σm(0,2,4,6,7,9)+ Σm(10,11) and realize the function with basic gates.
14. (a) Design a 16x1 MUX using 4x1 MUX.

    (b) Explain about carry look ahead adder.
15. (a) Design a combinational circuit with 3 inputs and 1 output. The output must be logic 1 when the binary value of the input is less than 3 and logic 0 otherwise.

    (b) Write characteristic and excitation tables for RS, JK, D and Tff.
16. Tabulate the PLA programming table for following Boolean function and minimize the number of product terms.

    A(x,y,z) = Σm(1,2,4,6)

    B(x,y,z) = Σm(0,1,6,7)

    C(x,y,z) = Σm(2,6)

    D(x,y,z) = Σm(1,2,3,,5,7)
17. Design a synchronous BCD counter using Tff.

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Code No.2551/CBCS/BL

FACULTY OF ENGINEERING

B. E. (IT)(CBCS) III – Semester (Backlog) Examination, October 2020

Environmental Studies

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

PART – A

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

1. Define the term Environment.
2. Compare the terms food chains and food webs.
3. List the various endangered and endemic species of India.
4. Define Pollution and pollutants.
5. Differentiate between climate and weather.
6. Define the terms Photochemical smog and endemic species.
7. Define species diversity and Biological oxygen demand.
8. What is water pollution?
9. Write a short note on global warming.
10. Distinguish between Hydrosphere and Lithosphere.

PART – B

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

11. (a) Determine the need for public participation in mitigating the environmental problems.
    (b) What are the ill-effects of water logging and salinity?
12. (a) Describe the various types of ecosystem.
    (b) Discuss how social, ethical, aesthetic values improve the conservation of Bio-Diversity.
13. (a) What is meant by Air pollution and list out the preventive measures of air pollution.
    (b) Write about the endangered and endemic species of India.
14. (a) Discuss the features of India's Environmental Act 1986 indicating its limitations.
    (b) Briefly explain about radioactive pollution.
15. (a) What are the hazards associated with use of plastics?
    (b) Illustrate the issues involved in Enforcement of wild life protection act.
16. (a) Explain about waste management.
    (b) Discuss the role of CFC's in the deplection of Ozone layer.
17. (a) Explain about Disaster Management Cycle.
    (b) Write a short note on Rainwater Harvesting.

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Code No: 2011/BL

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) I-Semester (Backlog) Examination, October 2020

Subject: Building Planning and Drawing

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

PART – A

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

1 Draw the isometric view of beveled brick and door opening.
2 Define header and stretcher
3 Draw the conventional sign for stone and brick.
4 Draw the isolated footing of course rubbled masonry.
5 Draw a line diagram of simple truss of 10 m span.
6 Sketch the elevation of a fully glazed door?
7 What is a footing mention the difference between shallow and deep footing
8 What is a flight in a staircase?
9 What is the importance of elevation for a given section?
10 Give the minimum sizes of bedroom and kitchen building planning.

PART – B

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

11 Draw the plan and isometric view of wall junction for one and a half brick wall in English bond. Draw minimum 4 layers.

12 Draw front elevation and sectional elevation of a fully glazed door of 1.2m x 2.1m to a scale of 1: 50.

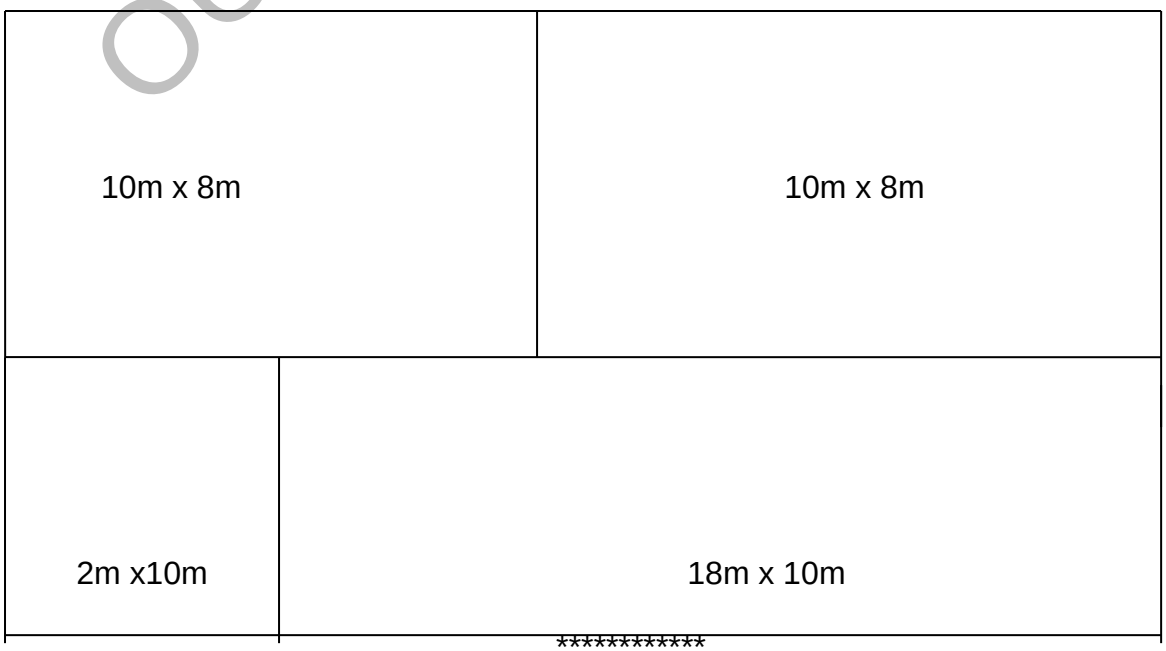
13 Draw the elevation and sectional plan of ashlar fine masonry.

14 Draw the front and sectional elevation of a open well staircase in a residential block to reach a floor height of 3.1m.

15 Draw the plan and elevation of a RC circular footing of foundation in a residential building

16 Write in detail the steps involved in planning of two storied residential building

17 The line diagram of a building is shown in the figure below. Draw plan and sectional elevation to a scale of 1 : 50 and locate doors and windows.Take thickness of wall as 0.3m.



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Code No. 2016/BL

FACULTY OF ENGINEERING

B.E. 2/4 (EEE/Inst.) I-Semester (Backlog) Examination, October 2020

Subject: Electronic Engineering - I

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

PART – A

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

1 A Germanium diode draws 50mA with a forward bias of 0.27 V. The junction is at room temperature of 27^0C. Determine the reverse saturation current of the diode
2 What is a Bleeder Resistance? Why it is used in LC filter?
3 Define the term cut-in voltage? What is the cut-in voltage value for Germanium diode?
4 Explain the terms Ripple, Regulation and Peak Inverse Voltage as referred to the rectifier circuits?
5 Determine the emitter current of a transistor for the given collector current I_C = 20mA and β = 50?
6 What is Thermal runaway in transistor amplifier circuits?
7 Draw the equivalent h-parameter model for CE Configuration?
8 Compare DIAC and TRIAC?
9 Why FET is known as unipolar device
10 Why E-MOSFET is called normally-off MOSFET

PART – B

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

11 a) Explain the current components of p-n junction diode and deduce the expression for the current in a diode due to the voltage applied.
b) The voltage across a silicon diode at room temperature of 300K is 0.7 V when 2mA current flows through it. If the voltage increases to 0.77 V. Calculate the diode current. Assume V_T = 26mV.

12 a) What is a Rectifier? Explain the operation of a full wave centre-tapped rectifier with necessary diagrams and waveforms
b) List out the differences between Half wave, Full wave and Bridge rectifiers

13 a) Compare the configurations of BJT with respect to their applicability and Performance
b) Derive the expression for stabilization factor(S) in a BJT amplifier with Fixed bias

14 a) A transistor has its h-parameters given by 1KΩ, 50, $2.5x10^{-4}$ and 25μA/V in CE configuration using a load resistance of 5KΩ and a source resistance of 1KΩ. Calculate A_V, A_{VS}, A_I, A_{IS}, R_i and R_0
b) Draw and explain V-I characteristics of UJT

15 a) Draw the structure of a JFET and explain its principle of operation with neat diagrams along with the V-I characteristics. Define Pinch-off voltage and mark it on the characteristics for a JFET.
b) Show that for a JFET $I_D = I_{DSS}\left[1 - \frac{V_{GS}}{V_P}\right]^2$

16 a) Draw the equivalent circuit and characteristics of a Tunnel diode and explain its operation
b) Compare LED and LCD?

17 Write short notes on the following
a) Cathode ray Oscilloscope
b) Bias Compensation technique of BJT
c) Varactor Diode

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Code No. 2024/BL

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I-Semester (Backlog) Examination, October 2020

Subject: Electromagnetic Theory

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

PART – A

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

1. Determine the magnitude of force between charges 3 x 10^{-4} C. at P (1,2,3) and (-10^{-4}) C at Q (2,0,5) in Vacuum.
2. Define Gauss's Law of Divergence?
3. Show that Energy Stored in a Capacitor is **0.5 ϵE^2** Joules?
4. State and prove Biot - Savart's Law?
5. State and prove Poynting Theorem?
6. Define Brewster's angle?
7. Describe various types of Polarization?
8. Define Skin Depth and Loss tangent?
9. Define Amperes Circuital Law?
10. Compare different types of Electric and magnetic potentials?

PART – B

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

11. a) Given the field $\overline{E} = (25\ x^2 y\ \hat{a}_z + 5x^3\ \hat{a}_y)$ find the equation of the streamline that passes through point P (2, 3, -4)?
    b) A point Charge Q_A = 1μC is located at A(0,0,1); and Q_B = -1 μC is at B(0,0, -1); Find $\overline{E}_r$, $\overline{E}_\theta$ and $\overline{E}_\Phi$ at P(1,2,3)?

12. a) Given the potential field V = 100 ($\sqrt{r}$)V. in free space. Find $\overline{E}$ and $\overline{D}$?
    b) Define Electric flux density and derive expression from Coulomb's law?

13. a) Show that Capacitance of Coaxial Capacitor C = [$2\pi\varepsilon$L / ln(b/a)] farads?
    b) Determine the Capacitance of a Sphere having two dielectric layers which has dielectric material $\epsilon = \epsilon_1$; from r =a to r = r_1 and $\epsilon = \epsilon_0$ from r = r_1 to r = ∞.

14. a) State and prove Laplace equation? In what region it is valid? Discuss applications. of Laplace equation in Conducting medium?
    b) Prove that $\vec{P} = (\overline{E} \times \overline{H})$ W/m^2 ?

15. A 150MHz Uniform Plane wave in free space is travelling in the $\hat{a}_x$ direction. The Electric field Intensity has a maximum amplitude of (200 $\hat{a}_y$ + 400 $\hat{a}_z$)V/m, at P(10, 30, -40) at t = 0; find (a) w (b) β (c) λ (d) γ (e) η (f) $\overline{E}$ (x, y, z, t)?
16. a) For Uniform plane wave in fresh lake water having σ = 10^{-3} ʊ/ m. ϵ_r = 80; and μ_r =1; find α, β, γ, and λ 100MHz.

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b) Derive expression for α, β, γ and η for a good conductors?

17. Write short notes on the following?
    a) Elliptical and Circular Polarization?
    b) Obtain an expression for Reflection Coefficient when Uniform Plane Wave incident normally on a plane boundary?
    c) Obtain an analogy between static electric fields vs magnetic fields?

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Code No. 2028/BL

FACULTY OF ENGINEERING

B.E 2/4 (M/P/AE) I Semester (Backlog) Examination, October 2020

Mechanics of Materials

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

PART – A

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

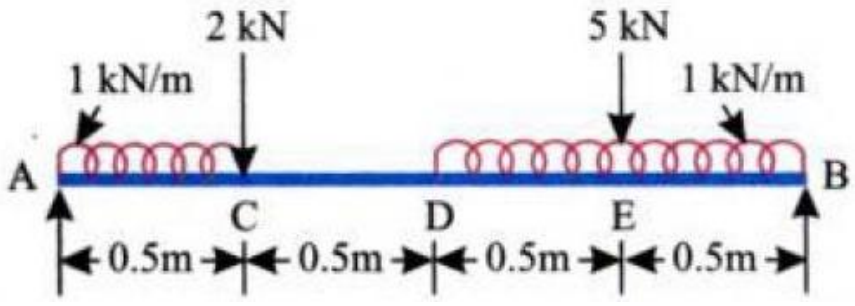
1 What is the difference between Elasticity and Plasticity?
2 Define strain. What are the various types of strains?
3 Write the relationship between intensity of loading, shear force and bending moment.
4 Draw the Shear force and bending moment for cantilever of length 'L' carrying a point load 'W' at the free end.
5 Define Slope and Deflection in a beam.
6 The shearing stress of a solid shaft is not to exceed 50 N/mm^2. When the torque transmitted is 40KN-m. Determine the minimum diameter of the shaft.
7 Draw the shear stress distribution diagram for an I-Section.
8 Define Principal planes and Principal stresses.
9 What do you mean by the terms, column and strut?
10 A spherical gas vessel of 2m diameter is subjected to an internal pressure of 2MPa.Find the minimum thickness of the plates required, if the maximum stress is not to exceed 100MPa.Take efficiency of the joint as 80%.

PART – B

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

11 A gun metal rod 22 mm diameter screwed at the ends passes through a steel tube 25mm internal diameter and 30mm external diameter. The temperature of the whole assembly is raised to 126^0C and the nuts on the rod are then screwed lightly home on the ends of the tube. Find the intensity of stress in the rod and the tube when the common temperature has fallen to 16^0C. Coefficient of linear expansion for steel = 12×10^{-6} per ^0C Coefficient of linear expansion for gun metal = 20×10^{-6} per ^0C Modulus of elasticity for steel = 2.1×10^5 N/mm^2 Modulus of elasticity for gun metal = 0.94×10^5 N/mm^2.

12. Draw the sheer force and bending moment diagrams for a beam as shown in below .



13 A solid shaft of 120mm diameter is required to transmit 200KW such that the shaft rotates 50 revolutions in 30 second. If the angle of twist is not to exceed 2^0, find the length of the shaft. Take Modulus of Rigidity for the shaft material as 90000Mpa.

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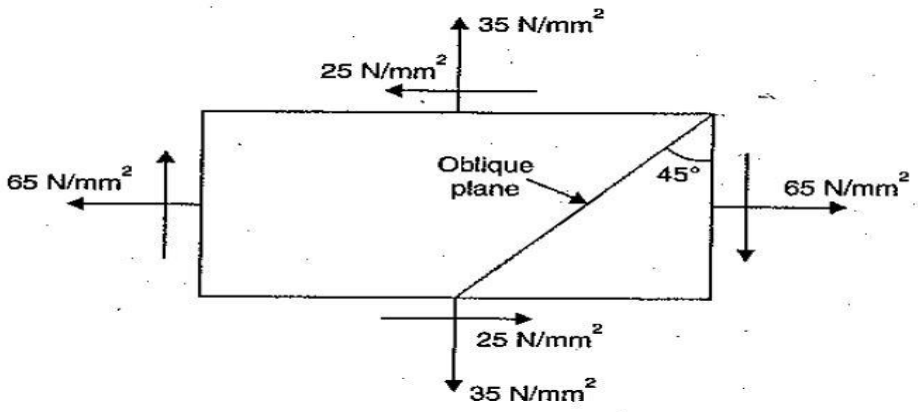
14 An I- Section consist of the following sections:
Upper flange = 130mm X 50mm, Lower flange = 200mm X 50mm and
Web = 200mm X 50mm, If the beam is subjected to a shearing force of 50KN, find the maximum shear stress across the section. Also draw the shear stress distribution diagram. Take $I_x = 284.9 \times 10^6$ mm^4.

15 A hollow cylindrical cast iron column is 4m long with both ends fixed. Determine the minimum diameter of the column if it has to carry a safe load of 250KN with a factor of safety as 5. Take the internal diameter as 0.8 times the external diameter. Take $\sigma = 550$N/mm^2. And $\alpha = 1/1600$ in Rankine's formula.

16 A point in a strained material is subjected to stresses as shown in figure below. Using
Mohr's circle method, determine the normal, tangential and resultant stresses across the oblique plane.



17 A cantilever of length (l) carries a point load (W) at a distance 'a' from the fixed end find
the slope and deflection at the free end.

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Code No. 2035/BL

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I-Semester (Backlog) Examination, October 2020

Subject : Data Structures Using C++

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

PART – A

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

1 What is the matrix which has more number of zero entries called ? How it can be represented efficiently?
2 Define space and time complexity of an algorithm.
3 Design a function to double the size of a Stack every time it becomes full.
4 Is Circular Queue efficient than Linear Queue? Justify.
5 Represent the expression $5x^3 + 4x^2+3x+10$ using Linked list
6 You are given a pointer 'p' which points to a node in the middle of a doubly linked list. Write code that will delete that node from the list (only deletion steps).
7 Write the recursive algorithm for Preorder traversal of a binary tree.
8 Differentiate full binary tree and complete binary tree.
9 Which data structures are used for BFS and DFS of a graph?
10 What is Minimum Cost Spanning tree?

PART – B

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

11 (a) Determine the time complexity of recursive function which finds the sum of array elements of size 'n'.
(b) Assuming a sparse matrix representation that stores only the non-zero elements, write a function to find the transpose of a given matrix.

12 (a) Explain the evaluation of postfix expression.
(b) What is Queue? How it is implemented using Linkedlist?

13 Write a function to insert an element into a singly linked list. The insert must ensure that the values in the list are always maintained in a sorted order.

14 (a) What is collision ? Explain how chaining method can be used to avoid the collision.
(b) What is splay tree? Explain inserting an element into a splay tree with example.

15 Write and explain Merge sort function with an example and analyse its time complexity.

16 How does the Knuth-Morris-Pratt string matching algorithm work? Find the failure function value for the following pattern: abaabaabb.

17 (a) Given the hash function h = key mod 10, where 10 is the size of the hash table. Insert the following data into hash table. Use linear probing to address the collisions. 25, 146, 304, 110, 550, 696, 88, 28,97,76
(b) Define Minimum cost spanning tree. Write Prim's algorithm for construct in it.

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Code No.2040/BL

FACULTY OF ENGINEERING

B. E. 2/4 (IT) I – Semester (Backlog) Examination, October 2020

Subject: Micro Electronics

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

PART – A

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

1. Define Cut-in voltage of PN junction diode. Give its values for Si & Ge diode.
2. List the measurements that can be performed using CRO.
3. Compare the doping levels of emitter, base & collector of BJT.
4. How Transistor can be operated as a switch?
5. Write the advantages of negative feedback in amplifiers.
6. Define Loop gain of Feedback amplifier.
7. Draw the circuit symbol & indicate the terminals of Operational Amplifier.
8. List the mathematical operations that can be performed using Op-amp.
9. Define Propagation delay.
10. What are the advantages of CMOS logic?

PART – B

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

11. (a) How N-type and P-type semi-conductors are formed.
    (b) Explain the working of PN junction diode with the help of V-I characteristics.
12. Explain the physical structure and modes of operation of n-p-n Transistor.
13. Define Bark-Hausen criteria. With the help of neat diagram explain the operation of RC phase shift oscillator.
14. Explain how Triangular wave can be generated using Op-amp.
15. Implement the following using CMOS logic and explain them.
    (a) 2 input NAND gate (b) 2-input NOR gate
16. (a) Explain how Zener diode can be used as voltage regulator.
    (b) Explain the physical structure & working of JFET.
17. Write short notes on the following.
    (a) Class-B power amplifier.
    (b) Op-amp as integrator.

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