FACULTY OF ENGINEERING

B.E. (Civil) III – Semester (CBCS) (Main) Examination, December 2017

Subject: Fluid Mechanics – I

Time: 3 Hours   **Max .Marks: 70**

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (10x2 = 20 Marks)

1	If specific gravity of oil is 0.82 find density and specific weight is MKS units.	2
2	Distinguish between path, line and streak line.	2
3	Define body forces and surface forces.	2
4	Write the principle involved in venturimeter and orifice meter for finding discharge.	2
5	Write the relation for stagnation pressure and stagnation density.	2
6	What is a manometer? Explain its working principle.	2
7	Distinguish between steady flow and under steady flow.	2
8	Write the continuity equation in 3 – D for a steady, compressible fluid flow.	2
9	Write a note on pressure on curved surfaces.	2
10	Define Mach number and classify the types of flows based on it.	2

PART – B (5x10 = 50 Marks)

11 a) Define bulk modulus of elasticity and vapour pressure. Explain the significance of vapour pressure in engineering applications.   5

   b) A flat plate 0.1 m^2 area is pulled at 30 cm/sec relative to another plate located at a distance of 0.01 cm from it, the fluid separating them being water with (μ=0.001N-s/m^2). Find the force and power required to maintain this velocity.   5

12 a) Write the properties of stream function and velocity potential function.   5

   b) A fluid flow is given by v = xy^2 i – $2yz^2$ j – [zy^2 – $2y^2$/3] k. Prove that it is a case of possible steady incompressible flow. Calculate velocity at the point.   5

13 a) Derive the continuity equation in three dimensional Cartesian coordinates.   5

   b) Water is flowing through a pipe having diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at bottom end is 24.525 N/cm^2 and the pressure at upper end is 9.81 N/cm^2 find the difference in datum head.   5

14 a) Show that the free surface of a forced vortex flow is parabolloid.   5

   b) Through a 15x10 cm venturmeter oil flows upwards at the rate of 1000 lpm. Throat section is 12 cm above the inlet. Specific gravity of oil is 0.8. What is the difference in pressure between inlet and throat if Cd is 0.97?   5

15 a) Derive Bernoulli's equation for compressible flow when the process is adiabatic.   5

b) A supersonic plane flies at 1900 KMPH in air having a pressure of 28.5 KPa (abs) and density of 0.439 kg/m^3. Calculate:
 i) Temperature
 ii) Pressure and
 iii) Density of air at a stagnation point on the nose of the plane.
 (Take K = 1.4 and R = 278 J/kg ^{o}K).   5

16 a) Explain the working of Rotameter.   5

b) An open circular cylinder of 15 cm diameter and 100 cm long contains water up to a height of 70 cm. Find the speed at which the cylinder is to be rotated about it vertical axis so that axial depth becomes zero.   5

17 Write short notes on <u>two</u> of the following: 10
 a) Micro nanometer
 b) Flow Net
 c) Velocity of pressure wave for adiabatic and isothermal conditions.

****

FACULTY OF ENGINEERING

B.E. (EEE/Inst.) III-Semester (CBCS) (Main) Examination, December 2017

Subject : Electro Magnetic Fields

Time : 3 hours   **Max. Marks : 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

1. Given field $\overline{A} = 3x^2 yz\ a_x + x^3 z\ a_y + (x^3 y - 2z) a_z$, it can be said that $\overrightarrow{A}$ is   2
   a) Harmonic   b) Rotational   c) Solenoidal   d) Conservative

2. Find the electric field intensity at a point A(3, -4, 2) due to charges $Q_1 = 2\mu c$ at N_1 (0,0,0) and $Q_2 = 3\mu c$ at N_2 (-1, 3, 4).   2

3. Define the term electric potential gradient and write its physical significance.   2

4. Show that $V = \overline{e}^{\,5x} \cos(13y) \sin h(12z)$ satisfied Laplace's equation.   2

5. Given the magnetic susceptibility and magnetic field intensity in a certain material, write the procedure to evaluate a) B and b) J   2

6. Write the analogy between electric and magnetic fields.   2

7. State and explain continuity equation.   2

8. Distinguish between displacement current density and conduction current density.   2

9. Draw a neat waveform traveling in the +2 direction having an x-component in a lossy medium. Justify your answer.   2

10. Mention at least three application of   2
    a) Poisson's equation and b) Method of images

PART – B (50 Marks)

11. a) State and explain Coulomb's law in vector for electrostatic fields.   5
    b) A charge of +2Q is located at (0, 1) and charge of –Q is at (0, -1). Find the points for which E = 0.   5

12. a) Determine the capacitance of a conducting sphere of radius 5 cm deeply immersed in sea water ($\varepsilon_r = 80$). Derive the necessary equations.   5
    b) Derive the boundary conditions of electrostatic field at an interface separating dielectric (ε_{r1}) and another (ε_{r2}) media.   5

13. a) A square conducting loop 3 cm of each side carries of 10 A. Calculate the magnetic field intensity at the centre of the loop. Derive the necessary equations.   5
    b) State and explain Biot-Savart law.   5

14. Write Maxwell's equations for time variant electric and magnetic fields in both differential and integral form. Also write their physical significance.   10

15. a) Derive the uniform plane wave equation of a wave traveling in a lossy medium.   5
    b) A uniform plane wave propagating in a medium has $E = 2 \cdot \overline{e}^{\,rz} \sin(10^8 t – \beta z)\ 2y$ v/m. If the medium is characterized by $\varepsilon_r = 1$, $\mu_r = 20$ and $\sigma = 3$ s/m. Find α, β and H.   5

16 a) The finite sheet $1 \le x \le 2$, $0 \le y \le 5$ on the z = 0 plane has a charge density $\rho_s = xy(x^2+y^2+25)^{3/2}$ nc/m². Find the force experienced by -1 mc charge located at (0, 0, 8).   5

b) A circular loop located on $x^2 + y^2 = 8$, z = 0 carries a direct current of 12A along a_ϕ. Determine H at (0, 0, 8) and (0, 0, -8). Derive the necessary equation.   5

17 Write short notes on :   10
   a) Uniqueness theorem
   b) Pointing theorem

******

FACULTY OF ENGINEERING
B.E. (ECE) III Semester (CBCS) (Main) Examination, December 2017
Subject: Signal Analysis and Transform Techniques

**Time: 3 Hours**   **Max. Marks: 70**

Note: Answer all questions from Part A and any five questions from Part B.

PART-A (20 Marks)

1. Plot the wave form for x(t)=u(t+2)+u(t+3)-u(t-4).   2
2. Define Energy signal and Power signal.   2
3. Write the relationship between Laplace transform and Fourier transform.   2
4. Define system transfer function.   2
5. Determine Z-transform and ROC of the discrete signal x(n)=u(n-5).   2
6. Explain linearity property of Z-transform.   2
7. Differentiate between convolution and correlation of two signals.   2
8. Perform the convolution between two signals x(n)={1,0,1,0} and h(n)={1,-2,1,0}.   2
9. Test the causality of the following system. $y(t)= x(t^2)$ 2
10. Define sampling.   2

PART-B (5X10=50 Marks)

11. Find the Exponential Fourier series of the following signal x(t).   10
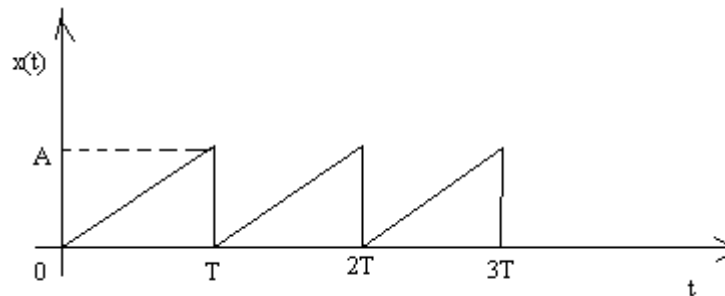
12. a) Determine the Power of the signal $x(t)=e^{-3t} u(t)$.   5
    b) Explain the basic operations can be performed on a continuous time signal?   5

13. a) Write any five properties of Laplace transform.   5
    b) Determine the Inverse Fourier Transform of the following signal   5

$$X(j\Omega)= j\Omega + \frac{5}{(j\Omega + 2)^2}$$

14. a) Find inverse Z-transform of $X(Z)= \dfrac{1}{[1- 1.5Z^{-1} + 0.5Z^{-2}]}$ 5
      if   a) ROC |Z|> 1   b) ROC |Z|< 0.5   c) ROC 0.5<|Z|<1
    b) A causal system is represented by the following difference equation. Find its transfer function.

$$y(n) - \frac{1}{3} y(n-1) = x(n) + \frac{1}{4} x(n-1)$$
   5

15. a) Determine the response of the LTI system whose input x(n) and impulse response h(n) are given by,   x(n)={1,2,3,-1}   and h(n)={2,1,-1,2}   5
    b) Differentiate between auto and cross correlation?   5

16. Determine the Fourier series representation of the following discrete time signal and sketch spectrum. 10

$$x(n)=\{\ldots\ldots,1,3,-2,\underset{\uparrow}{1},3,-2,1,3\text{-}2,\ldots\ldots\}$$

17. Write short notes on **any two** of the following. 10

   a) Stability and causality of the system.

   b) Time shifting and scaling operations of discrete time sequences.

   c) Cross correlation and its properties.

****

FACULTY OF ENGINEERING
B.E (M / P) (CBCS) III Semester (Main) Examination of December 2017
Subject: Fluid Mechanics

Time: 3 Hours   Max. Marks: 70

Note: Answer all questions from Part A and any five questions from Part B

PART – A (20 Marks)

1. Fluid Mechanics deals with _____?
2. Calculate the density, sp. Wt and weight of 1 lt of petrol of specific gravity 0.7.?
3. Define Viscosity?
4. Differentiate Kinematics and Kinetics?
5. What is Bernoulli's Equation?
6. Differentiate laminar, turbulent and transient flow?
7. What is the significance of boundary layer therapy?
8. Drag and lift phenomenon relate to what condition?
9. Define drag on a cylinder?
10. Velocity of elastic and pressure wave depends on the _____ of elasticity and the _____ of the fluids?

PART–B (50 Marks)

11. (a) The velocity distribution for flow over a flat plat is given by u = 3/4y – y2 in the velocity in meter which 'u' is second at a distance of x meter above the plate. Determine the sheek stress at y = 0.15m. Take 8. 6 poise?   [5]

    (b) The dynamic viscosity of a oil used for lubrication between the shape and sleeve but 6 poise. The shaft is of 0.4m dia rotates of 190 rpm. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of oil film is 1.5 mm?   [5]

12. (a) Briefly explain velocity potential function?   [6]
    (b) Briefly explain stream function?   [4]

13. (a) Explain briefly force exerted by a flowing fluid on a pipe bend?   [5]
    (b) Explain the functioning of venterimeters?   [5]

14. (a) Describe with a neat sketch U-tube differential manometer?   [5]
    (b) Briefly explain Reynolds experiments?   [5]

15. Explain Hagen – Poisenille equation with all mathematical derivation and why is it so important?   [10]

16. A circular disc 3m in diameter is held normal to a 26.4 m/s wind of density 0.0012 gm/cc.What force is required to hold it a rest? Assume cd of disc = 1.1   [10]

17. Short Notes: [10]
    (a) Stagnation pressure in a compressible flow?
    (b) Orifice meter?
    (c) Mach No.?

****

FACULTY OF ENGINEERING

B.E. III- Semester(CBCS)(AE)Main Examination, Dec, 2017

Subject : AUTOMOTIVE ENGINEERING DRAWING

Time : 3 hours   **Max. Marks : 70**

PART – A (20 Marks)

1. Sketch the conventional representation of the following materials   [4]
   a) Glass   b)Cast iron   c) Concrete and d) Wood.

2. What are foundation bolts and for what purpose is it used?   [4]

3. Differentiate between:
   a) Lap joint and butt joint   b) Chain riveting and zig-zag riveting.   [6]

4. Draw i) the view from the front and
   ii) the view from right of the object shown in Fig.1

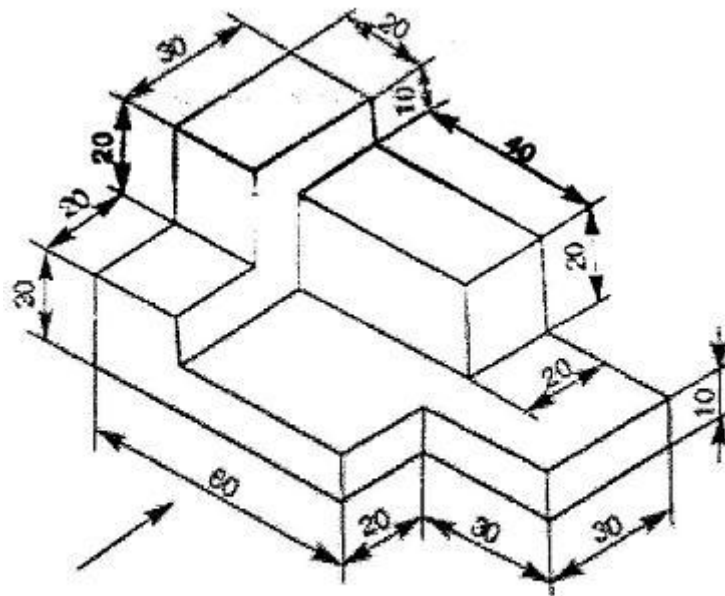   [6]

Figure 1

PART – B (50 Marks)

5. Assemble the parts of the Master Cylinder, shown in Fig.2 and draw the following
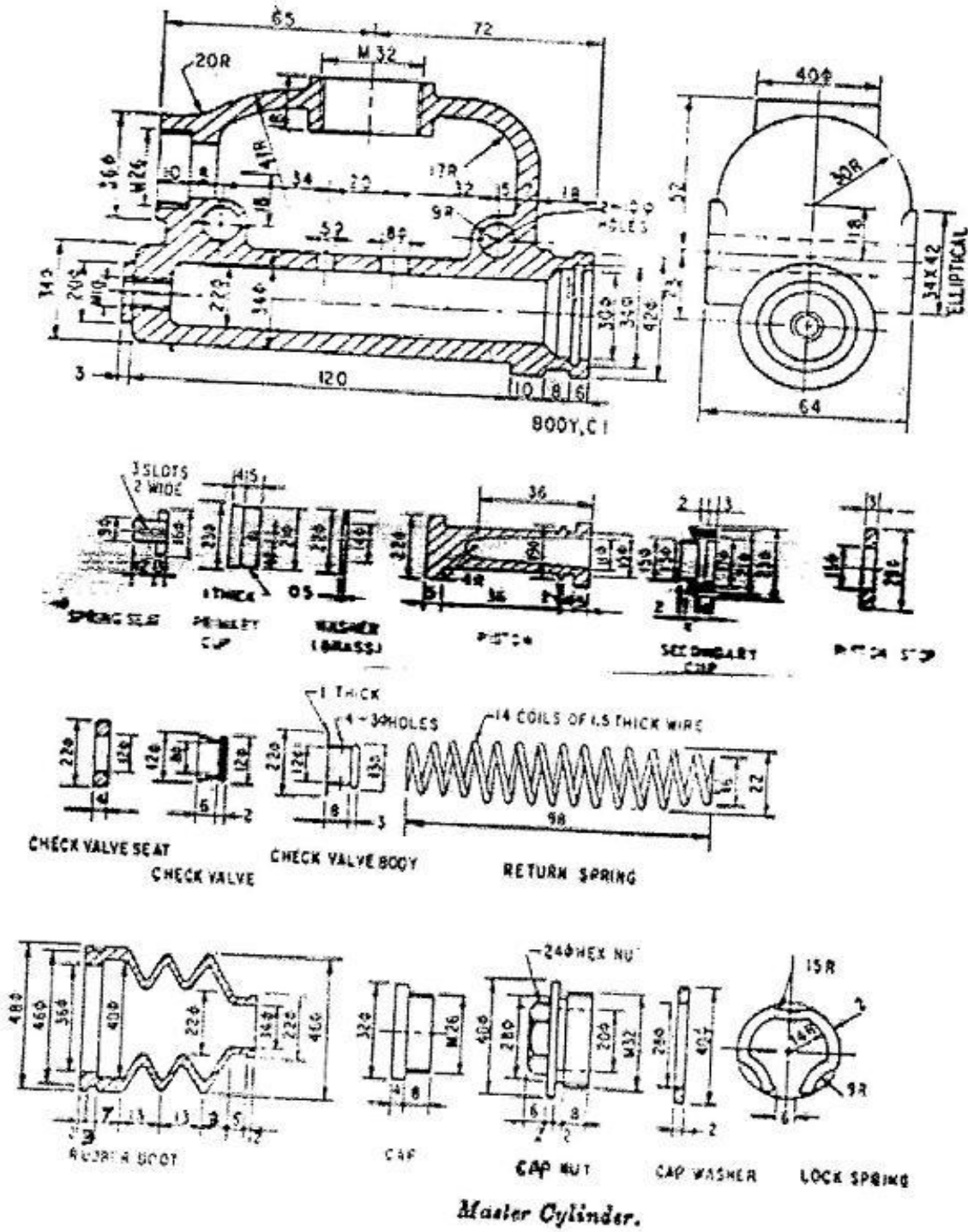views: i) Sectional view from the front, and [30]
ii) View from the left [20]

Master Cylinder.

Figure 2 All dimensions are in MM

****

FACULTY OF ENGINEERING

B.E. III Semester (CBCS) (CSE) Main Examination, December 2017

Subject: Logic and Switching Theory

Time: 3 Hours   **Max. Marks: 70**

Note: Answer all questions from part – A & Any five questions from part - B

Paper – A (20 Marks)

1. State and prove Idempotent Law.   2
2. Define Minterm and Maxterm.   2
3. Draw the equivalent AND and OR gates using NAND gates.   2
4. Design a full Adder using two half Adder and NAND gate.   2
5. Explain about SSI circuits.   2
6. What is a Multiplexer with example?   2
7. Explain about PLA.   2
8. Write the excitation table of RS and JK Flip – flop.   2
9. Differentiate Melay and Moore Machine.   2
10. Write down the applications of Counters.   2

PART – B (5x10 = 50 Marks)

11 a) Determine the minimal sum-of-products expression for: [5M]

$$F(w, x, y, z) = \sum_m (0,2,4,9,12,15) + \sum_\Phi (1,5,7,10)$$

b) Find a minimal products of sums expression for: [5M]

$$F(w, x, y, z) = \sum_m (1,2,3,5,13) + \sum_\Phi (6,7,8,9,11,15)$$

12 With the help of karnaugh Map simply the function $F(w, x, y, z) = \sum_m (1,5,9,10,13)$ using don't care function $d(w,x,y,z) = \sum_m (8,11)$ simply the problem with sum of products and products of sums.   [10M]

13 Simplify using Quine-Mccluskey method F(a,b,c,d)= $\sum_m (0,1,4,7,8,10,12,13,14,15)$ [10M]

14 A sequential circuit has three D flip flops A,B,C and one input X. The circuit is described by the following input equations:

$$D_A = (BC + \overline{B}C)X + (BC + \overline{B}\,\overline{C})\overline{X}$$

$$D_B = A$$

$$D_C = B$$

1) Derive the state table for the circuit.
2) Draw two state diagrams, one for X=0 and the other for X=1.   [10M]

15 a) Design a 4x16 decoder using 3 X 8 decoders.   [5M]
    b) Explain about Demultiplexer.   [5M]

16 Use JK Flip-flops to design a binary or synchronous counter with the following repeated binary sequence: 0,1,2,3,4,5,6,7.   [10M]

17 Write short notes on:
a) PROM   [3M]
b) Equivalence Function   [3M]
c) Encoder with truth table.   [4M]

****

FACULTY OF INFORMATICS

B.E. (IT) III-Semester (CBCS (Main) Examination, December 2017

Subject : Environmental Studies

Time : 3 hours   **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Define the terms Eutrophication and famine.
2 Give examples of renewable and non-renewable resources.
3 Differentiate between food chair and food web.
4 Explain the effects of Modern Agriculture.
5 Mention the hotspots of biodiversity.
6 What is meant by Endemic species?
7 Define photochemical smog and biological oxygen demand.
8 Write the remedial measures to control noise pollution.
9 Explain about ozone layer depletion.
10 What are the causes and effects of the earth quake?

PART – B (50 Marks)

11 a) Write briefly about the scope of environmental studies.   5
    b) What is impact of excessive use of pesticides and fertilizers?   5

12 a) Why should natural ecosystem and various forms of species be protected?   5
    b) Explain the aquatic ecosystem and explain fresh water ecosystem in detail.   5

13 a) Explain the En-Situ methods of conservation of biodiversity.   5
    b) Enumerate and explain in detail the values of biodiversity.   5

14 a) Explain the importance and salient features of wild life protection act.   5
    b) Write various types of disasters. Explain the impact of disaster on environment
       and infrastructure.   5

15 a) Define and explain the terms producers, consumers, decomposers and
       detritivores   5
    b) Discuss droughts and floods with respects to their occurrence and impact.   5

16 a) Explain the various sources of pollution.   5
    b) Define solid waste management. Give classification of solid waster.   5

17 Write short notes on :
    a) Acid rain   3
    b) Global worming   3
    c) Forest Conservation Act   4

******

FACULTY OF ENGINEERING

B.E 2/4 (Civil) I – Semester (Backlog) Examination, December, 2017

Subject : Engineering Geology

Time : 3 Hours   **Max Marks : 75**

Note: Answer all questions from Part – A & Any five questions from Part – B.
Part - A (25 Marks)

1. During weathering process feldspar are altered to_____ (3)
2. Define cross – bedding and ripple marks (3)
3. How does water table differ from that of perched water table (2)
4. Define intact rocks (2)
5. The volcanic equivalent of basalt is_____ (3)
6. The chemical composition of bloodstone is _____ (3)
7. What is the difference between crystalline & amorphous minerals (2)
8. Define axial plane, axis and hinges of fold (3)
9. Briefly describe the various forces acting on the gravity – dam (2)
10. Vesicular structure is common in (2)
    a. Granite   b. Dolerite   c. Basalt   d. None of the above

Part - B (50 Marks)

11. a) Describe various geological hazards and illustrate which is most
       destructive & why ? (6)
    b) Illustrate the general geology of the sri sailam dam (4)
12. a) What is grouting? How it is useful in improving the performance of rock mass (5)
    b) Describe different physical properties used to identify a mineral (5)
13. "The knowledge of geology is very essential at the planning and construction stage of
    any civil engineering project" – Justly the statement. (10)
14. a) Describe various investigation you take for a foundation of multi storied building (6)
    b) Describe important clay minerals and their physical properties (4)
15. a) Describe geological and geophysical methods used for locating ground water (6)
    b) Define fold? Describe various types of fold with neat sketches (4)
16. Describe texture structure mineralogy of the following rocks (10)
    a) Limestone – Marble
    b) Shale – Slate
    c) Granite – Gnesis
    d) Talc
17. Write short notes on the following   10
    a) Tsunamis and its impact
    b) Types of joints in the igneous rock
    c) Test of weathering
    d) Application of GIS in engineering geology

****

FACULTY OF ENGINEERING

B.E. 2/4 (EEE/EIE) I-Semester (Backlog) Examination, December 2017

Subject: Digital Electronics And Logical Design

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from part – A & Any five questions from part - B

Paper – A

1. Define the Terms i) Accuracy   ii) precision iii) resolution   [3]

2. Define damping torque and indicate various methods of producing damping torque   [3]

3. Explain how the following adjustments made in single phase induction type energy meter.   [3]

    i.   Lag adjustment

    ii. Overload compensation

    iii. creep

4. List out the advantages & disadvantages of moving iron power factor meters?   [2]

5. Differentiate between the following with suitable examples   [3]

    i.   analog and digital transducers

    ii. active and passive transducers

    iii. transducers and inverse transducers

6. Explain the calibration of ballistic galvanometer using hibbert magnetic standard method.   [3]

7. Describe the measurement of frequency & phase angle with CRO.   [2]

8. Define the term standardization of a d.c. potentiometer.   [2]

9. What is leakage factor.   [2]

10. What is reactive power measurement?   [2]

PART-B

11. a) With a neat sketch explain the working of PMMC instrument and desire the expression for deflecting torque with spring control.   [5]

    b) Explain the various types of errors in moving iron instruments.   [5]

12. a) Explain the working of a mechanical resonance type frequency meter   [5]

b) A 230V single phase watt-hour meter has a constant load of 4A passing through it for 6 hours at unity power factor. If the meter disc makes 2208 revolutions during this period. What is the meter constant? And calculate the power factor of the load if the no. of revolutions made by the meter are 1472 operating at 230V 5A for 4 hours. [5]

13. a) Describe the working of low voltage schering bridge with phase diagram of the bridge under condition of balance. [5]

b) Explain the function and working of wagner earth devices [5]

14. a) Explain the oscillographic method of determination of hysterisisloop of a magnetic material. [5]

b) Describe the Lloyd fishes square for measurement of iron less in a specimen of laminations. [5]

15. Explain the construction and working principle of a co- ordinate type AC potentiometer. Discuss how it is standardized? And also explain the sources of its errors. [10]

16. a) Explain the method of calibration of strain gauges. [5]

b) With the help of neat sketch explain the working of meggar. [5]

17. a) Draw the circuit of a kelvin's double bridge and derive the condition for balance for measurement of low resistance. [5]

b) Define the following terms for instrument transformers [5]

  i. Transformation ratio

  ii. Nominal ratio

  iii. Turns ratio

  iv. Ratio correction factor

  v. Burden.

****

FACULTY OF ENGINEERING
B.E 2/4 (ECE) I – Semester Examination, December, 2017
Subject : Electronic Devices

Time : 3 Hours   **Max Marks : 75**

Note: Answer all questions from Part – A & Any five questions from Part – B.
Part - A (25 Marks)

1   Write the current equation of diode and explain its terminology   3
2   Distinguish between depletion and diffusion capacitance of a PN junction diode   2
3   State the rule of connecting and inductor and capacitor in filter circuits for rectification   2
4   The load resistance of a full wave rectifier is 500 and the voltage is 60 sin (100 t) Calculate peak, average and rams value of current   3
5   What ate three regions of operation of a transistor? Name one application corresponding to each region   3
6   Draw the input and output characteristics of BJT in Common base configuration   3
7   Give the approximate hybrid parameter equivalent circuit of a CE configuration   2
8   Draw the low frequency T model of BJT   2
9   Give the circuit of source self bias and explain why is it called so?   3
10   Calculate transconductance of FET given Id = 9mA, Idss=2mA and Vp = 4V   2

Part - B (50 Marks)

11. a) Explain how a zener diode is used for line and load regulation. Give necessary expressions   6
     b) Calculate the voltage regulation range of a zener diode regulator, given Rs – 2K ohm, RL = 1 K ohm, Vz = 6V, Izmin=2mA and Izmax = 20mA   4

12 a) Obtain expression for ripple factor of FWR with capacitor filter   6
     b) A FWR with capacitor filter has a transformer secondary voltage of 18-0-18,. Given c= 100 microfarads, R1=4 K ohm, Rf=40 ohm, Rsec=0 ohm, Calculate ripple factor Vdc, Vac.

13. a) Obtain the expression for stability factor of self bias circuit   5
     b) Draw a collector to base bias circuit and its calculate operation point and stability factor. Assume Rc=4 K ohm, Rb = 500 K ohm, and Beta = 200.   5

14. Perform DC and AC analysis for the RC coupled common emitter BJT amplifier, assume hie = 1.1Kohm, hfe = 50, hre = 2.5x10-4 and hoe = 24 x 10-6 Given Vcc=12V, Rc=4 K ohm, Rs = 1Kohm, R1 = 75 K ohm, R2 = 15 K ohm, RL = 10Kohm and Beta = 200.   10

15. a) Draw the output and transfer characteristics of JFET and explain   4
     b) Find Vgs, ID, Q point and transconductance for the voltage divided bias JFET circuit Given R1=12M ohm, R2 = 8M ohm, Rd = 1K ohm, Rs = 2.5 K ohm, Vdd = 25V, Idss = 5m A and Vp = -2V.   6

16. a) What is thermal runaway, how can it be eliminated   5
     b) Explain the operation of n channel MOSFET   5

17. Write short notes on
     a) Early effect
     b) SCR
     c) Current components in BJT   10

****

FACULTY OF ENGINEERING

B.E. 2/4 (M/P/AE) I - Semester (Main) Examination, December 2017

Subject : Metallurgy and Materials Science

Time : 3 Hours   **Max. Marks: 75**

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 List out different types of point defects.
2 What is grain size number and how it is important?
3 What is strain hardening?
4 What is endurance ratio is fatigue?
5 What is the classification of plain carbon steels?
6 What is age hardening?
7 List out the methods of Extraction of copper from ore.
8 What is Induction Hardening?
9 What are the advantages of composite materials?
10 What is compacting and sintering in powder metallurgy?

PART – B (50 Marks)

11 (a) Explain about interstitial and substitution and impurities.
   (b) List out the differences between cold working and hot working.

12 (a) Explain the fatigue behaviour with S-N Curve.
   (b) Explain the creep behaviour with a neat creep curve.

13 (a) List out the methods of construction of equilibrium diagrams.
   (b) Draw Iron-Iron carbide equilibrium diagram, label all the areas and list out various
       reactions.

14 (a) Explain about heat treatment cycle.
   (b) List out the differences between Normalizing and Annealing.

15 (a) List out different types of cast Iron and give their characteristics and properties.
   (b) Explain Bessemer process with a neat diagram.

16 (a) Explain about Case carburizing and Nitriding.
   (b) Explain the effects of various alloying elements on the properties of steel.

17 Write short notes on :
   (a) Hume-Rothery rules of solid solutions
   (b) Mechanism of ductile fracture
   (c) Advantages and limitations of powder metallurgy products

*****

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I - Semester (Backlog) Examination, December 2017

Subject : Computer Architecture

Time : 3 Hours　　　　　　　　　　　　　　　　　　　**Max. Marks: 75**

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1　Distinguish between full adder and Half adder.　　　　　　　　　(3)
2　List any four Register – Reference Instructions.　　　　　　　　(2)
3　Evaluate the arithmetic expression using memory stack.　　　　(3)

$$Y = A * B + A * (B * C + D * E)$$

4　Compare Hardware and micro programmed control unit.　　　　(2)
5　Design the hardware implementation for signed 2's complement addition /
　　substraction.　　　　　　　　　　　　　　　　　　　　　　　　(3)
6　What is Instruction pipeline?　　　　　　　　　　　　　　　　　(2)
7　Compare Isolated I/O with memory mapped I/O.　　　　　　　　(3)

8　Discuss about the strobe signal.　　　　　　　　　　　　　　　(2)
9　What is locality of reference?　　　　　　　　　　　　　　　　(2)
10　Distinguish between write back and write through methods of writing data to
　　cache memory.　　　　　　　　　　　　　　　　　　　　　　　(3)

PART – B (50 Marks)

11　Design a Bus system to connect eight 8-bit registers onto a common bus system.
　　Show the logic required to transfer the data to and fro.　　　　(10)

12　(a) What are Interrupts? List the different types of Interrupts.　　(3)
　　(b) Design a mciroprogram sequence for control memory and explain its
　　　　operation.　　　　　　　　　　　　　　　　　　　　　　(7)

13　(a) Explain the pipeline for floating point addition / substraction.　(7)
　　(b) Write about the super computers.　　　　　　　　　　　　(3)

14　(a) Explain the Asynchronous data transfer handshake signals.　(5)
　　(b)　Explain the concept of Daisy chain priority interrupt.　　　(5)

15　With a neat figure, explain the memory connection to CPU.　　(10)

16　(a) What are Array processors?　　　　　　　　　　　　　　(3)

　　(b) Write a program to evaluate the following arithmetic statement.　(7)

$$W = P + (Q/R) * (Q - S)$$

17　Write short notes on :
　　(a) Binary adder / Subtraction　　　　　　　　　　　　　　　(5)
　　(b) Virtual memory　　　　　　　　　　　　　　　　　　　　(5)

*****

FACULTY OF INFORMATICS

B.E. 2/4 (IT) I-Semester (Backlog) Examination, December 2017

Subject : Electrical Circuits and Machines

Time : 3 hours   **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1   Three resistors 6Ω, 12Ω and 4Ω are connected in parallel. If the total current is 12A, find the current flowing in each resistor.   3
2   State Kirchoff current law and voltage law.   2
3   Draw the circuit diagram for the measurement of 3-φ power using two wattmeter method.   3
4   Define regulation of a transformer.   2
5   List out the differences between transformer and auto transformer.   3
6   Draw the circuit diagram for different types of compound motors.   3
7   What are the conditions for self excitation in a DC shunt generator.   2
8   Define slip of an induction motor.   2
9   Explain why single phase induction motor is not self starting. How do you produce a starting torque?   3
10 Mention the applications of a stepper motor.   2

PART – B (50 Marks)

11 a) Using Thevenin's theorem, find the current in 8Ω resistor shown in fig.   5
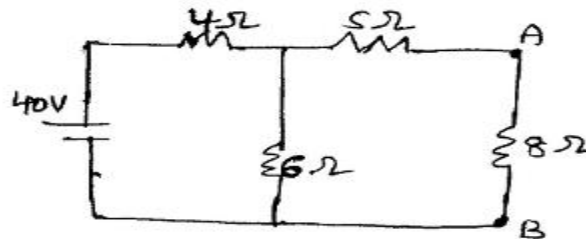
   b) Two coils of self inductances 3H and 2H respectively are connected in series. If coefficient of coupling between these coils is 0.5. Find the inductance of circuit when coils are connected in i) series adding   ii) Series opposing.   5

12 a) Derive the relationship between line and phase voltages, line and phase currents for a 3-φ balanced star connection. Draw phasor diagram.   5
   b) A 50KVA transformer has iron loss of 500W and full load copper loss of 800W. Find the efficiency of transformer at full load, 0.8 pf lagging and half full load, 0.9 pf lagging.   5

13 a) Explain the constructional details of a DC machine.   5
   b) A 6-pole lap wound shunt motor has 500 conductors. The armature and shunt field resistances are 0.05Ω and 25Ω respectively. Find the speed of the motor if it takes 120A from a DC supply of 100V. Flux per pole is 20mwb.   5

14 a) Explain the principle of operation of 3-ϕ induction motor. 5
   b) Explain any one method of speed control for a 3-ϕ induction motor with neat diagram. 5

15 a) Discuss the construction and working of a capacitor start single phase induction motor. 5
   b) Explain working of BLDC motor with neat diagram. 5

16 a) Derive the torque equation of a DC motor. 5
   b) Describe briefly the auto transformer starting of induction motor with neat diagram. 5

17 Write short notes on :
   a) 3-point starter 4
   b) OC and SC tests of a transformer 6

******