

INSTITUTE OF SCIENCE & TECHNOLOGY
ASSIGNMENT QUESTION FOR ODD SEMESTER-2017
DIPLOMA-1ST SEM – (CST+ETCE+EE+ME+CE)

PAPER NAME :- BASIC CHEMISTRY
PAPER CODE : CHM

1. State Rutherford's atomic model and state one of its drawback.
2. State the main postulates of Bohr's atomic model.
3. State Hund's rule of maximum spin multiplicity and describe how it explains the electronic configuration of Chromium of atomic number 24.
4. State and explain Pauli's exclusion principle. How it can be used to ascertain the maximum number of electrons which can be accommodated in a set of d orbital?
5. Why H₂O is liquid but H₂S is gas at ordinary temperature?
6. Give an example each of sigma and pi-bond. Which one is stronger and Why?
7. What is H-bond? Give an example of each of inter and intra molecular H-bonding.
8. Give the orbital picture of SP₂ hybridization.
9. FeCl₃ solution in water is acidic – Give reasons.
10. What is buffer solution? Give an example of acidic buffer and basic buffer.
11. Discuss the Lewis theory of acids and bases. Give examples of each.
12. The P^H of a solution is 4.5. Calculate the H⁺ ion concentration of the solution.
13. Give an example of (i) Normal salt
(ii) Acid salt
(iii) Basic salt
(iv) Complex salt
(v) Mixed salt .
14. Balance the following reaction by ion-electron method
$$\text{MnO}_2 + \text{Cl}^- \longrightarrow \text{Mn}^{2+} + \text{Cl}_2$$
15. Prove that P^H+ P^{OH} = 14

PAPER NAME : MATHEMATICS
PAPER CODE: MTHS

Answer the following questions.

1. If ω be an imaginary cube root of unity and show that $1 + \omega + \omega^2 = 0$.
2. If $\sin A = \frac{3}{5}$, then show that $\cos A = \frac{4}{5}$.
3. Simplify $\frac{\sin^2 A + \cos^2 A}{\sin A \cos A}$.
4. Find the vertex, axis, focus, length of latus-rectum, equation of director, coordinates end points of the latus-rectum and tangent at the vertex of the parabola $y^2 = 4ax$.
5. If $\sin A = \frac{3}{5}$, then find $\cos 2A$.
6. If A and B are positive acute angle and $\cos 2A = \cos 2B$ show that $\tan A = \tan B$.
7. If d_1 and d_2 are the two diagonal of a parallelogram. Find the area of the parallelogram.

PAPER NAME :- BASIC PHYSICS
PAPER CODE : PHY

1. Find out the dimension of force and universal gravitational constant.
Write down the limitations of dimensional analysis.
2. If the volume of a wire remains unchanged when subjected to a tensile strain, show that its Poisson's ratio will be $\frac{1}{2}$.
3. Differentiate between conduction, convection and radiation.
4. Define the terms stress and strain. Write down their SI units.
5. The density of a substance at C and C are 2600 kg/m^3 and 2596 kg/m^3 respectively. Find the coefficient of linear expansion of the substance.
6. State the first law of thermodynamics.
7. What do you mean by adhesive force and cohesive force? Define streamline and turbulent motion.
8. Derive the relation between coefficient of linear expansion and the coefficient of volume expansion.
9. Determine the dimension of K(thermal conductivity).
10. State zeroth law of thermodynamics. What do you mean by internal energy of a gas?

PAPER NAME: - COMMUNICATION SKILLS – I
PAPER CODE: - CS -I,

1. Suppose you are the General Secretary of the student's council of your college. The Principal Sir has asked you to investigate the facilities available in the library at your college and to make recommendations for improvement. Now write a report accordingly.
2. There has been significant decline in the business of the urban branches of a nationalised bank. A committee of five Regional Managers has been appointed to look into the causes. Write a report recommending computerisations of the branches and customer relations training for the staff.
3. Assume that you are the President of your hostel. You have been facing and receiving several problems regarding various issues in your hostel. The issues are as follows: a) Tasteless and unhygienic food b) Filthy washrooms c) Night time security within the premises.
4. Write a paragraph stating your views on "Pollution free transport system".
5. Develop a paragraph from the information given below :
Problem: Population explosion in India
Causes: Sharp fall in death rate due to improved medical and health care facilities. No substantial fall in birth rate due to illiteracy, practice of early marriage, religious and social attitudes.
Effects: Poverty, Unemployment, poor standard of living.
6. The following hints will help you to write about different sources of job vacancies.
a) Print:- Newspaper—National, Regional. Special newspaper—Sports journals, employment news, film magazines. b) Audio visual Media:- Radio-In general slots(during serials), In special slots(employment announcements) c) Informal sources:- By word of mouth(people already employed in an organisation, relatives,neighbours)
7. What is note taking? What are importance of note taking? Mention the methods of note taking.
8. What is the role of communication in an Organisation?
9. How many barriers are there in the Communication? Discuss at least one type of barrier occurred in the Communication.

PAPER NAME: ENGINEERING MECHANICS
PAPER CODE: EM

1. State & prove i) Parallelogram law of force. ii) Polygon law of forces. iii) Varignon's Theorem of coplanar forces.
2. Two forces act at an angle of 120° . The bigger force is 60N & the resultant is perpendicular to the smaller one, find the smaller force.
3. A) State and explain Lami's theorem.
B) Determine the horizontal force P to be applied to a block of weight 450N to hold it in position on a smooth inclined plane which makes an angle 30° with horizontal.
4. An oil drum of 50cm dia & 2m long is to be rolled across a footstep of 10cm high. Find the minimum push required at the top of the drum. Take density of oil as 1.5 kg/lit . Neglect weight of the drum.

5. A uniform rod of 8m length has self weight of 6 kN. The rod carried a weight of 25kN hung from one of its end. From what point each the rod to be suspended so that the rod remain horizontal.
6. Describe the following
 - a. Angle of friction
 - b. Angle of repose
 - c. A body resting on a rough horizontal plane, required a pull of 120N inclined at 30° to the plane just to move it. It was found that a push of 160 N inclined at 30° to the plane just to move it. Determine the weight of the body & the co-efficient of friction.
7. State the law of relating to static friction. An uniform ladder of 5m long rests on a horizontal ground floor & lean against a smooth vertical wall at angle of 60° with the horizontal. The weight of the ladder is 300N acts at the middle. The ladder is at the point of sliding, when a man weighing 150N stands on a rung of 2 m from the bottom of the ladder. Calculate the co-efficient of friction between the ladder & the floor.
8. Define centroid & centre of gravity.
9. An I-section has the following dimension:

Bottom flange	=	250x100
Top flange	=	150x50
Web	=	400x50

Determine mathematically the position of centroid of the given section.
10. In differential pulley block, A load of 800 N is raised by an effort of 100N. The no of teeth on the larger and smaller block are 18 & 16 respectively. Find the velocity ratio, mechanical advantage and efficiency of machine.
11. In a simple machine, whose velocity ratio is 50, a load of 1200N is lifted by an effort of 200N & a load of 2000N is lifted by an effort of 250N. Find the law of the machine. Also calculate the load that can be lifted by an effort of 300N.
12. A simply supported beam AB of span 4m is carrying point loads of 5KN ,2KN & 3KN at 1m , 2m & 3m from the support A. Calculate the reactions at the supports A & B.

DIPLOMA-3RD SEM (CST)

PAPER NAME : DISCRETE MATHEMATICS PAPER CODE: DMTHS

Answer the following questions:

1. Define equivalence relation. What is anti symmetric relation?
2. Among integers 1 to 300, how many of them are divisible neither by 3 nor by 7?
3. Solve the following recursive function using substitution.
4. What is weighted graph? Write Dijkstra's shortest path algorithm.
5. Draw the graph G corresponding to each adjacency matrix
6. Consider the lattice $L = \{1, 2, 3, 4, 6, 12\}$ ordered by divisibility. Find the upper and lower bound of L . Is L a complemented?

7. Suppose that 100 of 120 mathematics students at a college take at least one of the language French, German, and Russian. Also suppose----

65 study French 20 study French & German
45 study German 25 study French & Russian
42 study Russian 75 study German & Russian

- i) Find the number of students who study all three languages.
- ii) Determine the number k of students who study a. exactly one language, b. exactly two languages.

PAPER NAME: COMPUTER PROGRAMMING

PAPER CODE: CP

1. Enlist the features of C. Explain different data types used in C language?
2. Explain type identifiers in C? Explain in brief structure of C programming?
3. What is operator enlisting all operators used in C? What is data type explain the any four data types used in C language?
4. Explain the difference between '=' and '==' operator explain with example? Write a short note precedence & order of evaluation?
5. Differentiate between relational and logical operators used in C?
6. What is variable? What are the rules for defining variables? Differentiate between local variable and global variable?
7. Explain symbolic constants used in C? Explain any two bitwise operators with suitable example.
8. Explain with example ++i and i++. Explain logical operators and expressions used in C?
9. Write a C Program to print all numbers between 1 to n divisible by 7.
10. Write a C language program to print all Armstrong numbers between 1 to 500.
(e.g. $153=1^3+5^3+3^3=153$)

PAPER NAME: COMPUTER ARCHITECTURE

PAPER CODE: COA

- 1) Describe the Booth's multiplication algorithm with a suitable architectural diagram.
- 2) Explain about von-Neuman architecture?
- 3) Explain Inclusion property of memory?
- 4) Describe UMA model.
- 5) Describe about Floppy disk, hard disk and Magnetic tapes.
- 6) Write down the difference between multicomputer and multi processor.
- 7) Write down the difference between RISC and CISC architecture.
- 8) Explain Flynn's classification with the diagram and give the examples of each classification.
- 9) Explain set-associative mapping.
- 10) Explain write-back policy and write-through policy.

PAPER NAME: - DATA STRUCTURE

PAPER CODE: - DSC

1. Insert the following keys into a AVL tree.
64, 1, 44, 26,13,110,89,85,20
Then delete the following keys. 85, 1
2. Explain DFS with suitable example
3. Define the following: Connected graph, Tree, linked list.
4. Write the algorithm for binary search.
5. Convert the following infix to postfix expression using Stack

$$4+3*10/6+7-4/2+5^3$$

6. Construct a tree from following

INORDER: D B F E A G C L J H K

POSTORDER: D F E B G L J K H C A

7. Explain the tower of Hanoi problem of recursion of 3 peg and 3 disks

8. Show the stages in growth of a 4 order B-tree when the following keys are inserted in the given order.

74, 72, 19, 84, 51, 10, 35, 18, 60, 76, 58, 19, 45.

9. What is asymptotic notation? Define different notation associated with complexity.

10. Write the algorithm for Merge Sort.

PAPER NAME: ELECTRONIC AND DEVICES AND CIRCUITS

PAPER CODE: EDC

1. Discuss Comparator circuit.
2. Draw and discuss circuit of Monostable multivibrator using IC 555 timer.
3. Discuss h-model of CE transistor amplifier
4. Discuss complete power supply.
5. Write short note on
 - (i) Hartley Oscillator .
 - (ii) Positive feedback
 - (iii) Barkhausen criteria

PAPER NAME: DIGITAL LOGIC DESIGN

PAPER CODE: DLD

1. Describe with Two Inputs Truth Table & Standard Symbol of Three Basic Gates (AND, OR, NOT) & Two Universal Gates (NAND, NOR)
2. Realise the logic expression, $y =$ using gates.
3. State De-Morgan's theorem. Prove that $(A+B)(A+C) = (A+BC)$.
4. What is Truth Table, Binary, Octal, Hexa decimal number system?
5. Define subtraction using 2's complement method.
6. Short Notes on – RAM, ROM, PROM, EPROM, EEPROM
7. Realisation of Basic Operation (AND, OR, NOT) using NAND & NOR Gates.

DIPLOMA-3RD SEM

(EE)

PAPER NAME: ELECTRIC CIRCUIT THEORY

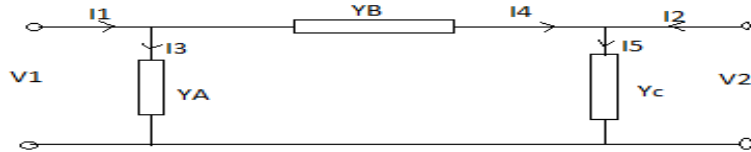
PAPER CODE:ECN

- (1) If $f(t)=\sin wt$ then prove that $F(s)=w/(s^2+w^2)$.
- (2) Determine the Laplace Transform of R-L-C series circuit when step response is applied on its input.
- (3) A function in Laplace domain is given by

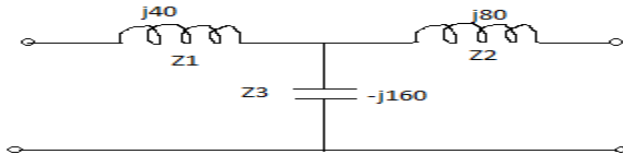
$$I(s)=(s+1)/s(s^2+4s+4)$$

Obtain its Inverse Laplace Transform.

- (4) A capacitor of $5\mu\text{F}$ being charged initially to 10V is connected to a resistance of $10\text{K}\Omega$ in series and is allowed to discharge through it by switching of a switch K. Find the expression of discharging current when step response input is applied in it.
- (5) Determine the condition of Reciprocity and Symmetry in Z-parameter representation.
- (6) Calculate the different parameters in h- parameter representation.
- (7) Find the Y-parameters of the following π -circuit and draw the Y-parameter model.



- (8) Find the Y-parameters of network shown in figure below from Z-parameters.



PAPER NAME: PROGRAMMING CONCEPT USING C

PAPER CODE: PCC

1. Enlist the features of C. Explain different data types used in C language?
2. Explain type identifiers in C? Explain in brief structure of C programming?
3. What is operator enlisting all operators used in C? What is data type explain the any four data types used in C language?
4. Explain the difference between '=' and '==' operator explain with example? Write a short note precedence & order of evaluation?
5. Differentiate between relational and logical operators used in C?
6. What is variable? What are the rules for defining variables? Differentiate between local variable and global variable?
7. Explain symbolic constants used in C? Explain any two bitwise operators with suitable example.
8. Explain with example ++i and i++. Explain logical operators and expressions used in C?
9. Write a C Program to print all numbers between 1 to n divisible by 7.
10. Write a C language program to print all Armstrong numbers between 1 to 500.
(e.g. $153=1^3+5^3+3^3=153$)

PAPER NAME: BASIC ELECTRONICS.

PAPER CODE: BE

1. A BJT is a current controlled device while a FET is a voltage controlled device-explain.
2. Write short note on-SCOTTKY DIODE, PHOTO DIODE.
3. Define drain resistance, Transconductance and amplification factor of JFET and Deduce their relationship
4. Differentiate zener breakdown and avalanche breakdown.
5. Discuss the frequency response of Single stage CE amplifier, Bandwidth and its significance.
6. What is the need for cascade amplifier? Discus the gain of cascade amplifier.
7. Draw circuit diagram and discuss operation of Shunt and series regulator using transistor

PAPER NAME - ELECTRICAL MEASURING INSTRUMENTS

PAPER CODE : EMI

- (1) What are absolute and secondary instruments? Write short notes on each of them.
- (2) Write short notes on indicating, integrating and recording instruments explaining the purpose of using such instruments and the basic differences among them.
- (3) (a) What are the principal considerations for the choice of spring materials as used in instruments? Name some of the common spring materials.
(b) Describe, with neat sketch, the control spring assembly of a moving coil instrument explain the principle of operation.
- (4) What are the different types of damping systems used in practice? Explain, with neat sketches, the principle of operation of each of them.
- (5) (a) What is creeping in an energy meter? How it is minimized?
(b) What is phantom loading?
- (6) Describe with phasor diagram the method of measuring power of 3-phase balance star connected load using two wattmeter.
- (7) Describe, with a neat sketch, the construction of a single phase induction type energy meter and explain its working principle.

PAPER NAME : ELECTRICAL MACHINE-1

PAPER CODE:EM-1

- (1) What do you mean by armature reaction in DC machine?
- (2) Drive the e m f equation for dc motor
- (3) Draw a neat sketch of a DC motor and state the function of each part?
- (4) Explain what is mean by back EMF?
- (5) Explain transformer EMF equation
- (6) Why a DC series motor should not be started at no load?

SUB: ELEMENTS OF MECHANICAL ENGINEERING

PAPER CODE:(EME)

1. Write Difference between S.I and C.I engine and also state its merits and demerits.
2. State the working principle of room air conditioner.
3. Define Second law of thermodynamics. Distinguish between vapour compression system and adsorption vapour system.
4. Explain with neat sketch working principle of Domestic refrigerator with neat sketch.
5. List out the Difference between fire tube and water tube boiler .Explain the working principle of water tube boiler with neat sketch.
6. What do you mean by heat engine? What are the difference between a refrigerator and heat pump?
7. Write down the advantages of impulse turbine? Also classify the different types of turbine?
8. What is scavenging? Describe with a neat sketch the working principle of two stroke petrol engine.
9. Explain the Working principle of 4-stroke Diesel Engine and also writes its application.

DIPLOMA-3RD SEM

(ME)

PAPER NAME: ADVANCE STRENGTH OF MATERIALS

PAPER CODE: ASOM

1. Derive the relation when a circular bar subjected to torque $\tau/R=C\theta/l$.
Where, τ is shear stress, R is radius of circular shaft, l is length of shaft, θ is angle of twist.
2. A rectangular beam, simply supported over a span of 6m, is carrying a uniformly distributed load of 30 KN/m. Find the dimension of the beam, if depth of the beam section is 3 times its width. Take maximum bending stress in the beam section as 60 Mpa.
3. At a point in a stressed element, the normal stress in two mutually perpendicular directions are 45Mpa and 25Mpa both tensile. The complementary shear stress in these directions is 15 Mpa. Determine the maximum and minimum principle stresses.
4. Derive the strain energy stored in a body when the load is sudden applied.
5. Derive the deflection of closely coiled helical spring when its subjected to an axial load.
6. A closely coiled helical spring of round steel wire 4 mm in diameter having 10 complete coils of 30 mm mean diameter is subjected to an axial load of 90N. Find the deflection of the spring and maximum shearing stress in the material. Modulus of rigidity (C) = 80Gpa.
7. A hollow shaft is to transmit 250 kW at 100 r.p.m. If the shear stress is not to exceed 60 Mpa and internal diameter is 0.8 of the external diameter, find the diameters of the shaft.
8. Write the assumptions for find out the shear stress in a circular shaft, subjected to torsion.
9. A closed- coiled helical spring is required to carry a load of 150N. If the mean coil diameter is to be 8 times that of the wire, calculate the diameters. Take maximum shear stress as 100MPa
10. A rectangular beam 60mm wide & 150mm deep is simply supported over a span of 6m. If the beam is subjected to central point load of 12 KN, find the maximum bending stress induced in the beam section.
11. A 3m long alloy bar of 1000 mm² cross-section area hangs vertically and has a collar securely fixed at its lower end. Find the stress induced in the bar, when a weight of 2.5 kg falls from a height of 150 mm on the collar. Take $E=120$ G pa. Also find the strain energy stored in the bar
12. State the assumption made in deducing the torsion equation. Also establish torsion equation in solid circular shaft.

PAPER NAME: THERMAL ENGINEERING –I PAPER CODE- TE-I

1. Derive the expression for the quantity of heat flow through hollow cylinder.
2. Write a short notes on .
A) Bio mass Energy ,B) Solar distillation
3. A). What are primary and secondary sources of energy.
B). State Klevin-Planck and Clausius statements on second law of thermodynamics.
4. A) Obtain an expression for general change of entropy of perfect gas in terms of volume and pressure.
B). One Kg of gas expands adiabatically through a volume 1: 5 Initial pressure and temperature of gas are 28 bar and 250 °C respectively. Find the pressure and temperature for gas take $C_p= 1.024$ and $C_v =0.7135$ KJ/Kg. K .
5. Explain what constant pressure is. Represent the process on P-V and T-S Diagram .Find out thr work done and heat transferred during process.
6. A). Writes notes on Mollierdiagram . What is importance of this diagram .
B). Explain with temperature-enthalpy diagram wet saturated steam ,dry saturated steam and super heated steam
7. Describe working principle of throttling calorimeter with neat sketch and also state the limitations.
8. A).What do you mean by thermal conductivity ?what is its unit.
B). Deduce a formula for the overall heat transfer co-efficient for a flat composite wall, taking into consideration the convective heat transfer co-efficient.

9. A). State Fourier's law of heat conduction . Define thermal conductivity. Define Absorptivity, Reflectivity, Transmissivity
- B). Explain Three Modes of heat transfer
10. What are the conventional and non-conventional energy sources ? Describe briefly.
11. Prove that the efficiency of heat engine always less than 100%. Also find out the COP of heat pump and refrigerator.
12. the pressure of steam inside boiler, as measure by gauge is 1.2 N/mm^2 . If the barometric reading is 770 mm of mercury, find the absolute pressure of steam inside the boiler in N/mm^2 and bar.
13. Define the following terms: saturated steam, super saturated steam, wet steam and sensible heat of water.
14. Derive the expression for change of entropy in terms of temperature and volume.
15. Define the thermodynamics equilibrium with types .
16. What is gauge pressure and absolute pressure? How absolute pressure is obtained from gauge pressure.
17. What is polytrophic process? Find out the work done during polytrophic process.
18. prove that adiabatic process follow the law $PV^\gamma = C$
19. state the working principle and application of heat exchangers (i)shell type (ii)tube type (iii) plate type.

PAPER NAME : MANUFACTURING PROCESS

PAPER CODE : MP-1

1. Describe press forging. How does it differ from drop forging?
2. What is re-crystallization? Define re-crystalline temperature. Differentiate between hot and cold working.
3. Discuss the methods used for the production of pipes and tubes. Write the name different type of pattern materials and their advantages and disadvantages
4. Make neat sketch and explain the construction and operation of a cold chamber die casting machine.
5. Explain the various steps involved in the investment casting of metals. Explain in brief the defects in forging?
9. a. With neat sketches describe up milling and down milling.
b. Describe various lathe parts
10. State the nomenclature of twist drill. How to specify a lathe.
11. Describe various Drilling machine parts. Using neat sketch, describe the principal parts of the milling machine by neat sketches. Explain various types of milling operations using neat sketches. What is indexing? Describe direct indexing, with example.
12. How will you obtain neutral, oxidizing and reducing flames using welding torch in gas welding? Compare the merits and demerits of using A.C and D.C for arc welding. (6+4)
13. Compare TIG welding with MIG welding. Explain submerged arc welding with neat sketch.
14. What do you understand by thermit welding? What are its main advantages?
15. Describe the process of submerged arc welding stating its advantages and limitations.
16. Discuss the method of resistance welding. What are its advantages and disadvantages?
17. Discuss, with the help of neat sketch, the principle of spot welding, Explain the principle of atomic hydrogen welding.

PAPER NAME: FUNDAMENTALS OF ELECTRONICS.

PAPER CODE: FE

1. Define drain resistance, Transconductance and amplification factor of JFET and Deduce their relationship.
2. Write short note on-SCOTTKY DIODE, PHOTO DIODE.
3. A BJT is a current controlled device while a FET is a voltage controlled device-explain.
4. Discuss the frequency response of Single stage CE amplifier, Bandwidth and its significance.
5. What is the need for cascade amplifier? Discus the gain of cascade amplifier.
6. Draw circuit diagram and discuss operation of Shunt and series regulator using transistor
7. Discuss and draw the circuit of differentiator , Instrument amplifier, wien bridge oscillator and schmitt's trigger.
8. Draw and discuss temperature control circuits using SCR, FWR and Speed control circuits.
9. Discuss working principle with general block diagram of shift register and counter.

PAPER NAME :ENGINEERING MATERIALS

PAPER CODE:EM

1. What is 18-4-1 high speed steel?
2. What is the maximum solubility of carbon in iron?
3. Explain TTT curve.
4. Distinguish between eutechic and eutectoid steels.
- 5.Explain the term 'martensite' transformation.
6. Distinguish between white and grey cast-iron. Distinguish between high carbon steel and alloy steel
7. What is duralumin? Give the composition and application.
8. Draw and level the stress- strain diagram for mild steel and cast iron and various point explain.
9. Describe with neat sketch of one common method used for forming plastic sheets.
10. State the difference between thermoplastic & thermosetting plastic.
11. Characteristic and application of ferrous materials.
12. Classify carbon steel and their uses.
13. Classify the difference types of stainless steel with their properties and application.
14. Write the short notes on (a) Free cutting steels and (b) Spring steels.
15. Write short notes on injection moulding and compression moulding.

DIPLOMA-3RD SEM

(CE)

PAPER NAME: SURVEYING

PAPER CODE: SURV

1. Write short notes :
 - a) What is the principle of levelling? How can the term 'radiation' e table surveying
 - b) Type of offsets
 - c) Error in chain surveying
 - d) Error in plane table surveying
 - e) Contour characteristics
 - f) Difference between prismatic compass and surveyor's compass
2. a) What is the principle of chain surveying?
- b) When chain survey is recommended?

c) When chain survey is inconvenient? in case of plane table surveying be described ?

3. The following are the bearings observed in traversing with a compass in an area where local attraction was suspected. Calculate the interior angles of the traverse and correct them if necessary.

Line	Fore bearing	Back bearing
AB	191°45'	13°
BC	39°30'	222°30'
CD	22°15'	200°30'
DE	242°45'	62°45'
EA	330°15'	147°45'

4. Write short notes on any *four* of the following
 - a) Orientation of plane table surveying
 - b) What is the principle of levelling? How can the term 'radiation' e table surveying
 - c) Type of offsets
 - d) Error in chain surveying
 - e) Error in plane table surveying
 - f) Contour characteristics
 - g) Difference between prismatic compass and surveyor's compass
5.
 - a) Write on Errors and mistakes in chain surveying and their limitations.
 - b) What are all the instruments used for the setting out right angles? Describe in short.
6. What is orientation? Why is it done? b)Method of plane tabling by radiation and intersection.
7. Write short notes on any four of the following
 - a) Sensitiveness of a bubble tube
 - b) Reconnaissance survey
 - c) Local attraction
 - d) Merits and demerits of plane table survey
 - e) Mass haul diagram.
8. Write down the characteristics of contours. Briefly discuss about the contouring methods. Name the methods of interpolation of contour.
9.
 - a) What are the different methods of contouring? Describe any one of them with sketch.
 - b) What is grade contour? Describe along with sketch.
10. The following particular were noted while measuring the area of a figure with a planimeter.
 - a) IR and FR were 8.652 and 6.798 respectively.
 - b) The tracing arm was set to the natural scale.
 - c) The zero of the dial passed the index mark once in the anticlock wise direction.
 - d) Constant $c=20$
 - e) Scale of the map is 1cm=10m
 - f) the anchor point was inside the fig
 - b) What is planimeter?

PAPER NAME: BUILDING MATERIALS & CONSTRUCTION

PAPER CODE: BMC

1. Classify mortar and write short notes on each of the classification.
2. Briefly illustrate the classification of rocks with at least one example each.
What are the precautions need to be taken during layout of a building.
3. What do mean by brick bonding? Explain with neat sketch.
Write short note on English bond with neat sketch.
4. State briefly the functions of any two following items: foundation, parapet, and beam.

What do you mean by mortar?

5. Discuss in brief about providing damp proof course at the plinth level? Explain the causes of dampness in brief. Write the process of damp proofing of roofs. write one objective of painting
6. Classification of termite. State the two methods of termite treatment. Explain the various methods of damp-proofing i.) Flat roofs ii.) Pitched roofs.
What precautions should take before giving water-proofing treatment with bitumen felt to building situated in a coastal region with very heavy rainfall?
7. Define the term cement? What are the chief chemical ingredients of cement and their percentages in cement? Types of cement which are mostly used? Discuss briefly about bulking of sand.
8. Name the various types of roof .what is truss? State the advantages and disadvantages of flat roofs.name least three roof covering materials.

PAPER NAME: CONCRETE TECHNOLOGY

PAPER CODE:CT

1. State the chemical composition of cement with percentages and role of each ingredient. What is heat of hydration?
2. State some field test of cement. What is aggregate impact and aggregate crushing value? Explain in details.
3. What is admixture? Classify admixtures. State its effect on the properties of concrete.
4. What is bulking of sand? What is its phenomenon? State bulking effect on concrete mix proportion.
5. What is segregation, bleeding and laitance? What is flakiness index and elongation index?
6. Explain creep, shrinkage of concrete. Explain some non destructive test of concrete.
7. Write short notes on a) ready mix concrete b) fibre reinforced concrete.
8. What are design stipulations for design of concrete mix? What test data for materials are required for the design?

PAPER NAME: MECHANICS OF STRUCTURE

PAPER CODE: MOS

1. Find the total strain energy stored in the bar, when it is subjected to a gradual load of 70 KN. Also find the total strain energy stored in the bar, when the bar is made of uniform cross section of the volume under the same load. Take $E=200\text{Gpa}$.
2. A rectangular body $400\text{mm}\times 50\text{mm}\times 40\text{mm}$ is subjected to a shear stress of 60 Mpa. Calculate the strain energy stored in the body. Take $C= 80\text{Gpa}$. Define – proof resilience and modulus of resilience.
3. What is frame? Classify frame. Write assumptions taken for forces in the members of a perfect frame.
4. A simply supported beam of 3m span carries two loads of 5KN each at 1m and 2m from the left hand support. Draw the shear force and bending moment diagrams for the beam.
5. An overhanging beam ABC loaded with 4.5 KN/m with whole beam. Distance between A and B is 3m and B to C is 1m. Calculate point contra flexure.
6. A beam of square section is used as a beam with one diagonal horizontal. Find the maximum shear stress in the cross section of the beam. Also sketch the shear stress distribution across the depth of the section.
7. A hollow rectangular masonry pier is 1.2m x 0.8 m wide and 150mm thick. A vertical load of 2 MN is transmitted in the vertical plane bisecting 1.2m side and at an eccentricity of 100mm from the geometric axis of the section. Calculate the maximum and maximum stress intensities in the section.
8. Derive an expression for deflection of a cantilever beam with a gradually varying load. A simply supported beam of 2m span carries a point load of 20 KN at its mid point. Determine the maximum slope and deflection of the beam. Take flexural rigidity of the beam as $500\times 10^9\text{ N-mm}^2$.

9. Write MOHR'S theorems. A beam of rectangular cross section is 200mm wide and 350mm deep. If the section is subjected to a maximum S.F 30 KN , Find the maximum shear stress.
10. A circular column 200mm dia. Carries a vertical load of 30KN at a distance 30 cm from the axis. Find the maximum and minimum stress intensities at the base.
11. A solid circular shaft of 3 m length and 200mm dia is subjected to a torque of 100 KN-m. Find the relative rotation between the end cross section of the shaft. Given, $C= 1 \times 10^5 \text{ N /mm}^2$.
12. What is pure torsion? Write pure bending equation with notations. A solid shaft is subjected to a torque of 1.6 KN-m. Find the necessary dia. Of the shaft, if the allowable shear stress is 60 Mpa. The allowable twist is 1° for every 20 diameters length of the shaft. Take $C = 80\text{Gpa}$.
13. Find the Eulers crippling load for a hollow cylindrical steel column of 38 mm external diameter and 25 mm thick. Take length of the column as 2.3 m and hinged at its both ends . Take $E= 205 \text{ Gpa}$. Also determine crippling load by Rankine formula using constants as 335 Mpa and $1/7500$.

PAPER NAME: HYDRAULICS
PAPER CODE: HDL

1. State Bernoulli's equation from Euler's equation. What are the assumptions of Bernoulli's equation?
2. A pipe through which water is flowing is having diameters 20cm and 10cm at the cross sections 1 & 2 respectively. The velocity of water at section 1 is given 4 m/s. find the velocity head at sections 1 and 2 and also rate of discharge.
3. What is venturimeter? Derive the expression for rate of flow through venturimeter.
4. State Darcy weishbach formula and chezy's formula for loss of head due to friction in pipes.
5. What are major and minor energy losses? State it's classification.
6. Calculate the discharge through a pipe of diameter 200mm when the difference of pressure head between the two ends of a pipe 500m apart is 4m of water. Take the value of $f=0.009$ in the formula $h_f=4flv^2/d*2g$.
7. State the formula of minor energy loss for entrance and exit of the pipe.
8. What is water hammer in pipes? Explain with figure.
9. What are the different types of fluid flow? State the formula for Reynolds's number.
10. What are the gauge pressure and absolute pressure at a point 3m below the free surface of a liquid having a density of $1.53 \times 10^3 \text{ kg/m}^3$ if the atmospheric pressure is equivalent to 750 mm of mercury? The specific gravity of mercury is 13.6 and density of water = 1000 kg/m^3 .

DIPLOMA-5TH SEM
(CST)

PAPER NAME:-SOFTWARE ENGINEERING
PAPER CODE : SE

1. What are the features of good software? What are the Top-down, Bottom-up approach?
2. What is McCall's quality model? Explain the different factor associated with this model?
3. What is the difference between Cohesion and coupling? With proper example explain why a good system requires high cohesion low coupling?
4. What is testing? What is the importance of testing? What are terms related to testing?
5. What is use case diagram? Draw the use case diagram for ATM system.
6. What is 4Ps of software project management?
7. What is iterative waterfall model? What are the advantages of iterative waterfall model over

classical waterfall model?

8. What is prototype? Explain the model which use prototype.
9. What is DFD? Draw a DFD for Hospital Management System.
10. What is software maintenance? What are the different types of software maintenance?

PAPER NAME : JAVA PROGRAMMING

PAPER CODE: JP

1. Write a program to print the right angle triangle given below

```
*
* *
* * *
* * * *
* * * * *
```

2. Write a program to print the triangle given below

```
      *
     * *
    * * *
   * * * *
```

3. Describe the JAVA features.
4. Give a number, write a program using while loop to reverse the digits of the number. For example, the number 12345 should be written as 54321.
5. Write a program finds the number is prime or not. Example 1003 is prime or not.
6. List any eight controls from java.awt package.
7. a) Explain use of command line arguments.
b) Explain about try-catch functionality in Exception Handling.
8. Write a program to create a servlet that handles HTTPGET request.
9. Write a program to print factorial of any number. (e.g. – Factorial of number 4 is 24 (4x3x2x1=24)).
10. Describe with suitable example and syntax:
i) While ii) do while iii) for

PAPER NAME : OPERATING SYSTEM

PAPER CODE: OS

1. Consider a system with a 32bit logical address space, a two level paging scheme, 4 byte page table entries, 1 kb pages and a 4 entry TLB. The page table base register access time is 0ns, TLB access time is 10ns and memory access time is 100ns.
 - i) How many address bits are needed for the page offset?
 - ii) How much memory in bytes is required to store the outer page table entirely in main memory?
2. What is the problem of fragmentation and how can it be solved?
3.
 - a) Briefly explain the critical section problem.
 - b) Mention the criteria which must be satisfied to solve the critical section problem.
 - c) What is semaphore? What are the alternatives?
 - d) Briefly explain the role of semaphore in relation to critical section problem.
 - e) Differentiate between pre-emptive and non pre-emptive scheduling of processes.
4.
 - a) Describe the task of long term, short term and medium term scheduler with diagram.

b) Consider the following set of processes. CPU burst times of them are given below in milliseconds.

process	Burst time	Arrival time
P1	3	1
P2	8	0
P3	1	2
P4	5	4
P5	2	5

Draw the gnat chart and calculate average waiting time, average turnaround time for

- i) FCFS
- ii) R.R scheduling where time quantum $q=2$ milliseconds.
- iii) SRTF

5. What is deadlock? Describe the necessary and sufficient conditions for the occurrence of deadlock. "All unsafe states may not lead to deadlock". Why or why not?

6. Consider the following snapshot of a system :

process	allocation	max	Available
	A B C D	A B C D	A B C D
P0	0 0 1 2	0 0 1 2	1 5 2 0
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 6	
P4	0 0 1 4	0 6 5 6	

Answer the following questions using the Bankar's algorithm:

- i) What is the content of the matrix need?
- ii) Is the system a safe state?
- iii) If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediately?

7. What is process? Draw the state diagram of a process and describe it.

8. What is PCB? Describe it with suitable diagram.

9.

a) What are seek time and latency time?

b) A disk has tracks (numbered 0 through 199). At a given time, it was servicing the request of reading data from track 120 and at the previous request, service was for track 90. The pending request (in order of their arrival) is for track numbers -30 70 115 110 80 20 25

How many times will the head change its direction for the disk scheduling policies-

- i) SSTF(shortest seek time first)
- ii) FCFS (first come first serve)?

10. Write short notes on any three of the following:

- a) Segmentation
- b) Belady's anomaly
- c) Kernel level thread

SUB: THEORY OF COMPUTATION

PAPER CODE: TOC

1. What is Mealy machine? What is Moore machine? Transforming a Mealy machine into Moore Machine

Present State	Next State			
	Input a = 0		Input a = 1	
	State	Output	State	Output
q1	q3	0	q2	0
q2	q1	1	q4	0
q3	q2	1	q1	1
* q4	q4	1	q3	0

2. i) What is Arden's theorem?
ii) prove that $(1+00^*1)+(1+00^*1)+(0+10^*1)^*(0+10^*1)=0^*1(0+10^*)^*$
3. Remove the null productions from the following grammar
 $S \rightarrow ABAC$
 $A \rightarrow aA / \epsilon$
 $B \rightarrow bB / \epsilon$
 $C \rightarrow c$
4. Explain Chomsky Normal Form. Convert the following grammar into Chomsky Normal Form
 $S \rightarrow S(S) / \epsilon$.
5. Describe Turing Machine. What do you mean by lossy and lossless decomposition in Turing machine.
6. Give a DFA accepting the string over alphabet $\Sigma 0,1$, such that in each string number of 0's divisible by 3 and the number of 1's is divisible by 5.
7. Let $L1 = L2 \cap L3$.
i) Show values for $L1, L2$, and $L3$, such that $L1$ is context-free but neither $L2$ nor $L3$ is
ii) Show values for $L1, L2$, and $L3$, such that $L2$ is context-free but neither $L1$ nor $L3$ is
8. Let L be the set of all palindromes over $\{a, b\}$. Construct a grammar G generating L .
9. Let $G = (\{S, C\}, \{a, b\}, P, S)$ where P consists of $S \rightarrow aCa, C \rightarrow aCa \mid b$. Find $L(G)$.
10. Let $L = \{w \in \{a, b\}^* : \text{the first, middle, and last characters of } w \text{ are identical}\}$.
(a) Show a context-free grammar that generates L .
(b) Prove that L is not regular

SUB: MULTIMEDIA & ANIMATION TECHNIQUE

PAPER CODE: MAT

- 1) Describe different types of audio file formats.
- 2) What are the different data types of multimedia?
- 3) What is hypertext and hypermedia?
- 4) Explain the application of multimedia.
- 5) Describe RGB and CMYK color model with the help of proper diagram.
- 6) What is compression? What are the different types of compression?
- 7) Explain the hardware and software requirement of multimedia playback.
- 8) Explain the steps for creating a multimedia presentation.
- 9) Explain following file formats of image i) JPEG ii) MBP
- 10) What are the different data types of compression? Explain about them.

DIPLOMA-5TH SEM

(EE)

PAPER NAME:-POWER ELECTRONICS & DRIVES

PAPER CODE : PED

- (1) Describe the principal of step-down chopper. Derive an expression for the output voltage in terms of input voltage and duty cycle. State the assumption made.
- (2) Describe single pulse width modulated inverter.
- (3) Explain the working of a single phase full bridge inverter (voltage source type) with RLC under damped type of load. Draw the relevant waveform and comment whether forced commutation is necessary for this type of load, if the inverter circuit mentioned above is constructed with SCR as switching element.
- (4) What is the function of a Cycloconverter. What are the advantages of cycloconverter over an inverter?
- (5) A step down chopper has resistive load of $r=15\Omega$ and input voltage of 200 volt. When chopper remains on its voltage drop are 2.5 v, chopper frequency is 1KHZ. If the duty cycle is 50%, determine
 - (a) Average out voltage
 - (b) RMS output voltage
 - (c) Chopper frequency
 - (d) Effective input resistance of chopper.

PAPER NAME: MICROPROCESSOR & MICROCONTROLLER

PAPER CODE: MPMC

- i. Draw and explain the minimum and maximum mode operation of 8086 microprocessor.
- ii. What purpose does the "READY" signal serve in an 8085 microprocessor?
- iii. Write the difference between :-
 - a) RAM & ROM
 - b) SRAM & DRAM
- iv. Explain the flag register of 8085 & control word register of 8255.
- v. Write a program that adds 16bit data .Store the result and carry in two different register pair.
- vi. How does ALE signal demultiplex the ADO-7 bus ? Explain with diagram.
- vii. Compare non-programmable input / output device and programmable input/output devices

PAPER NAME: SWITCHGEAR & PROTECTION

PAPER CODE: SP

1. Write a short note on PT.
2. Explain with sketches and their R-X diagrams for the following distance relays.
 - a) Impedance relay
 - b) Mho relay
3. Write a short note on the following.
 - a) Combined leakage and overload protection for transformers.
 - b) Earth-fault protection for transformers.
4. Describe the following system of bus-bar protection.

- a) Differential protection.
 - b) Fault-bus protection.
5. What is surge diverter? Discuss the construction, principle and working of a valve type arrester.

PAPER NAME : UTILIZATION, TRACTION HEATING & DRIVES

PAPER CODE : UTHD

- (1) Explain the different methods of Induction Heating. Give some application of Induction Heating.
- (2) Explain the working of a fluorescent tube with the help of the circuit diagram giving the function of various parts. How stroboscopic effect is eliminated in fluorescent tube lighting?
- (3) Discuss the suitability of Three Phase Induction Motor for Traction.
- (4) What do you mean by electric heating? Classify the different types of electric heating methods and discuss them with proper diagram.
- (5) What do you mean by resistance welding? Discuss the principle of resistance welding. State the advantages of resistance welding.
- (6) Write the Laws of Illumination. Discuss about the Sodium Vapour Lamps, Compact Fluorescent Lamps (C.F.L.), Metal Halide Lamps, LED Lamps.
- (7) What do you mean by Luminous Flux, Luminous Intensity, Lumen, Candle Power, Reduction Factor, Utilization Factor, Absorption Factor, Reflection Factor?

PAPER NAME: ILLUMINATION ENGINEERING

PAPER CODE:IE

- (1) What is Photometry? What are the different methods to measure luminous intensity? Discuss any one.
- (2) Discuss working principle and application of Luxmeter.
- (3) Write short notes on followings:
 - (a) Black body radiation
 - (b) Fluorescent lamp
 - (c) LED
 - (d) LASER
 - (e) Luminance
- (4) What is colorimetry? What are the different colorimetric instruments are there? Discuss any one.
- (5) What is the basic concept of "human eye as an optical system".

DIPLOMA-5TH SEM

(CE)

PAPER NAME:-BUILDING SERVICES & ENTREPRENEURSHIP DEVELOPMENT

PAPER CODE : BSED

- 1. Define the term ventilation. Discuss the various factors which affect the ventilation.
- 2. Enumerate the requirements of good ventilation system. Explain various methods of mechanical ventilation.

3. What do you understand by the terms natural ventilation and mechanical ventilation? Write in detail the points to be observed to obtain good natural ventilation.
4. Define the term lighting. Classify lighting.
5. What is plumbing? Discuss different plumbing system?
6. Discuss the characteristics and classification of Entrepreneur.
7. Discuss SWOT analysis. State the importance of marketing.
8. What is the importance of project report? State the component of project report.
9. Outline the major component of Business Plan.
10. Explain the evolution concept of marketing management.

PAPER NAME: CONTRACT & ACCOUNTS
PAPER CODE: CA

1. What is contract? What are the different types of civil engineering contracts?
2. Discuss the provisions in Civil Engineering contract to settle dispute with Contractor.
3. What is plinth area and cubic rate estimate? Why a revised estimate is necessary?
4. Give short note on: (a) Breach of contract (b) Substituted item. (c) Earnest money.
5. Write brief clauses of general condition of contract any two of the following: (a) Rectification of defective work and removal of materials not conforming to specifications; (b) Extension of the completion of work.

PAPER NAME: TRANSPORTATION ENGG.-II
PAPER CODE: TE-II

1. State the important characteristics of a vehicle that are considered in transportation engineering.
2. What is turning radius? What is overhang?
3. Describe the perception-reaction process in detail. Describe the term visual acuity? Which Indian Road Congress code describes the color perception?
4. What are the various road characteristics of road that affects the flow of traffic? State how the surface conditions affect the traffic flow? what would be the stopping distance of a vehicle moving with 50 Kmph on a plane surface, where the value of 'f' (friction) 'g' (gravitational acceleration) are 0.5 and 9.81 respectively.
5. What is grade separated interchange? Explain what weaving angle and weaving length mean. For what type of intersection are these important and how?
6. Name the four major strength related tests of road aggregates.
7. Discuss the various factors affecting sight distance of a road.
8. Explain the difference between flexible and rigid pavement.
9. When and why concrete pavement is used?

PAPER NAME: DESIGN OF RCC STRUCTURE
PAPER CODE: DRCCS

1. Design shear reinforcement for rectangular beam 250 mm wide and 525 deep. Simply supported over a clear span of 4.5m to take up a super imposed load of 15kN/m. Support width is 250mm tension reinforcement 5 no 16mm dia bar, considered M15 grade of concrete and Fe 250 Grade of steel.
2. Design a RCC lintel over an opening 2.2m wide height of brick work above soffit of lintel is 3m. Unit weight of masonry is 19.2 kN/m³ the brick wall is 250mm wide. The grade of concrete is M20 and grade of steel is Fe415.
3. Design of simply reinforced rectangular beam simply supported over a clear span of 4.5m to carry a superimposed load of 15kN/m width of support 250mm. consider grade of steel and concrete is Fe250,M15.(working and limit state method)
4. Design a simply supported RCC slab a roof of a hall 3mx8m (inside dimension) with 250mm thick wall all around assume a life load of 3kN/m² and floor finish 0.75kN/m² .Use M15 grade of concrete and Fe250 grade of steel.(working and limit state method)
5. A dog legged stair is provided 1st floor to 2nd floor. Draw a neat proportional sketch of one flight of the stair extending from 1st to half landing showing the arrangement of reinforcement .also calculate the effective reinforcement. Also calculate the effective span of the flight .Following data is given below.
 - i) Vertical distance between 1st floor and 2nd floor is 3m.
 - ii) Size of step 150mm rise and 250mm tread.
 - iii) Width of half landing 1.1m
 - iv) Width of each flight 1.2m
 - v) The landing slab span in the same direction as stair. The waist slab and landing slab is to be considered to form a single slab.
 - vi) Thickness of waist slab 130mm
 - vii) Main reinforcement 10mm dia @100mm c/c
 - viii) Distribution bar 8mm dia @125mm c/c
 - ix) Assume any other data if necessary.
6. Design a square footing of uniform thickness for the foundation of an axially loaded square column 500mm wide carrying an axial load 12×10^5 N. bearing capacity of soil 0.115N/mm. Use M15 grade of concrete and Fe415 grade of steel.
7. A RCC beam 400mm wide and 600mm deep effective is reinforced with 5 bars 20mm dia. A V groove 100mm wide and 100 mm deep has cut out from the beam at top in the centered longitudinally. Given

$m=18, \sigma_{bc}=5\text{N/m}^2, \sigma_{st}=140\text{ N/m}^2$ effective cover 50mm if the beam carries a S.I UDL of 6000N/m in

- addition to a point load of 10000N at the centre. find safe span of the beam.(working State method)
8. A singly reinforced RCC beam 360mm wide and 500mm deep effective span 6m it carries a total UDL 18000N/m. calculate area of tensile steel require .use M15,Fe415 $m=18$ (working State method)
 9. Design a T beam of a hall 12mx8m.supporting wall 30cm thick there are 3 beams space 3m c/c. life load 4000 N/m² floor finish 25mm thick, slab thickness120mm. (working State method)
 10. A short RCC column carries a factored load of 1700kN. Design a sq column assume $e_{\min} < 0.05D$.use M15,Fe415
 11. Design a RCC slab of dimension 4 m \times 5 m whose adjacent edges are continuous and remaining two edges are discontinuous, against a live load of 3.5 KN/m² M20 concrete and Fe 415 grade steel should be used. Apply 'Limit state method of design' as per IS 456.
 12. Design a square footing of a column of size 300 mm \times 300 mm carrying an axial compressive force. The footing will be placed on a soil having bearing capacity of 120 KN/m². Use M20 concrete and Fe415 grade steel. Apply 'Limit state method of design' as per IS 456.

13. Calculate the load carrying capacity of a RCC column of dimension 250×400 reinforced with 8 nos 16 Fe415 HYSD bars. Effective length of the column = 5m. Apply 'Limit state method of design' as per IS 456.
14. Find M_u of a T beam with the following data. $B_f=1250\text{mm}$, $D_f=100\text{mm}$, $b_w=250\text{mm}$, $d=650\text{mm}$, $A_{st}=2800 \text{ mm}^2$, $f_y=415 \text{ N/mm}^2$, $f_{ck}=20 \text{ N/mm}^2$.
15. Find area of steel required for a T beam given the following data.
 $b_f=1250\text{mm}$, $D_f=100\text{mm}$, $b_w=250\text{mm}$, $d=650\text{mm}$, $M_u = 400 \text{ KN-m}$, $f_y=415 \text{ N/mm}^2$, $f_{ck}=20 \text{ N/mm}^2$.

PAPER NAME: GEOTECHNICAL ENGG. -II

PAPER CODE: GE-II

1. Write down Terzaghi's bearing capacity formula for general shear failure stating the meaning of symbols used in the formula.
2. Calculate the ultimate bearing capacity of shallow foundation. Using the following data cohesion= 30 KN/m^2 , unit weight of soil = 18 KN/m^3 , Depth of foundation= 1.5 m . Width of foundation = 1.5 m . $N_{\epsilon}=6$ $N_q=5$ $N_{\gamma}=3$.
3. How piles are classified as per function?
4. Mention the Hiley's formula related to pile foundation. Discuss about the primary process of settlement of foundation.
5. A $2 \text{ m} \times 2 \text{ m}$ footing is to be founded at 2 m below existing ground level on a stratum of Cohesive soil having cohesion = 0 Angle of internal friction $\phi=30^\circ$ unit wt= 1.8 t/m^3 the Water table is at G.L Determine ultimate bearing capacity of the footing.
6. Write down the assumption of Terzaghi's bearing capacity for shallow foundation. What do you mean by pile efficiency?
7. a) Classify different Types of piles based on function and material used.
b) Discuss about Rankin Suggestion on minimum depth of foundation.
8. The Natural void ratio of a 6.0 m Thick clay Deposit having liquid limit of 45% each 1.2 Determine the consolidation Settlement of a layer when the overburden pressure on the soil deposits is increased from 10 to 25 T/m^2 .
9. Draw a neat sketch of a pile load test and Explain the load settlement curve obtained from a pile load Test.

DIPLOMA-5TH SEM

(ME)

PAPER NAME: FLUID MECHANICS & MACHINERY

PAPER CODE: FMM

1. Two large plane surfaces are 10 mm apart & the gap contains a liquid of viscosity 0.8 N-S/m^2 . Within the gap a thin plate of cross sectional area of 0.8 m^2 is to be pulled at a velocity of 0.6 m/s at a distance of 8 mm from one surface. Determine the force required for pulling the plate.
2. A) Explain the various types of fluids. State & explain Newton's law of viscosity. What is dynamic viscosity & kinematic viscosity?
B) A plate 0.025 mm distance from a fixed plate, moves at 60 cm/s and required a force of 2 N per unit area i.e., 2 N/m^2 to maintain this speed. Determine the fluid viscosity between the plates.
3. A) Explain the Pascal's law. State & prove Pascal's law of fluid pressure.
B) A Relationship between Bulk Modulus (k) and Pressure (p) for Gas.

C) Describe the different types of fluid flow process.

4. A) Define atmospheric pressure, Gauge pressure, Vacuum pressure & absolute pressure.
B) A u-tube containing mercury has its right limb open to atmosphere & left limb connected to a pipe conveying water under pressure, the difference in level of mercury in the two limbs being 200mm. If the mercury level in the left limb is 300mm below the centre line of the pipe, find the Gauge & absolute pressure in the pipeline.
4. A) State Bernoulli's theorem & derive it for the frictionless flow with necessary condition
B) A vertical tapering pipe is 2.5m long. The dia of the pipe is 25 cm at the top end & the 15 cm at the bottom end. If 40 l/s of the water flows through the pipe, find the difference in pressure between the two ends of pipe, neglect losses.
5. A) Derive the continuity equation for steady flow process. Differentiate between steady & unsteady flow.
B) Fluid flow through a pipeline which contracts from 50 cm dia. at A to 35 cm at B & then branches into two pipes C & D. The dia. of the pipe C is 20 cm & that of D is 25 cm. If the velocity at A be 2 m/s & that at D be 4 m/s, determine velocity at B & discharge at C & D.
6. A) What are the major losses in pipe flow? Give the expression of major loss.
B) Define Reynold's number. Explain the process of determination of this number.
7. Crude oil of density 800 kg/m^3 & viscosity 0.14 NS/m^2 flows through a pipe of dia 40 cm at a rate of 50 lit/s. Find the head lost due to friction in this pipe of length 350 km.

PAPER NAME: ADVANCE MANUFACTURING PROCESSES

PAPER CODE : AMP

1. Discuss the mechanism of material removal for Abrasive jet machining (AJM). State their limitations.
2. Explain with a neat sketch the operation of the canned cycle G81 as per ISO.
3. Describe with neat sketch the working principle of Electro discharge machining (EDM)?
4. Describe with neat sketch the working principle of Laser beam machining (LBM)?
5. Write down the advantages wire cut EDM over conventional EDM.
6. Write principle & advantages Electro chemical machining (ECM) process.
7. Write down the need of N.T.M process. Write the difference between traditional and non traditional machining process.
8. Explain with figure the Ultrasonic machining (USM) process with its various components.
9. Describe with neat sketch the working principle of Laser beam machining (LBM)?
10. Draw the schematic diagram of AJM set up .
11. State the Faraday's law of electrolysis. Describe with fig. ECM process.
12. Write advantages & disadvantages of ECM.
13. What are the differences between jig and fixture. Write the name various types of jig and explain any one of them.
14. Write the name different types of clamp. Explain any two of them.
15. Explain six point location principle.

16. Write the name different types of locator. Explain any two of them.
17. Explain lapping and honning process.

PAPER NAME: MEASUREMENT & CONTROL

PAPER CODE: MC

- (1) Define open loop and closed loop control system with proper example.
- (2) Describe with block diagram the functional elements of a general measurement system.
- (3) Describe with block diagram the measurement & control system for heating a room at specific temperature.
- (4) Explain the working principle of centrifugal force tachometer.
- (5) Sketch & explain the working principle of a Rotameter. Why it is called variable area flow meter?
- (6) Explain the working principle of inductive pick up.
- (7) Explain with neat sketch the construction, working principle of unbounded strain gauge.

PAPER NAME : POWER ENGINEERING

PAPER CODE: PE

1. Deduce the thermal efficiency of a 4 stroke diesel cycle, engine in terms of compression ratio and expansion ratio.
2. Describe Carnot cycle with gas with the help of P-V and T-S diagram and deduce a formula for its thermal efficiency.
3. Derive the efficiency of Dual cycle with p-v and T-S diagram. Write short note on scavenging and supercharging.
4. A petrol engine working on Otto cycle has a maximum pressure of 50 bar. Heat supplied is 1000KJ/KG. If the pressure ratio during compression 12.286, find the compression ratio and also ration of peak temperature to inlet temperature. Take $p_1=1$ bar and $T_1=27^\circ\text{C}$
5. List out the Difference between fire tube and water tube boiler .Explain the working principle of water tube boiler with neat sketch.
6. Explain the purpose of reheating steam. Show the flow of a reheat cycle. Draw T-S diagram of a reheat cycle
7. Show the difference between an ideal Otto cycle and real Otto cycle in P-V and T-S diagrams.
8. What do you mean by critical pressure ratio? What is the physical significance of critical pressure ratio?
9. What do you mean by impulse turbine and reaction turbine? Describe the working principle of pressure compounding of impulse turbine.
10. Show two major differences between steam engine and steam turbine. Describe six major differences between impulse and reaction turbine. What is nozzle control governing and in which stage of a turbine of a turbine it can only be applied
11. Derive the expression for maximum blade efficiency of an impulse turbine. why impulse turbine is compounded?
12. What is the function of a nozzle? Discuss the flow of steam through a convergent divergent nozzle and explain the effect of friction on steam flow rate.

13. Compare open and closed type gas turbines. write down the uses of gas turbines.
14. State the assumptions made for thermal efficiency of an ideal gas turbine plant.
15. Define Compressor? Explain basic function of air compressor? Draw a neat sketch of centrifugal compressor?
16. Define. a) Atmospheric pressure, b) absolute pressure, c) gauge pressure. Find out relation between them
17. Why is an impulse turbine called a velocity turbine? Why is a pelton wheel suitable for high height only?
18. Draw a neat sketch of pelton turbine and show its components.
19. Write short notes on governing of impulse turbine?
20. Derive an expression for the hydraulic efficiency of pelton wheel.

PAPER NAME : AUTO MOBILE ENGINEERING
PAPER CODE: AE

1. What are the function of crank shaft piston and cam.
2. With neat sketch explain clearly the working of A.C. mechanical fuel pump.
3. Explain clearly the necessity of a transmission in a vehicle.
4. Describe working principle of simple carburetor with neat sketch.
5. A) What are the different between two stoke engine and four stoke engine?
 B). What are the different between C.I engine and S.I engine?
6. What are the common types of steering gears? Describe any one in detail with the help of simple sketch.
7. What is the function of differential in an automobile with neat sketch
8. Describe disc braking system with neat sketch.
9. What are the merit and demerit of frameless construction over frame type construction?
10. What is scavenging? Types of scavenging and their brief discussion?
11. Write short-notes
 A) Spark plug B) Propeller Shaft

DIPLOMA-5TH SEM
(ETCE)

PAPER NAME: DIGITAL & MICROWAVE COMMUNICATION
ENGINEERING
PAPER CODE: DMCE

1. Describe the PCM-TDM in modern application using synchronous digital hierarchy.
2. Compare among ASK, FSK, PSK.
3. Discuss about ground wave, space wave and sky wave.
4. Draw and the the block schematic diagram of pulsed radar.
5. Explain the different properties of antenna.
6. Write short notes on directional coupler.

PAPER NAME: ELECTRONICS MEASUREMENT

PAPER CODE: EM

- (1) Define the term (i) sensitivity (ii) resolution (iii) dynamic response (iv) accuracy (v) precision as related to measurements.
- (2) Discuss with diagram the construction and working principle of electro-dynamometer type wattmeter.
- (3) Sketch a net diagram of a PMMC type instrument and describe its principle of operation. Discuss briefly the advantages of PMMC type instruments.
- (4) Describe the working principles of Hay's bridge for measurement of inductance. Why is this bridge suited for measurement of inductance of high Q coil?
- (5) What is a bolometer? Write down the procedure of measuring r.f power using a bolometer in a bridge circuit.
- (6) (a) Draw the block diagram of a function generator and explain its operation.
(b) Draw the block diagram of a digital frequency counter and explain its working.
- (7) (a) What is the difference between a wave analyser and a harmonic distortion analyser?
(b) Explain with the help of a block diagram the working principle of a spectrum analyser.

PAPER NAME: INDUSTRIAL ELECTRONICS-1

PAPER CODE: IE-1

- (1) Write down the principle and operation of n-channel power MOSFET.
- (2) Discuss two transistor model of SCR.
- (3) What are the input, output and switching characteristics of power IGBT.
- (4) What are the different types of triggering process of SCR? Discuss in details.
- (5) Write short notes:
 - (a) Switching characteristics of SCR
 - (b) dV/dt protection of SCR
 - (c) Class-D commutation
 - (d) V-I characteristics of power BJT
 - (e) GTO

PAPER NAME: MICRO CONTROLLER & EMBEDDED SYSTEM

PAPER CODE: MCES

1. Intel 8051 follows which architecture?
2. Why 8051 is called 8 bit microcontroller?
3. Explain the PIN Diagram features of the 8051.
4. How Much on chip RAM is available?
5. Compare microprocessors and microcontrollers.
6. Mention what are the essential components of embedded system?

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PAPER NAME: DIGITAL SIGNAL PROCESING-I

PAPER CODE: DSP-1

1. Prove that an LTI system is BIBO stable if the ROC of system function includes the unit circle.
2. Find the Z-transform and ROC of the signal,
3. State the sampling theorem. What is aliasing effect?
4. Find the Fourier transform of the signal for a.
5. Define Z -transform. State the properties of ROC for z-transform.

End