

DIPLOMA-2ND SEMESTER (ALL STREAM)

SUB: BUSINESS ECONOMICS AND ACCOUNTANCY PAPER CODE: - BEA

Answer the following Questions

1. Discuss Cobb-Douglas Production Function.
2. Differentiate Journal and Ledger. Explain the accounting process in detail.
3. Explain Law of Variable proportion in details.
4. Journalise the below transactions for the month of April 2017 in the books of Mr. Subhramanyam.

Date	Transactions	Amount (Rs.)
1	Subhramanyam started his business with cash	5,00,000
2	Borrowed from Mahesh	5,00,000
2	Purchased furniture	1,00,000
4	Purchased furniture from Mohan on credit	1,50,000
5	Purchased goods for cash	50,000
6	Purchased goods from Ram on credit	2,50,000
8	Sold goods for cash	1,25,000
9	Sold goods from Shyam on credit	25,000
10	Paid cash to Ram	90,000
11	Deposited into bank	5,00,000
11	Withdrew cash for personal use	10,000
14	Withdrew cash for office use	50,000
19	Paid Ram by cheque	1,50,000
20	Paid salary	30,000
25	Paid instalment of loan	25,000
28	Interest allowed by bank	8,000
30	Paid LIC premium	12,000

5. The following details on the cash flows of two projects X and Y.

Year	Project X cash flows (Rs.)	Project Y cash flows (Rs.)
0	4,00,000	5,00,000
1	2,00,000	1,00,000

2	1,75,000	2,00,000
3	3 25,000	3,00,000
4	2,00,000	4,00,000
5	1,50,000	2,00,000

Compute PBP, NPV and PI for X and Y and suggest which project should be accepted and why.

6. Define Price elasticity of Demand. What are factors affecting Price Elasticity of Demand? Define Cross Elasticity of Demand.

SUB-APPLIED PHYSICS

PAPER CODE: AP

- A. Write down Newton's second law of motion and give the measurement of force from it.
- B. What is apparent weight? Derive the condition for complete weightlessness and super weightlessness of a man in a lift moving with an acceleration a .
- C. State with example – (i) positive work done (ii) negative work done.
- D. Write down kinematical equations for motion under gravity and mention the different terms.
- E. If kinetic energy of a particle is increased by 100%, what will be the percentage change in its momentum?
- F. Show the relation between linear and angular velocity.
- G. Draw the time-displacement graph for a particle moving with uniform velocity.
- H. Distinguish between metal, insulator and semiconductor according to band theory.
- I. A body of mass 5kg is moving with a velocity 10m/s. How much force should be applied against its motion to stop it within 20 seconds?
- J. Write down Ohm's law.

SUB-APPLIED CHEMISTRY

PAPER CODE: AC

1. What is Portland cement? State sequentially the chemical reactions that occur during setting and hardening of cement(write the equation).
2. Define lubricant. Give the functions of lubricant. Give example of each type of lubricants.
3. Define primary and secondary fuel with example. What do you mean by HCV and LCV? How calorific value of a fuel is calculated by Dulong's formula?
4. What is knocking and anti-knocking compound? Give the by products of coal gas and their uses.
5. Write notes on: (i) LPG (ii) Biogas.
6. Name two common lubricants and mention their uses. What are flash point and fire point?
7. What are cement mortar and cement concrete? Mention their uses. How gypsum is converted into plaster of paris?

8. What is the difference between paint and varnish? Write down the composition and use of one paint.
9. What is galvanization? Give one example of vehicle, thinner and drier used in making of paint.
10. Write down the composition of coal gas. Why it is poisonous? Name two important products obtained from fractional distillation of petroleum.

ENGINEERING MATHEMATICS

Paper Code: EM

Answer the following questions

- 1) Using Trapezoidal rule with $h = 2$, evaluate the integral $\int_0^{12} \frac{dx}{1+x^2}$ correct to two decimal places. Find the value analytically.
- 2) Find the probability of having 53 Wednesdays in a an ordinary year b) a leap year.
- 3) If $u = \tan^{-1} \frac{x^3+y^3}{x-y}$, show that $x \frac{\delta u}{\delta x} + y \frac{\delta u}{\delta y} = \sin 2u$.
- 4) Solve the system of linear equations by Gauss-Elimination Method.

$$6.1x + 2.2y + 1.2z = 16.55$$

$$2.2x + 5.5y - 1.5z = 10.55$$

$$1.2x - 1.5y + 7.2z = 16.80$$

- 5) If $x^2 + y^2 + z^2 - 2xyz = 1$, then prove that $\frac{dx}{\sqrt{1-x^2}} + \frac{dy}{\sqrt{1-y^2}} + \frac{dz}{\sqrt{1-z^2}} = 0$.

$$6) \text{ Prove that } \begin{vmatrix} 1+a & 1 & 1 & 1 \\ 1 & 1+b & 1 & 1 \\ 1 & 1 & 1+c & 1 \\ 1 & 1 & 1 & 1+d \end{vmatrix} = abcd \left(1 + \frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}\right).$$

- 7) Find the values of the integral : $\int_0^{\frac{\pi}{2}} (\sqrt{\tan x} - \sqrt{\cot x}) dx$

ELECTRICAL TECHNOLOGY

PAPER CODE : -ET

1. An alternating voltage is given by the equation $e = 339 \sin 314t$. Determine-
 - a) R.M.S value
 - b) Frequency
 - c) Time period and
 - d) The value of the voltage after 0.005 sec.
2. Explain the basic principle of a transformer.
3. State the difference between transmission and distribution of electric power.
4. Sketch a scheme to measure the insulation resistance of a under ground cable with the help of a megger the insulation resistance tester.

5. State the explain the Faradays laws of electromagnetic induction.
6. Define- a) leakage flux b) fringing of magnetic flux c) useful flux

SUB-STRENGTH OF MATERIAL

PAPER CODE : -SOM

1. Define bending moment & shear force at any section of the beam. Explain the term point of contraflexure. Calculate the shear force & bending moment diagram of a simply supported beam carried an udl of w kg/m run for a length of L meter.
2. Draw the shear force & bending moment diagram of a simply supported beam carrying point loads of 10 KN & 15 KN at a distance of 2m & 3.5m from the left & right support for a length of 8m of the beam.
3. A steel girder of I-shape cross section has equal flanges each 12 cmx 2cm connected by a web 20cm x 2cm. Determine the moment of inertia of the section about its centroidal axis which is parrel to the web.
4. A load of 20 KN is to be raised with the help of a stel wire. Find the minimum diameter of the wire if the stress is not to exceed 20000 KN/m².
5. A boiler is 1.5m in diameter having thickness of plate as 20mm. The efficiencies of the longitudinal joint & circumferential joint are respectively 60% & 80%. If the maximum allowable tensile stress in plate be 70 N/mm², calculate the safe steam pressure in the boiler.
6. A solid rod 300 cm long & 5m in diameter is used as a column whose one end is fixed & other end is hinged. If $E = 2 \times 10^4$ KN/cm² & factor of safety = 4, determine the safe compressive load for this column.
7. Define these mechanical properties such as Elasticity, Ductility, Malleability, Hardness, Brittleness, Strength, Creep etc.
8. Classify the different types of beam with proper sketch. classify the different types of loading with proper sketch.
9. For a simply supported steel beam, 6m long & 150mm diameter, what point load should be placed at the mid span to restrict the deflection 10.35mm. Take $E = 2 \times 10^5$ N/mm² What will be the slope at the ends.
10. What is the difference between strut & column? What are the classification of columns. What are the assumptions made in the Eulers theory.

DIPLOMA-4TH SEMESTER (EE)

SUBJECT: ELECTRICAL MACHINE-II

PAPER CODE: EM2

1. Derive the EMF Equation of 3 phase alternator. Define distribution factor and coil span factor?
2. Explain the Star-Delta starter & Direct-On-Line(DOL) starter of 3-phase induction motor with proper diagram.
3. Explain the operation of the different types of stepper motors.
4. (a) Why is short pitch winding preferred over full-pitch winding?

- (b) What is distributed winding?
5. Explain the regenerative Braking of 3-phase induction motor.
 6. Describe any two methods of determining the voltage regulation of 3-phase Alternator.
 7. Write short notes on (i) A C series motor (ii) Reluctance motor.
 8. Explain the construction and principle of operation of 3-phase alternator.

ELECTRICAL MEASUREMENT AND CONTROL

PAPER CODE- EMC

1. Describe the operation of an LVDT for measuring displacement. How is its operation dependent on the position of the core? How is the nonlinearity attempted to be eliminated?
2. Describe shortly for different type of strain gauges.
3. a) Explain the phenomenon, how charges develop on two plates placed across a piezoelectric crystal with force applied on it.
b) Describe the measurement of speed by using the contact and non-contact type tachometer.
4. What is see-beck effect? How does it develop and how has it been commercially exploited.
5. a) Draw the block diagram of basic CRO and explain its block. Explain the electrostatic focussing of an electron beam in CRO.
b) How does the voltage, current and phase can be measured by CRO.
6. a) Describe the working principle of digital frequency meter.
b) Describe the working principle of successive approximation type digital voltmeter.
7. How PID controller is used to control the output of closed loop system?
8. Describe the working and construction of resistance thermometer.

TRANSMISSION & DISTRIBUTION OF POWER

PAPER CODE: TDP

- (1) What is sag? What is the effect of wind and ice on sag?
- (2) State Kelvin's laws and limitation of this law for the economic choice of conductor size.
- (3) What is string efficiency?
- (4) Give the advantages, drawbacks and limitations of EHV ac transmission.
- (5) What do you understand by hollow, ACSR and bundled conductors?
- (6) What are the I.E rule related to spacing of conductors and length of span of overhead transmission lines?
- (7) Explain end condenser method and Nominal T-Method with appropriate pharos diagram.
- (8) Discuss the advantages and disadvantages of (i) pin type insulators (ii) Suspension type insulators

PAPER NAME: APPLIED & DIGITAL ELECTRONICS

PAPER CODE: ADE

1. State De-Morgan's theorem.
Prove that, $A+BC = (A+B)(A+C)$
2. Why FETs are called unipolar? Write down the differences between MOSFET and JFET.
3. Write short notes on the following:
 - a. CMOS
 - b. Even parity generator and checker.

- c. Pinch-off voltage
4. Design EX-OR gate using NAND gates.
 5. Simplify the following Boolean function using K-Map

$$Y = \sum_m(0,2,3,6,7) + \sum_d(8,10,11,15)$$
 6. Define amplification factor, transconductance, drain resistance related to JFET and establish the relationship between them.
 7. Design NOR gate using NAND gates.
 8. Short Notes: a) OP AMP – ‘Inverting & Non Inverting’ b) MOSFET C) EPROM
 9. Obtain the canonical product of sum form of the function: $Y = A + BC$
 10. Design 16:1 mux using 4:1 mux & OR gate.
 11. Give the logic diagram and logic symbol of 4-to-16 Decoder & briefly explain its function.

PAPER NAME: POWER PLANT ENGINEERING

PAPER CODE: PPE

1. Layout and working principle of a Gas turbine power plant.
2. Explain the principal of operation of wind power plant. Also discuss its advantages and disadvantages .
3. Layout and working principle of a Diesel turbine power plant.
4. What are the different working fluids in binary cycle geothermal power plants?
5. Explain the construction and working of Geo thermal power plant.
6. What are the different types of tidal power plants?
7. What are the different types of solar plate collector? Discuss in details

PAPER NAME: DEVELOPMENT OF LIFE SKILL-II

PAPER CODE: DLS-II

- A. What is interpersonal relationship? What are the types of interpersonal relationship?
- B. What are interpersonal conflicts? What are the types of interpersonal conflicts?
- C. What is Interpersonal Relationship? What are the types of Interpersonal Relationship?
- D. Write a note on developing effective listening skills.
- E. What are the steps involved in problem-solving?
- F. How to develop Human Relations?
- G. How to use audio-visual aids effectively.

DIPLOMA-4TH SEMESTER (CE)

SUB: ADVANCED SURVEYING

PAPER CODE: SURV

1. What are the sources of error in theodolite survey?
2. What is mass diagram? Explain the procedure of mass diagram.
3. What is the principle of compass surveying?

4. What do you mean by foresight, backsight and intermediate sight reading?
5. What is the purpose of levelling?
6. Explain temporary adjustment of transit theodolite.
7. What is radius and degree of curve?
8. Two tangents AB and BC intersect at a point B at chainage 150.5m. Calculate all the necessary data for setting out a circular curve of radius 100m and deflection angle 30° by the method of offsets from the long chord?
9. What is ideal triangle? Who are the leader and follower when a chain line is being chained?
10. State the difference between collimation and rise and fall system.

SUB: GEOTECHNICAL ENGINEERING-I

PAPER CODE: GE-I

1. Write short notes on black cotton soil.
2. What is consolidation? How this process occurs?
3. The mass specific gravity of a fully saturated specimen of clay having a water content of 36% is 1.86. on oven drying the mass specific gravity drops to 1.72. calculate the specific gravity of clay and its shrinkage limit.
4. What is uniformity coefficient and coefficient of curvature?
5. Define-void ratio, porosity, degree of saturation.
6. The total unit weight of soil is 18.8 kn/m^3 , the specific gravity of the solid particles of the soil is 2.67 and the water content of the soil is 12%. calculate the dry unit weight, void ratio and the degree of saturation.
7. What is permeability? State Darcy's law.
8. Draw nearly the typical curve for moisture content vs. atterberg limit.
9. Explain the light compaction test.
10. What is residual and transported soil?

SUB: TRANSPORTATION ENGG.-1

PAPER CODE: TE-I

1. What is the function of sleeper in a railway track? What is dog spike?
2. What method will you adopt in draining the water from tunnel?
3. What is creep in a railway track? What are the causes and effect of creep?
4. What are the different types of station? Explain in detail.
5. What is super elevation? What are the objectives of providing super elevation?
6. State briefly the procedure of carrying out a preliminary survey for the alignment of a railway track in plain of west Bengal.
7. Draw the plan and elevation of a bridge showing its component parts clearly.
8. Define ruling gradient, momentum gradient and cant deficiency
9. Write short notes on loading gauge and adzing of sleeper.
10. Define a bridge. Explain the difference between a bridge and culvert.

ESTIMATING & COSTING

PAPER CODE : EAC

1. What is rate analysis? Explain in detail.)

2. Find out the quantity of bricks and Cement required to construct a single storied residential building having a plinth area of 120 sqm using C.B.R.I Formula.
3. What do you mean by estimating? What is the purpose of estimating?
4. Write unit of measurement of any ten item for the construction of a residential building.
5. What is carpet area and area of wall?
6. Write short notes on administrative approval, key plan and sub work.
7. Define the following terms-floor area, carpet area, plinth area, floor area ratio.
8. What do you mean by quantity survey and abstract estimate?
9. State the factor to be consider during preparation of a detailed estimate.
10. Differentiate between Revised & Supplementary Estimate and briefly discuss it.

Sub: IRRIGATION ENGINEERING

Paper Code: IE

1. What is hydrograph? Explain with sketch.
2. What is meant by hydrologic cycle? Explain with neat figure.
3. What is duty, delta and base period of a crop?
4. Explain the relation between duty, delta and base period with proper units.
5. Explain clearly how the dam is recognized as low dam and high dam
6. What are the different types of dams? State example of each.
7. What is the difference between dam and barrage?
8. What are the different methods of determining yield of open well? Describe then with sketch.
9. What should be the standard of the irrigation water?
10. What are the different pool levels in a reservoir?

DIPLOMA-4TH SEMESTER (CST)

SUBJECT NAME – MICROPROCESSOR & PROGRAMMING

SUB CODE: MP

- 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. Explain the flag register of 8085 & control word register of 8255.
- iv. Write a program that adds 16bit data .Store the result and carry in two different register pair.
- v. Draw the architecture of 8085 microprocessor
- vi. Write about the interrupt of 8086 microprocessor.

Sub: COMPUTER NETWORK

Paper Code: CN

1. Compare between Optical fiber and Coaxial Cable?
2. Compare between Guided and Unguided media.
3. Write the function of Data Link Layer and Transport Layer?
4. Distinguish between Bus topology and Mesh topology.

5. Differentiate between Router and Switch.
6. Write short notes on FTP.
7. Describe CSMA/CA protocol.
8. Write short notes on Token Bus.
9. Write short notes on cyclic redundancy check.
10. Write short notes on OSI model

PAPER: RELATIONAL DATA BASE MANAGEMENT SYSTEM

PAPER CODE: RDBMS

1. Describe 3-layer architecture of DBMS with diagram.
2. Short notes on Data models.
3. What are entity, primary key and candidate key?
4. What is normalization? What are the anomalies?
5. Draw an E-R diagram on banking system?
6. Compare 1NF, 2NF and 3NF.
7. What is BCNF.
8. What is functional dependency?

SUB: OBJECT ORIENTED PROGRAMMING METHODOLOGY

PAPER CODE: OOP

1. What do you mean by default constructor?
2. Write C++ code to implement copy constructor.
3. Write down three properties of destructor.
4. What is inline function? Explain with example.
5. What is the advantage of an inline function over a macro? Explain with example.
6. Explain the default argument with proper example.
7. What does polymorphism mean in C++?
8. Briefly explain runtime polymorphism with appropriate example.
9. Distinguish between function overloading and overriding (state at least 3 points).
10. a) What do you mean by operator function?
b) State at least three operators that cannot be overloaded.
11. What is the purpose of inheritance? Explain with example. What do you mean by multiple inheritance? What do you mean by friend function? State at least three points each to describe the merits and demerits of friend function.

PAPER NAME : COMPUTER GRAPHICS

PAPER CODE: CGR

1. Describe Cathode Ray Tube (CRT)
2. Describe Shadow Mask CRT.
3. Short note: Raster Scan Display (Monitors)
4. Write DDA Algorithm
5. Implement the DDA algorithm to draw a line from (0,0) to (6,6).
6. Write Generalized Bresenham's algorithm.

7. Consider a line from (0,0) to (6,7). Use Bresenham's algorithm to rasterize the line.
8. Write Midpoint Ellipse algorithm.
9. Scan line Polygon Fill Algorithm.
10. Describe Geometric Transformations with diagram.

PAPER NAME: DEVELOPMENT OF LIFE SKILL-II

PAPER CODE: DLS-II

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- E. What are the steps involved in problem-solving?
- F. How to develop Human Relations?
- G. How to use audio-visual aids effectively.

DIPLOMA-4TH SEMESTER (ME)

PAPER NAME: DEVELOPMENT OF LIFE SKILL-II

PAPER CODE: DLS-II

- A. What is interpersonal relationship? What are the types of interpersonal relationship?
- B. What are interpersonal conflicts? What are the types of interpersonal conflicts?
- C. What is Interpersonal Relationship? What are the types of Interpersonal Relationship?
- D. Write a note on developing effective listening skills.
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- F. How to develop Human Relations?
- G. How to use audio-visual aids effectively.

SUB- THERMAL ENGINEERING-II

PAPER CODE - TE-II

1. Why carnot cycle not used in practical purpose?
2. A carnot engine work between pressure limits of 35 bar and 0.7 bar. Find the amount of work done per kg of steam and thermal efficiency of the engine.
3. A carnot engine absorbs 200J of heat from a reservoir at the temperature of normal boiling point of water and reject heat to a reservoir at the temperature of triple point of water. Find the heat rejected the work done by the engine and thermal efficiency.
4. Reheat, actual regenerative and actual Reheat regenerative cycle represent on T-S, h-S and P-V Diagrams.
5. Prove that for natural draught $h=353H[(1/T_a) - \{(m+1)/m\}1/T_g]$
6. A boiler uses 2000 kg/h of coal. The temperature of air supplied is 300K and the average temperature of the flue gas leaving the chimney is 650K. The 33m height steel chimney produces a draught of 20mm of column.

Determine the

- a. Quality of air supplied per kg of coal
- b. The draught in terms of column of hot gases
- c. Base diameter of chimney

Assuming that 10% of the theoretical draught is used for creating the flow velocity of gases through the chimney.

7. In a trial on a boiler the observation recorded are feed water temperature 50°C , boiler pressure 10bar, quality of steam 95%, coal consumption 500 kg/hr, calorific value of coal 35,500kJ/kg, Feed water supplied 4000 kg/hr. determine the evaporation factor and equivalent evaporation from and at 100°C in per kg of coal fired and efficiency. Specific heat of water = 4.1868kJ/kg k.
8. The following observation were taken during a test on a steam boiler
Quantity of coal burnt/hour-720kg
Feed water supplied /hour-7000kg
Calorific value of coal fired- 34000kJ/kg
Feed water temperature entering economizer- 25°C
Feed water temperature leaving economizer- 80°C
Steam pressure -10 bar
Dryness fractions of steam leaving boiler drum- 0.95
Temperature of steam leaving super heater - 250°C
Determine the thermal efficiency of the plant, also calculate the heat absorbed by feed water in various components as a percentage of the total heat absorbed.
9. What are the desirable properties of a refrigerant.
10. Write basic principle and Labeled schematic flow diagram and represented on P-V, P-H & T-S diagrams of vapour compression refrigeration system.
11. Define, relative humidity, specific humidity and degree of saturation, wet bulb temperature and dew point temperature.
12. Prove that volumetric efficiency of compressor $\eta_v = 1 + c - c(p_2/p_1)^{1/n}$
13. Comparison between surface condenser and jet condenser.
14. Steam at 50bar, 400°C expands in a rankine engine to 0.34 bar for 150 kg/sec of steam; determine
 - (i) Power developed
 - (ii) The thermal efficiency
 - (iii) Specific steam consumption.
15. In a Rankine cycle, the steam at inlet to turbine is saturated at a pressure of 35 bar and the exhaust pressure is 0.2 bar. Determine : (i) The pump work, (ii) The turbine work, (iii) The Rankine efficiency, (iv) The condenser heat flow, (v) The dryness at the end of expansion. Assume flow rate of 9.5 kg/s.
16. In a steam power cycle, the steam supply is at 15 bar and dry and saturated. The condenser pressure is 0.4 bar. Calculate the Carnot and Rankine efficiencies of the cycle. Neglect pump work.
17. An air refrigeration open system operating between 1 MPa and 100 kPa is required to produce a cooling effect of 2000 kJ/min. Temperature of the air leaving the cold chamber is -5°C and at leaving the cooler is 30°C . Neglect losses and clearance in the compressor and expander. Determine :(i) Mass of air circulated per min. ;(ii) Compressor work, expander work, cycle work ; (iii) COP and power in kW required.
18. Write the Construction and Working Principle of Screw compressor.
19. Define and explain 'equivalent evaporation'.
20. Determine the height and the diameter of the chimney used to produce a draught for a boiler which has an average coal consumption of 1800 kg/h and flue gas formed per kg of coal fired are 14 kg. The pressure losses through the system are given below :

Pressure loss in the fuel bed = 7 mm of water, Pressure loss at boiler flues = 7 mm of water Pressure loss in bends = 3 mm of water, Pressure loss in chimney = 3 mm of water.

The temperatures of ambient air and flue gases are 35°C and 310°C respectively. Assume actual draught as 80% of theoretical draught.

SUB- MANUFACTURING PROCESS-II

PAER CODE –MP-II

1. What is taper? What is taper turning? Describe various taper turning methods.
2. What factors should be selected during selection of a grinding wheel.
3. Describe various material used in a grinding wheel.
4. Find the time required on a shaping machine for completing one cut on a plate 400mmx600mm if the cutting speed is 20mm/ unit. The return to cutting time ratio is 2:3. Assume approach =40mm, over travel =35mm, allowance on either side of the plate width =6mm and feed/ cycle = 1mm.
5. Sketch and describe the tool head of a shaper machine.
6. Write down the various milling operation with figures.
7. What are the different between up milling and down milling, shaper and planer & thermo plastic and thermosetting plastic.
8. Explain the process of extrusion, compression moulding , transfer moulding and clandering due to produce of plastic.
9. Sketch and pointing the drilling cutter.
10. What is super finishing process? What are the purpose of super finishing process?
11. Index for 87 divisions in milling machine.
12. Calculation cutting time for cutting 150mm long key way using end mill of 20mm diameter having 4 cutting teeth. The depth of key way is 4.2 mm, feed/ tooth is 0.1 and cutting speed is 38mm /min. Assume approach and over travel distance as half of the diameter of the cutter and a depth of cut 4.2mm/pass.
13. Draw and explain various types of lathe chuck.

ELEMENTS OF ELCTRICAL ENGINEERING

PAPER CODE: EEE

1. What is the three phase induction motor working principle? What are the advantages and disadvantages of three phase induction motor?
2. Explain in details the starting of slip ring motors.
3. What is a transformer and how does it work?
4. Explain the transformer Open – Circuit test and Short- Circuit test.
5. Explain the All Day Efficiency.
6. Describe the Construction of PMMC Instruments. What are the advantages and disadvantages of PMMC Instruments?
7. Describe the Construction of Moving Iron Instruments. And describe the torque equation of moving iron instruments.
8. What is LVDT? And explain the construction of LVDT.
9. What is Strain Gages?
10. Distinguish between conventional and nonconventional sources of energy.
11. Explain the methods for Power Factor Improvement.

SUB: ENGINEERING METROLOGY

PAPER CODE: EM

1. State the working principal of Sine Bar.
2. Draw and levelling the vernier height gauge.
3. State the working principal of optical encoder.
4. What type of basis size limiting system used in metrology measurement and describe them with example.
5. Write the definition of Allowance, Tolerance, Fit, Zero limit and Nominal size.
6. Describe how to test flatness by dial gauge.
7. Show the various symbols for designating surface finish on drawing.
8. In the measurement of surface roughness, height of 20 successive peaks and valleys measured from a datum are as follows 45, 25, 40, 25, 35, 16, 40, 22, 25, 34, 25, 40, 20, 36, 28, 18, 20, 25, 30, 38. If these measurements were made over a length of 20mm, determine C.L.A and R.M.S value of these.
9. In a screw thread show major diameter, minor diameter, effective diameter, pitch and thread angle.
10. Describe about two wire method.

THEORY OF MACHINES & MECHANISM

PAPER CODE : TMM

List of Question:

1. What do you understand by instantaneous centre of rotation in kinematic of machines?
2. Discuss the three types of instantaneous centers for a mechanism.
3. What is machine? Give Classification of link. What is significance of degrees of freedom of a kinematic chain when it functions as a mechanism? Give Examples.
4. Explain the slotted and lever quick return motion mechanisms with neat sketches
5. Define Cam and Follower. A cam drives a flat reciprocates follower in the following manner: During the first 120° rotation of the cam, follower moves outwards through a diameter of 20 mm with simple harmonic motion. The follower dwells during next 30° of cam rotation. During next 120° of cam rotation, the follower moves inward with simple harmonic motion. The follower dwells for the next 90° of cam rotation. The minimum radius of the cam is 25mm. Draw the profile of cam.
6. Why we use Belt drive? State the types of belt drives and explain the various types belt drive material. Also state the factors for selection of belt drive.
7. Derive the equation for Velocity Ratio of belt drive. Also explain the slip of belt with derivation.
8. An engine running at 150 rpm, drives a line shaft of a belt. The engine pulley is 750 mm diameter and the pulley on the shaft being 450 mm. A 900 mm diameter pulley on the line shaft drives a 150 mm diameter pulley keyed to a dynamo shaft. Find the speed of the dynamo shaft. When 1). There is no slip, and 2) there is a slip of 2% at each drive.
9. Two pulleys, one 450 mm diameter and the other 200 mm diameter are on parallel shafts 2.95 m apart and are connected by a crossed belt. Find the length of the belt required and the angle of contact between the belt and pulley. What power can be transmitted by the belt when the larger pulley rotates at 200 rev/min, if the maximum permissible tension in the belt drive is 1 kN, and the coefficient of friction between the belt and pulley is 0.25?
10. Explain rope drive, its types and advantages and disadvantages in detail.
11. A pulley used to transmit power by means of ropes has a diameter of 3.6 m and has 15 grooves of 45° angle. The angle of contact is 170° and the coefficient of friction between the ropes and grooves sides is 0.29. The

maximum possible tension in the ropes is 960 N and mass of the ropes is 1.5 Kg per metre length. What is the speed of pulley in rpm and the power transmitted if the condition of maximum power prevail ?

12. A chain drive is used for reduction of speed from 240 rpm to 120 rpm. The number of teeth on the driving sprocket is 20. Find the number of teeth on the driven sprocket , if the pitch circle diameter of the driven sprocket is 650 mm and centre to centre distance between the two sprocket is 800 mm ,determine the pitch and length of the chain.
13. Explain the Shoe Brake with its derivations and explain the conditions.
14. A bicycle and rider of mass 100kg are travelling at the rate of 25 Km/h on a level road. A brake is applied to the rear wheel which is 0.9 m in diameter and this is the only resistance acting. How far will the bicycle travel and how many turns will it make before it comes to rest? The pressure applied on the brake is 100 N and Coefficient of friction is 0.5.
15. A .band brake acts on the $\frac{5}{6}$ th of circumference of a drum 450 mm diameter which is keyed to the shaft. The band brake provides a braking torque of 225 N-m. One end of the band is attached to a fulcrum pin of the lever and other end to a pin 100 mm from the fulcrum. If the operating force is applied at 500 mm from the fulcrum and coefficient of friction is 0.25 , Find the operating force when the drum rotates in the (a) anticlockwise , (b) clockwise problem.
16. In a laboratory experiments, the following data were recorded with rope brake: Diameter of the flywheel 1.2 m , diameter of the rope 12.5 mm , speed of the engine 200 rpm , dead load on the brake 600 N , spring balance reading 150 N .Calculate the brake power of the engine.
17. Explain the Belt transmission Dynamometer and its derivation with neat skeych.
18. Define Governors. Explain Centrifugal governors with neat sketch and derivations
19. In an engine governor of the Porter type , the upper and lower arms are 200 mm and 250 mm respectively and pivoted on the axis of rotation . The mass of the central load is 25 Kg , the mass of each ball is 5 Kg and friction of the sleeve together with the resistance of the operating gear is equal to a load of 30 N at the sleeve. If the limiting inclinations of the upper arms to the vertical are 30° and 50° , find , taking friction into account , range of speed of the governor.
20. Two parallel shafts , about 600 mm apart are to be connected by spur gears. One shafts is to run at 560 rpm and other at 220 rpm . Design the gears if the circular pitch is to be 35 mm.
21. A single plate clutch , effective on both sides , is required to transmit 25 KW at 4500 rpm . Determine the outer and inner diameters of frictional surface if the coefficient of friction is 0.355 , ratio of diameters is 2.25 and maximum pressure is not to exceed 0.3 N/mm² . Also determine the axial thrust to be provided by springs . Assume the theory uniform theory.
22. The load on the journal is 150 KN due to turbine shafts of 350 mm diameter running at 2500 rpm determine the Following .(1) Length of the bearing if allowable bearing pressure is 2.9 N/mm² . (2) . Amount of heat to be removed by the lubricants per minute if the bearing temperature is 75° C and viscosity of the oil at 75° C is 0.025kg/m-s and bearing clearance is 0.29 mm.
23. `Explain term Vibrations. State different types of vibrations and explain briefly . Also State the causes and remedies of Vibrations.
24. Define balancing. What is different between Vibrations and Balancing. What are steps to taken to avoid problem of balancing .

DIPLOMA-6TH SEMESTER (EE)

ELECTRICAL DESIGN, ESTIMATION & COSTING

PAPER CODE: EDEC

1. State the factors, governing the amount of illumination at a particular place and the necessary point to be kept in view for executing schemes.
 2. Explain utilization factor and depreciation factor used in connection with lighting scheme.
 3. Write short notes on (i) transformer bushings (ii) transformer tapping.
 4. What are the functions of conservator and breather in transformer?
 5. What are type factors to be considered for selecting the particular type of wiring?
 6. What type of wiring would you recommend for mechanical workshop? Give reasons in support of your answer.
7. As per IE rules, what are the provision applicable to medium, high and extra-high voltage installation?

ELECTRICAL INSTALLATION, MAINTENANCE & TESTING

PAPER CODE: EIMT

- (1) Discuss in details installation of alternator, induction motor and transformer.
- (2) What is planning and design of installation work-explain. Also explain inspection before arrival of machine.
- (3) What is drying out of rotating electrical machine? What is the necessity of drying out? Discuss different methods of drying out.
- (4) Discuss in details installation of transmission and distribution lines.
- (5) State of operational steps involved in installation of electric machines in a workshop.
- (6) On arrival of electrical machines what steps you should follow for their acceptance?
- (7) Write short notes on following:
- (8) Levelling and alignment b) procedure for storing a machine at site.

PAPER NAME: INDUSTRIAL MANAGEMENT

PAPER CODE: IM

Q. Answer the following questions.

1. Define financial management. Explain its goals. What are the elements of financial management?
2. What is Human Resource Planning? Describe the different stages in Human Resource Planning process.
3. What is Recruitment? State the various methods of recruitment.
4. Give a short note on:
 - a. EOQ
 - b. ABC analysis
5. What is Motivation? Describe Maslow's theory of motivation.
6. Define financial ratio. What are the objectives of ratio analysis?

7. What do you mean by Industrial Disputes? What are the different methods of settlement adopted by an organization to resolve Industrial Dispute?

8. Give a short note on:

- a. JIT
- b. MBO

PAPER NAME: CONTROL OF ELECTRICAL MACHINE

PAPER CODE: CEM

1. Draw the control circuit for auto transformer starter of closed circuit transition and explain.
2. Draw the schematic diagram of solid state relay.
3. Describe the Limit switch with its proper diagram.
4. Explain the advantages of solid state control of machines.
5. Explain the following: (i) Electronic timer (ii) zero speed switch.
6. What is Fuse? State the classification of fuse.
7. Describe the principle of operation of single phase induction motor using thyristor.

DIPLOMA-6TH SEMESTER (CST)

PAPER NAME: INDUSTRIAL MANAGEMENT

PAPER CODE: IM

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2. What is Human Resource Planning? Describe the different stages in Human Resource Planning process.
3. What is Recruitment? State the various methods of recruitment.
4. Give a short note on:
 - c. EOQ
 - d. ABC analysis
5. What is Motivation? Describe Maslow's theory of motivation.
6. Define financial ratio. What are the objectives of ratio analysis?
7. What do you mean by Industrial Disputes? What are the different methods of settlement adopted by an organization to resolve Industrial Dispute?
8. Give a short note on:
 - c. JIT
 - d. MBO

SUB: ADVANCED JAVA PROGRAMMING

PAPER CODE: AJP

1. What is class? Define a class with example.
2. What is constructor? Define with example.

3. What is method overloading? Describe with example.
4. What is single inheritance? Define with example.
5. What is Thread Priority? Define with example.
6. Define various types of exceptions.
7. Define Applet life cycle.
8. How do applets differ from application programs?
9. Discuss the steps involved in developing and running a local applet.
10. Discuss the steps involved in loading and running a remote applet.

Sub: SYSTEM PROGRAMMING & COMPILER DESIGN

Paper Code: SPCD

1. 1) Explain Peephole optimization.
2. 2) What are three address codes? Explain them.
3. 3) What is SDT? What is parsing?
4. 4) Describe the role of Lexical Analyzer.
5. 5) What is Cross compiler?
6. 6) Explain the conflicts that may occur during shift reducing parsing.
7. 7) What is macro instruction?
8. 8) List the advantages and disadvantages of operator precedence parsing.
9. 9) Write quadruples, triples and indirect triples for the expression $A=B*-C+C*-B$
10. 10) What are the different types of parsing?
11. a) Define Flow graph and explain it with the help of example.
b) Write down the process for identifying the basic blocks.
12. a) What is an operator precedence parser? List the advantages and disadvantages of operator precedence parsing.
b) What do you mean Thompson Construction? Explain with an example.
13. Write short notes of the following.
 - a) Peephole optimization.
 - b) YACC
 - c) Symbol Table
 - d) Thompson Construction
 - e) Cross compiler

Sub : DIGITAL IMAGE PROCESSING

Paper Code: DIP

1. What is sampling? What is quantization? What is the relation between them?
2. What is meant by image segmentation? What its use in image processing?
3. What is Image smoothing? Explain image smoothing using ideal low pass filters and Butterworth low pass filters?
4. Explain edge linking using Hough transform.
5. Explain about edge detection using gradient operator.
6. Explain the terms in details
 - a) RGB color model
 - b) Contrast stretching.
7. What is meant by histogram specification? Explain

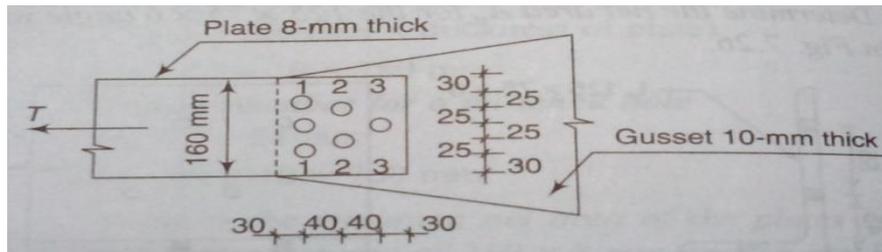
8. What is wavelet? How it is useful in image processing?
9. Explain different grey level transform.
10. What is meant by lossless coding and lossy coding?

DIPLOMA-6TH SEMESTER (CE)

Sub: DESIGN OF STEEL STRUCTURE

Paper Code: DSS

1. Design a built up column 10m long to carry factored axial load of 1080KN. the column is restrained in position but not in direction at both the ends. Provide single lacing system with bolted connections. Assume steel of grade fe410 and bolts of grade4.6. design the column with two channels placed back to back.
2. Design a single angle discontinuous strut to carry a factored axial compressive load of 65KN. the length of strut is 3m between intersections. It is connected to 12mm thick gusset plate by 20mm diameter 4.6 grade bolts. Use steel of grade Fe410.
3. How shear value, bearing value and tearing value related to riveted connection is calculated?
4. Define slenderness ratio. State its values as per is 800.
5. What is batten and lacing? Draw a figure for each.
6. Define ductility factor and shear lag factor of tension members.
7. Design a lap joint to connect two plates 300mm wide and 16mm thick using 20mm diameter bolts of grade4.6 the applied service load is 375KN.
8. Write the design procedure of Tension member
9. What are the assumptions in the riveted joint theory?
10. Determine the design tensile strength of plate (160x8mm) connected to 10mm thick gusset using 16mm bolts, as shown fig, if the yield and the ultimate stress of steel used are 250 Mpa and 410 Mpa respectively.



Sub: CONSTRUCTION & DISASTER MANAGEMENT

Paper Code: CDM

1. What is plinth area and cubic rate estimate?
2. Write notes on (a) precedence of contract document; (b) Completion certificate
3. What is a detailed estimate and how it is prepared?
4. What are charts? Enumerate the various types of chart with graphical representation.
5. Write about the contracting of network.
6. Write a short note-

- a. Slack b. Forward plans
7. Distinguish between Amount put to tender and tender amount.
8. What are the factors to be considered while planning the rebuilding works after a major disaster due to flood /cyclone/earthquake
9. Differentiate natural disaster and manmade disasters with examples.
10. What is plinth area and cubic rate estimate?

Sub: ENVIRONMENTAL ENGINEERING

Paper Code: EE

1. What are the common coagulants used in treatment plant?
2. What is activated sludge? Describe activated sludge process
3. What is oxidation pond and oxidation ditch?
4. What is environmental impact assessment?
5. Write short notes on swacch bharat abhiyan.
6. Write short notes on acid rain and green house gases and its effects.
7. Give the comparative detail between slow sand filter rapid sand filter.
8. What is corrosion? What are the effects of corrosion?
9. What are the various types of sewers and various systems of sewerage?
10. Name the different type of pipes used in water supply scheme

Sub: WATER RESOURCE MANAGEMENT

Paper Code: WRM

1. Define the term runoff, and list the various factors that affect the runoff of a given area.
2. Explain with neat sketch the method of determining the infiltration.
3. Define the important of stream gauge.
4. Describe with a neat sketch the working of a float type rain gauge.
5. What are the open wells? Explain with a sketch constant level pumping test
6. explain mass curve analysis, explain with sketches.
7. Enumerate the systems of flood forecasting.
8. Write a short note on deary's law of measuring velocity of ground water.
9. What is the necessity of temperature control is gravity dam?
10. Describe the method of watershed management.

PAPER NAME: INDUSTRIAL MANAGEMENT

PAPER CODE: IM

Q. Answer the following questions.

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3. What is Recruitment? State the various methods of recruitment.
4. Give a short note on:

- e. EOQ
- f. ABC analysis

5. What is Motivation? Describe Maslow's theory of motivation.
6. Define financial ratio. What are the objectives of ratio analysis?
7. What do you mean by Industrial Disputes? What are the different methods of settlement adopted by an organization to resolve Industrial Dispute?
8. Give a short note on:
 - e. JIT
 - f. MBO

DIPLOMA-6TH SEMESTER (ME)

Sub: DESIGN OF MACHINE ELEMENTS

Paper Code: DME

1. Define Stress Concentration. State the Method By which we reduce the effect of Stress concentration.
2. What are the General Considerations in Machine Design
3. State the Classification of machine Design in Brief
4. Distinguish between cotter joint and knuckle joint.
5. A knuckle joint is required to resist an axial load of 60 KN. Design the joint completely. Assume $\sigma_t = 80\text{MPa}$, $\tau = 50\text{MPa}$, $\sigma_{cr} = 150\text{MPa}$.
6. What is a lever? Explain the principle on which it works?
7. State the applications of hand and foot levers. Discuss the procedure for designing the hand and foot levers
8. State the Purpose of Shaft Coupling.
9. Design and make a neat dimensioned sketch of a muff coupling which is used to connect two steel shafts transmitting 40KW at 350 rpm. The material for the shafts and key is plain carbon steel for which allowable shear crushing stresses may be taken as 40 MPa and 80 MPa respectively. The material for muff is cast iron for which the allowable shear stress may be assumed as 15 MPa.
10. Explain the term 'Effect of keyways'.
11. A 15 KW, 960 rpm motor has a mild steel shaft of 40 mm diameter and the extension being 75 mm. The permissible shear and crushing stresses for the mild steel key are 56 MPa and 112 MPa. Design the keyway in the motor shaft extension. Check the shear strength of the key against the normal strength of the shaft.
12. Explain in brief the classification of spur gear in brief.
13. Explain Merits and Demerit of Gear Drive.
14. State the Design Consideration of a Gear Drive.
15. Explain the process of general costing method any components
16. State the Advantage and Disadvantage of Rolling contact bearing over sliding contact bearing
17. Explain the term 'life of bearing'.

PAPER NAME: INDUSTRIAL MANAGEMENT

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8. Give a short note on:
 - g. JIT
 - h. MBO

Sub: FLUID POWER

Paper Code: FP

1. a. Explain the merits & demerits of the three types of hydrostatic type of hydraulic circuits in use.
b. Why is a relief valve used in a hydraulic circuit? Explain its working with the help of a diagram.
2. a. What is the difference between the terms fluid power & hydraulics & pneumatics?
b. Compare the use of fluid power to a mechanical system by listing the advantages & disadvantages each.
3. a. What is a positive displacement pump? In what ways does it differ from a centrifugal pump.
b. A gear pump has a 75mm outside diameter, 50mm inside diameter & 25mm width. If the volumetric efficiency is 90 % at rated pressure, what is the corresponding actual flow rate? Take pump speed as 1000 r.p.m.
4. a. What is a 3-way & 4-way direction control valve. Explain with a neat sketch.
c. What is a pressure reducing valve? What is its purpose?
5. a. Explain the principle of a balanced design of vane pump.
b. What type of pumps are available in variable displacement design.
6. a. How does a pilot check valve differ from a simple check valve.
b. A hydraulic motor has a 82 cm³ volumetric displacement. If it has a pressure rating of 70 bars & it receives oil of 0.0006 m³/s from a theoretical flow rate pump find the speed, theoretical torque, theoretical power of motor.
7. a. Differentiate between compensated & non compensated flow control valve.
b. State the construction & working function of meter in & meter out circuit in fluid flow.
8. a. Draw the flow diagram circuit of pressure intensifier and explain it.
b. Explain the function of - linear actuator, hydraulic motor, direction control valve.
9. a. What is a hydraulic filter? What function does it serve in a hydraulic circuit? What are the common materials used for hydraulic filter?

- b. Write a brief note on hydraulic piping used in a hydraulic circuit .
- 10. a. List out the characteristic properties of hydraulic fluids. What are the common hydraulic fluids used in practice.
Give the schematic diagram of a direction control valve. Explain how it works.
- 11. a. Explain the merits & demerits of the three types of hydrostatic type of hydraulic circuits in use.
- b. Why is a relief valve used in a hydraulic circuit? Explain its working with the help of a Diagram.
- c. Diagram.

Sub: REFRIGERATION & AIR CONDITIONING

Paper Code: RAC

1. State any five desirable properties of an ideal refrigerant.
2. Draw the p-h chart of actual vapour compression refrigeration cycle compared with standard vapour compression cycle
3. Define positive displacement compressors.
4. Write short note on various types of compressors
5. A vapour compression refrigeration using R134a works between temperature limits of -6°C and 40°C . The refrigerant leaves the compressor as dry saturated. Calculate the refrigeration effect and C.O.P, if (a) refrigerant leaves the condenser saturated. (b) The refrigerant is sub-cooled to 20°C before entering the throttle valve. (Refer table For R134a)
6. Differentiate between Vapour Compression Refrigeration System and Vapour Absorption Refrigeration System.
7. State the basic function of an Expansion device.
8. What are the Factors which affect the condenser capacity?
9. Explain heat rejection factor for the case of a condenser.
10. Write a short note on defrosting.
11. What are factors that affect the heat transfer capacity of an evaporator?
12. What do you understand by pool boiling and flow boiling?
13. Classify the Air Conditioning system.
14. Write a short note on the factors affecting comfort air conditioning.
15. Explain the difference between winter air conditioning and summer air conditioning.
16. Define the Psychrometric? Explain the Dalton's law of Partial Pressures
17. Explain with the help of psychrometric chart, Sensible heating and Sensible cooling process.

Sub: PRODUCTION MANAGEMENT

Paper Code: PM

1. State the objectives of Production Planning and Control (PPC). Discuss the relation of PPC with other functional departments.
2. What is work Study? State the objectives of work Study. Differentiate time study and motion study.
3. Define TQM. Explain advantages and disadvantages of TQM.
4. Discuss the importance of Productivity. Explain Productivity Measurement with a suitable example.

4. Give a short note on:
- (a) Just in Time
 - (b) VED Analysis
 - (c) Automated Guided Vehicles (AGV)
5. What is Despatching? State the various steps of despatch procedure for each operation.

DIPLOMA-6TH SEMESTER (ETCE)

Sub: INDUSTRIAL MANAGEMENT

Paper Code: IM

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4. Give a short note on:
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 - j. ABC analysis
5. What is Motivation? Describe Maslow's theory of motivation.
6. Define financial ratio. What are the objectives of ratio analysis?
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8. Give a short note on:
 - i. JIT
 - j. MBO

Sub: ADVANCE COMMUNICATION ENGINEERING

Paper Code: ACE

1. What do you mean by 'Mono mode' & 'multi mode' optical fibre cable?
2. Write down the advantages and demerits of Optical fibre cable?
3. Short notes: FDMA & TDMA.
4. A silica optical fibre with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47, Determine ---
 - a) The critical angle at the core-cladding interface.
 - b) N.A for the optical fibre cable.
 - c) acceptance angle.
5. What do you mean by Routing & Topology?
6. Short notes: (i) Wi max
(ii) GSM
7. Explain the schematic structure of Optical fibre. How can you classify fibre optical fibre cable? Discuss their characteristic features.

8. Short notes : 'DS-SS' & 'FH-SS' .

Sub: INSTRUMENTATION & CONTROL
Paper Code: IC

1. Write a short note PI, PD, PID controllers
2. A closed loop control system has the characteristic equation given by $s^3+4.5s^2+3.5s+1.5=0$ find the system stability using Routh's stability criterion.
3. What is DAS? Explain it with a block diagram. What are the advantages of it?
4. Write the working principal of capacitance transducer in details
5. What are discontinuous and continuous modes?
6. What is the role of controllers in process industry?
7. How PID controller is used to control the output of closed loop system?

Sub: INDUSTRIAL ELECTRONICS-II
Paper Code: IE-II

1. . Draw the circuit diagram of armature voltage control method of speed control of a DC shunt motor using a thyristor bridge and explain its working.
2. With the help of a net circuit diagram explain the principle of voltage source and current source inverter.
3. Briefly explain with the help of a simplified block diagram the operation of an On-line UPS
4. Write down short notes on the followings:
(i) Phase control AC regulator (ii) CVT (iii) Working principle of PLC.
5. Explain servo system with the help of block diagram
6. What are the PLC characteristics and hardware configuration of CPU

Sub: DIGITAL SIGNAL PROCESSING-II
Paper Code: DSP-II

1. Compute the convolution of following sequences
 $x_1(n) = \{1, 0, -1, 1\}$ and $x_2(n) = \{1, 1, 0, 0\}$
2. . Find linear convolution of following two sequence using Overlap-save method
 $x(n) = \{1, -1, -1, 2, -2, -2, 3, -1, 2, 1, 2\}$ and $h(n) = \{1, 2, 1\}$.
3. Design of FIR filter using window method.
4. Compute the circular convolution of following sequences
 $x_1(n) = \{1, 0, 2, 1\}$ and $x_2(n) = \{1, 1, 1, 2\}$
5. . write the short note on overlap save and overlap add method.