B.TECH 2ND SEM – CE+CSE

BASIC COMPUTATION & PRINCIPLES OF COMPUTER PROGRAMMING
PAPER CODE: CS201

1. Define infinite loop with example. Explain entry control and exit control loops with example
2. Write a program which will reverse the values in 1D array of size N.
3. Write a C language program to find whether given number is palindrome or not.
4. What are the different storage classes in C? Explain each of them with suitable example?
5. State and explain different types of string functions with example.
6. Explain dynamic memory allocation and releasing dynamically allocated memory
7. Explain with example the meaning of explicit and implicit type casting.
8. Briefly describe the different loop control structures in ‘C’ with syntax, example
9. What is the local variable and global variable?
10. What is string in C?

SUB-CHEMISTRY-I
PAPER CODE: CH201

1. Prove that \( C_p-C_v=R \) for 1 mole of ideal gas.
2. Prove that \( W_{rev}>W_{irr} \).
3. Derive Kirchhoff’s equation.
4. Derive Gibb’s-Helmholtz equation.
5. Derive the Carnot cycle with diagram.
6. Derive the specific rate for a second order reaction and find out half life period.
7. What is Arhenious equation? Signify it. What is activation energy? Draw the net sketch of activation energy for an exothermic and endothermic reaction.
8. What is TST? Derive the Eyring equation. Derive the expression for homogenous catalysis.
9. What is Hess’s law? Prove that it is the application of first law.
10. A diatomic ideal gas(y=1.4) initially at 600 K and 10 atm undergoes reversible adiabatic expansion till the final pressure becomes 2 atm. Find out its final volume.
11. Derive an expression for \( \frac{1}{4} \) completion of 1st order reaction.
12. Draw the conductometric titration curve (a)CH\(_3\)COOH vs NaOH. (b) HCl vs NH\(_4\)OH. (c) AgNO\(_3\) vs KCl.
13. What is Kohlrauch’s law of migration of ions? Applying this law find out the equivalent conductance of acetic acid at infinite dilution.
14. How equivalent conductance of strong and weak electrolytes change with dilution?

MATHEMATICS-2
Paper Code: M-201

1) Write down the BFS algorithm.
2) Give an example of a graph having both Eulerian circuit and Hamiltonian circuit.
3) Show that the improper integral \( \int_0^\infty \frac{\sin x}{x} \, dx \) is convergent.
4) Use Kruskal’s algorithm to find a shortest spanning tree in the following graph and find its weight.

5) Show that \[ \int_{0}^{\infty} \frac{\cos a x - \cos b x}{x} \, dx = \log \frac{a}{b}, \quad 0 < b < a. \]

6) Prove that \[ (m, n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}. \]

7) Write down the DFS algorithm.

8) Prove that a tree with n vertices has (n-1) edges.

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**PAPER NAME: BASIC ELECTRICAL & ELECTRONICS ENGG.-II**

**PAPER CODE: ES-201**

1. Implement EX-NOR gate using Basic gates.
2. Short Note: JFET, CMOS
3. Derive the relationship between the JFET parameters.
4. What is called ‘Min-term’ in Boolean Algebra?
5. Prove that, \( A+BC = (A+C)(A+B) \)
6. Implement EX-OR gate using Nand gates.
7. Realise the logic expression using basic gates only:
   \[ Y = \overline{B}\overline{C} + \overline{C}\overline{A} \]
8. Explain what will happen to transformer if we give DC supply to it.
9. Derive the expression for energy stored in electric field.
10. Define voltage regulation of a transformer at a given load.

11. a) A coil having resistance of 50 Ω and inductance of 0.02H is connected in parallel with a capacitor of 25 μF across a 200 V, 50 Hz supply. Find the current in the coil and the capacitor. Also find total current taken from the supply and overall power factor. Draw a neat phasor diagram.

12. Two coils having 3000 & 2000 turns are wound around a magnetic ring. 60% of flux produced in first field coil links with second coil. A current of 3A produces flux of 0.5 mWb in the first coil & 0.3 mWb in the second coil. Determine the mutual inductance & the coefficient of coupling.

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**ENGINEERING THERMODYNAMICS & FLUID MECHANICS**

**PAPER CODE – ME 201**

1. An inverted differential manometer containing an oil of sp. gr. 0.9 is connected to find the difference of pressures at two points of a pipe containing water. If the manometer reading is 40 cm, find the difference of pressure.
2. Recalculate (a) the temperatures at the cardinal points, (b) the m.e.p., and (c) the cycle efficiency when the cycle of Problem 1 is a Diesel cycle with the same compression ratio and a cut-off ratio such as to give an expansion curve coincident with the lower part of that of the dual cycle of Problem 1.

3. A heat engine operating between two reservoirs at 1000 K and 300 K is used to drive a heat pump which extracts heat from the reservoir at 300K at a rate twice that at which the engine rejects heat to it. If the efficiency of the engine is 40% of the maximum possible and the COP of the heat pump is 50% of the maximum possible, what is the temperature of the reservoir to which the heat pump rejects heat? What is the rate of heat rejection from the heat pump if the rate of heat supply to the
engine is 50 kW?

4. a. The water is flowing through a taper pipe of length 50 m having diameter 40 cm at the upper end and 20 cm at the lower end, at rate of 60 lt/s. The pipe has a slope of 1 in 40. Find the pressure at lower end if the pressure at higher level is 24.525 N/cm².

b) What are the difference between venturimeter and orifice meter.

c) Derive the equation of rate of flow of venturimeter and orifice meter.

5. Two reversible heat engines A and B are arranged in series, A rejecting heat directly to B. Engine A receives 200 kJ at a temperature of 421°C from a hot source, while engine B is in communication with a cold sink at a temperature of 4.4°C. If the work output of A is twice that of B, find

(a) The intermediate temperature between A and B

(b) The efficiency of each engine

(c) The heat rejected to the cold sink

6. A heat pump working on the Carnot cycle takes in heat from a reservoir at 5°C and delivers heat to a reservoir at 60°C. The heat pump is driven by a reversible heat engine which takes in heat from a reservoir at 840°C and rejects heat to a reservoir at 60°C. The reversible heat engine also drives a machine that absorbs 30 kW. If the heat pump extracts 17 kJ/s from the 5°C reservoir, determine

(a) The rate of heat supply from the 840°C source

(b) The rate of heat rejection to the 60°C sink.

7. If a refrigerator is used for heating purposes in winter so that the atmosphere becomes the cold body and the room to be heated becomes the hot body, how much heat would be available for heating for each kW input to the driving motor? The COP of the refrigerator is 5, and the electromechanical efficiency of the motor is 90%. How does this compare with resistance heating?

8. A Carnot cycle operates between source and sink temperatures of 250°C and –15°C. If the system receives 90 kJ from the source, find:

(i) Efficiency of the system; (ii) The net work transfer; (iii) Heat rejected to sink.

9. A heat pump working on a reversed carnot cycle takes in energy from a reservoir maintained at 5°C and delivers it to another reservoir where temperature is 77°C. The heat pump derives power for its operation from a reversible engine operating within the higher and lower temperatures of 1077°C and 77°C. For 100 kJ/kg of energy supplied to reservoir at 77°C, estimate the energy taken from the reservoir at 1077°C.

10. a) If a certain amount of steam is produced at a pressure of 8 bar and dryness fraction 0.8. Calculate:

(i) External work done during evaporation.

(ii) Internal latent heat of steam.

b) One liter of crude oil weights 9.6N. Calculate its specific weight, density, and specific gravity.

11.a) Two plate are placed at a distance of 0.15 mm apart. The lower plate is fixed while upper plate having surface area 1 m² is pulled at 0.3 m/s. Find the force and power required to maintain this speed, if the fluid separating them is having viscosity 1.5 poise.

b) A 150 mm diameter cylinder rotates concentrically inside another cylinder of diameter 151mm. Both the cylinders are 250 mm height. The space space between the cylinder is filled with a liquid of viscosity 10 poise. Determine the torque required to rotated the inner cylinder at 100 r.p.m.

12.a) A hydraulic press has a ram of 20 cm diameter and a plunger of 4 cm diameter. It is used for lifting a weight of 20 kN. Find the force required at plunger.

b) An inverted differential manometer containing an oil of sp. gr. 0.9 is connected to find the difference of pressures at two points of a pipe containing water. If the manometer reading is 40 cm, find the difference of pressures.

13. A steam power plant has the range of operation from 40 bar dry saturated to 0.05 bar. Determine for rankine cycle

a) Cycle efficiency

b) Work ratio

c) Specific fuel consumption

14.a) Define stream line, laminar flow & turbulent flow.

b) A 40 cm diameter pipe, conveying water branches into two pipes of diameters 30 cm and 20 cm respectively. If the average velocity in the 40 cm diameter pipe is 3 m/s. Find the discharge in this pipe. Also determine the velocity in 20 cm pipe if the average velocity 30 cm pipe is 2 m/s.

15.a) What is Euler’s equation of motion? How will you obtained Bernoulli’s equation from it?
b) Water is flowing through a pipe of 100 mm diameter under a pressure of 19.62 N/cm² (gauge) and with mean velocity of 3 m/s. Find the total head of the water at a cross section which is 8 m above the datum line.

**B.TECH 2ND SEM – ECE**

**BASIC COMPUTATION & PRINCIPLES OF COMPUTER PROGRAMMING**

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8. Briefly describe the different loop control structures in ‘C’ with syntax, example
9. What is the local variable and global variable?
10. What is string in C? Explain working principle of any four string function.

**SUB- CHEMISTRY-I**

**PAPER CODE: CH201**

A. Establish the differential equation of damped harmonic motion.
B. State Brewster’s law.
C. Describe the working principle of ruby laser.
D. Write down the condition for sustained interference.
E. Newton’s rings are observed with reflected light of wavelength 6000 Å. The diameter of the 10th dark ring is 0.52cm. Calculate the radius of curvature of the lens and the fringe width.
F. What is wave particle duality?
G. Potential energy of a particle of mass m is given by \( \frac{1}{2} mw^2x^2 \), where w is constant. Show that the particle executing S.H.M.
H. State the advantages of fibres over wires or cables.
I. What are positive and negative crystals, state with example.

**MATHEMATICS-2**

**Paper Code: M-201**

1) Write down the BFS algorithm.
2) Give an example of a graph having both Eulerian circuit and Hamiltonian circuit.
3) Show that the improper integral \( \int_0^\infty \frac{\sin x}{x} \, dx \) is convergent.
4) Use Kruskal’s algorithm to find a shortest spanning tree in the following graph and find its weight.
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15. Derive the relationship between the JFET parameters.

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21. Derive the expression for energy stored in electric field.

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23. . a) A coil having resistance of 50 Ω and inductance of 0.02H is connected in parallel with a capacitor of 25 μF across a 200 V, 50 Hz supply. Find the current in the coil and the capacitor. Also find total current taken from the supply and overall power factor. Draw a neat phasor diagram.

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**ENGINEERING THERMODYNAMICS & FLUID MECHANICS**

**PAPER CODE – ME 201**

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c) Water is flowing through a pipe of 100 mm diameter under a pressure of 19.62 N/cm² (gauge) and with mean velocity of 3 m/s. Find the total head of the water at a cross section which is 8 m above the datum line.
Answer the following questions

1) Find the Lagrange’s formula the interpolating polynomial which corresponds to the following data

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3+6+6 = 15

2) Derived the Newton-Raphson Method. Using this formula to find the roots of the equation \( x^2 - 5x + 2 = 0 \) correct up to three places of decimals.

3) Establish the iterative formula for for Gauss-Seidel iterative method.

4) Solve the system of linear equations by Gauss-Jordan’s Matrix inversion method:
   \[
   \begin{align*}
   x + 3y + 2z &= 17 \\
   x + 2y + 3z &= 16 \\
   2x - y + 4z &= 13
   \end{align*}
   \]

5) Construct the formula for Confluent Divided Differences.

6) Use Runge-Kutta Method of forth order to compute the numerical values of the differential equation \( \frac{dy}{dx} = x^2 + y^2 \); \( y(1) = 0 \), find \( y \) at \( x = 1.3 \).

7) Obtain an approximate value of \( \int_0^1 \frac{dx}{1 + x^2} \) by Simpson’s One-third rule taking four equal intervals.

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**MATHEMATICS-3**

Paper Code: M-402

Answer any five questions taking at least one question from each module.

**Module-I**

1. Find the Fourier Transform of the function

\[
    f(x) = \begin{cases} 
        1, & |x| \leq a \\
        0, & |x| > a 
    \end{cases}
\]

Hence evaluate

(i) \( \int_{-\infty}^{\infty} \frac{\sin sx \cos sx}{s} ds \)  
(ii) \( \int_{-\infty}^{\infty} \frac{\sin x}{x} dx \)

2) Find a series of sine and cosines of multiples of \( x \) which represents \( f(x) \) in the interval \( -\pi \leq x \leq \pi \) when

\[
    f(x) = \begin{cases} 
        0, & -\pi < x \leq 0 \\
        \frac{\pi x}{4}, & 0 < x < \pi 
    \end{cases}
\]

Hence show that \( 1 + \frac{1}{3^2} + \frac{1}{5^2} + \ldots \infty = \frac{\pi^2}{8} \).

**Module-II**

3) For the functions defined by \( (z) = \sqrt{|xy|} \), show that the Cauchy-Riemann Equations are satisfied at \( (0, 0) \) but the function is not differentiable and analytic at that point.

4) Evaluate \( \int_0^{2\pi} \frac{d\theta}{1+a^2-2a\cos \theta} \), \( 0 < a < 1 \). [Take a complex number \( z \) of modulus 1 and amp \( \theta \).]

b) Expand the function \( f(z) = \frac{1}{(z-1)(z-2)} \) in Laurent’s series between the annual region \( |z|=1, |z|=2 \).

**Module-III**

5) The probability that a pen manufactured by a company will be defective is 1/10. If 12 such pens are manufactured, find the probability that
(i) exactly two will be defective   (ii) none will be defective   (iii) at least two will be defective.

Module-IV

6 ) Solve $\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial x^2}$, $x > 0, t > 0$, if $u(0,t) = 0$, $u(x,0) = e^{-x}$, $x > 0$, $u(x,t)$ is bounded.

7.a) Prove that $\int_0^1 x J_n(\alpha x) J_n(\beta x) \, dx = \begin{cases} 0 & \alpha \neq \beta \\ \frac{1}{2} J_{n+1}(\alpha)^2 & \alpha = \beta \end{cases}$

where $\alpha$ and $\beta$ are the roots of $J_n(x) = 0$.

b) Prove that $P_n(x) = \frac{1}{n! 2^n} \frac{d^n}{dx^n} (x^2 - 1)^n$.

**FLUID MECHANICS**

**CODE-CE401**

1. Determine the total pressure and centre of pressure of vertical plane surface submerged in liquid.
2. Calculate the pressure due to a column of 0.3 of a) water b) an oil of specific gravity 0.8 and c) mercury of specific gravity 13.6. Take density of water as 1000 kg/m$^3$.
3. What is buoyancy and centre of buoyancy?
4. What is stability of a floating body? What is stable and unstable equilibrium?
5. Derive the expression for velocity potential function and stream function.
6. Express the formula for discharge over a rectangular notch or weir.
7. Find the discharge of water flowing over a rectangular notch of 2 m length when the constant head over the notch is 300 mm. Take coefficient of discharge = 0.60.
8. What is water hammer concept? State the factors on which it depends.
9. Differentiate between steady, unsteady, laminar and turbulent flow.
10. What is most economical channel? Express the formula for trapezoidal section.

**STRUCTURAL ANALYSIS-I**

**CE-402**

1. What are the steps to be taken for analysis of continuous beams by moment distribution method?
2. Describe the methods for analysis of continuous beams with simple supported ends.
3. What is sway condition? Explain with figure.
4. What are the assumptions followed in portal method?
5. Write down slope deflection equation for a continuous beam with their usual notations.
7. A cantilever beam 7 m long with constant $EI$ is subjected to two 45 KN loads, one at 2 m from end & another at free end respectively. Compute deflection at the free end using ‘Area Moment Method’.
8. What is influence line diagram? Explain with figure.
9. What is Muller Breslau principle?
10. What is determinate and indeterminate structure?

**Sub: SOIL MECHANICS**

**Paper Code: CE-403**

1. State the relation between void ratio, specific gravity, water content and degree of saturation.
2. What is relative compaction? State its formula.
3. A soil has a porosity of 40 percent. The specific gravity of solids is 2.70. Calculate void ratio, dry density, unit weight if the soil is 50 percent saturated.
4. Define the following—total unit weight, water content, dry unit weight, saturated unit weight.
5. Define permeability and explain Darcy’s law.
6. What is compression index and coefficient of compressibility?
7. What is bulking of sand and thixotropy of clay?
8. Explain the textural method of classification of soil.
9. Explain the IS heavy compaction test.
10. Explain the Mohr coulomb envelope theory related to shear strength.

B.TECH 4TH SEM – ME

NUMERICAL METHODS

Paper Code: M(CS)-401

Answer the following questions

1) Find the Lagrange’s formula the interpolating polynomial which corresponds to the following data

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   Hence evaluate
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Hence show that  
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where \(\alpha\) and \(\beta\) are the roots of \(J_n(x) = 0\).

b) Prove that \(P_n(x) = \frac{1}{n!} \frac{d^n}{dx^n} (x^2 - 1)^n \).
7. Prove that for most economical rectangular channel section,
   (i) Depth of flow = Half of bottom width.
   (ii) Hydraulic radius = Half the depth of flow.
8. (a) State the working principle of a Pelton wheel.
   (b) Derive the expression of discharge through a rectangular weir.
   (c) Write a short note on Francis turbine.
9. A Kaplan turbine is develops a shaft power of 24650 KW at an average head of 39m. Assuming a speed ratio of 2, Flow ratio 0.6, diameter of the boss equal to 0.35 times the diameter of the runner & an overall efficiency of 90%. Calculate the diameter, speed & specific speed of the runner.
10. A centrifugal pump having an overall efficiency of 70% delivers water 1500 l/m through a pipe 12 cm diameter & 100m long. Calculate the power required to drive the pump if its lift water to height of 22m. The co-efficient of friction for the pipe may be taken as 0.01.
11. Define displacement thickness & momentum thickness in boundary layer flow.

**SUB – MECHANISM**

**PAPER CODE – ME 402**

1. For the kinematic linkages shown in fig 1.65, find the number of binary links \(N_b\), ternary links \(N_t\), other links \(N_o\), total links \(N\), loops \(L\), joints or pairs \(P_1\), and degree of freedom \(F\).

![Fig. 1.65](image)

2. A linkage has 14 links and the number of loops is 5. Calculate its
   (1) Degree of freedom
   (2) Number of joints
   (3) Maximum number of ternary links that can be had.

Assume that all the pairs are turning pairs.

3. A crank-rocker mechanism ABCD has the dimensions AB=30mm, BC=90mm, CD=75mm and AD (fixed link)=100mm. Determine the maximum and minimum values of the transmission angle. Locate the toggle positions and indicate the corresponding crank angles and the transmission angles.

4. In a four-link mechanism, the dimensions of the links are as under: AB=50mm, BC=66mm, CD=56mm, and AD=100mm. At the instant when \(<DAB=60^\circ\), the link AB has an angular velocity of 10.5 rad/s and retardation of 26 rad/s\(^2\) in the counter-clockwise direction. Determine the
   I. Velocity of the point C
   II. Velocity of the point E on the link BC when BE=40mm
   III. Angular velocity of the links BC and CD
IV. Velocity of an offset point F on the link BC if BF=45mm, CF=30mm and BCF is read clockwise

V. Velocity of an offset point G on the link CD if CG=24mm, DG=44mm and DCG is read clockwise

VI. Velocity of rubbing at pins A,B,C and D when the radii of the pins are 30, 40, 25 and 35mm respectively.

VII. The angular accelerations of the links BC and CD

VIII. The linear accelerations of the points E,F and G

5. The crank OP of a crank- and slotted-lever mechanism (shown in fig.) rotates at 100rpm in the counter-clockwise direction. Various length of the link are OP=90mm, OA=300mm, AR=480mm RS=330mm. The slider moves along an axis perpendicular to AO and is 120mm from O. Determine the velocity of the slider when the AOP is 135°. Also, find the maximum velocity of the slider during cutting and return strokes.

6. A cam with a minimum radius of 25 mm is to be designed for a knife-edge follower with the following data:
   - To raise the follower through 35 mm during 60° rotation of the cam
   - Dwell for next 40° of the cam rotation
   - Descending of the follower during the next 90° of the cam rotation
   - Dwell during the rest of the cam rotation

   Draw the profile of the cam if the ascending and descending of the cam is with simple harmonic motion and the line of stroke of the follower is offset 10mm from the axis the cam shaft.

   What is the maximum velocity and acceleration of the follower during the ascent and the descent if the cam rates at 150 rpm?

7. A pinion has 24 teeth and drives a gear with 64 teeth. The teeth are of involute type with 20° pressure angle. The addendum and the module are 8 mm and 10 mm respectively. Determine path of contact, arc of contact and the contact ratio.

8. The minimum number of teeth on the wheel for the given values of the gear ratio, the pressure angle and the addendum coefficient \( a_w \) is given by
   \[ T = 2a_w / \sqrt{1 + 1/G(1/G + 2)\sin^2\phi - 1} \]

9. The centre distance between two spur gears in a mesh is to be approximately 275 mm. The gear ratio is 10 to 1. The pinion transmits 360 kw at 1800 rpm. The pressure angle of the involute teeth is 20° and the addendum is equal to one module. The limiting value of normal tooth pressure is 1kN/mm of width. Determine the
   I. Nearest standard module so that interference does not occur.
   II. Number of teeth on each gear wheel, and
   III. Width of pinion.

10. A compound train consists of four gears. The number of teeth on gears A,B,C and D are 54,75,36 and 81 respectively. Gears B and C constitute a compound gear. Determine the torque on the output shaft if the gear A transmits 9 kW at 200rpm and the train efficiency is 80%.

11. An epicyclic gear consists of a pinion , a wheel of 40 teeth and an annulus with 84 internal teeth concentric with the wheel. The pinion gears with the wheel and the annulus. The arm that carries the axis of the pinion rotates at 100 rpm. If the annulus is fixed, find the speed of the wheel, if wheel is fixed, find the speed of the annulus.

12. In a crank and slotted lever quick return mechanism, the distance between the fixed centres is 150 mm and the driving crank is 75 mm long. Determine the ratio of the time taken on the cutting and return strokes.
13. In a crank and slotted lever quick return mechanism, as shown in Fig. 5.37, the driving crank length is 75 mm. The distance between the fixed centres is 200 mm and the length of the slotted lever is 500 mm. Find the ratio of the times taken on the cutting and idle strokes. Determine the effective stroke also.

**SUB – PRIMARY MANUFACTURING PROCESS**

**PAPER CODE – ME 403**

1. Explain different steps in sand casting process.
2. Compare the relative advantages and disadvantages of hot and cold working.
3. Explain the various casting defects.
4. What is the function of electrode coating.
5. How to produce seam welded tubes by seam welding.
6. Explain different types of gas flames.
7. Explain with neat sketches the process SMAW and its applications.
8. Explain with neat sketches the process TIG.
9. Describe with sketches the principle of wire drawing.
10. Explain various forging defects their cause and remedy.
11. Why are clearance and shear angle provided in press tool punch.
12. Explain different type of centrifugal casting process.
13. Explain pressure die casting.
14. Explain ultrasonic welding in brief.

**B.TECH 4TH SEM – ECE**

**Sub:- VALUE AND ETHICS IN PROFESSION**

**Paper Code:- HU401**

Q. Answer the following questions.

1. Discuss the role of engineers and technologists in the development of the society.
2. What is pollution? What are the chief causes of pollution?
3. Write a short note on sustainable development.
4. What are the processes of technology transfer? What are the problems of technology transfer?
5. Discuss about the influence on above on an assembly line.
6. Define ‘Code of Professional Ethics’. Explain some of the universally accepted codes of professional ethics.
7. Define social values. Describe the concept of a good society in terms of justice, rules of law and democracy.
8. How far can Whistle blowing be treated as a failure of organizational ethics?

**SUB-PHYSICS**

**PAPER CODE- PH401**

1. Write down Schrödinger equation for one dimensional motion of free particle in one dimensional potential box. Find its Eigen function and Eigen energy.
2. Give the physical significance of skin depth.
3. Plot electron distribution function governed by Fermi-Dirac statistics in metal at (i) $T> 0K$, (ii) $T= 0K$.
4. Derive Poisson’s and Laplace’s equation.
5. Show that, if a given co-ordinate is cyclic in the Lagrangian, it will also be cyclic in Hamiltonian.
6. If the radius of a hydrogen atom is 0.053 nm, find its electronic polarizability.
7. State the basic postulates of- a) M-B statistics b) F-D statistics c) B-E statistics.
8. Why $\sin^2 x$ is not an eigen function of the operator $\hat{A} = \frac{d^2}{dx^2}$?
9. Derive the Lagrange’s equations for a particle falling freely under the influence of gravity.
10. What do you mean by normalised wave function?

**SUB-BASIC ENVIRONMENTAL ENGINEERING & ELEMENTARY BIOLOGY**

**PAPER CODE: CH401**

1. What is atmosphere? What are the component of atmosphere? What are the ecological factors of the environment?
2. Define resources. What is environmental resistance? Classify different types of resources.
3. Define pollutant and contaminant. Give one example of each. What is environmental pollution? What are the natural and man made activities that cause environmental pollution?
4. Define population growth. Prove that in exponential growth the doubling time and half life time are equal.
5. What is sigmoidal curve? What is ZPG? Derive the rate constant for logistic population growth.
6. What are the different steps involved in EIA study? Define food chain. What are the different types of food chain? Give one example each.
7. What is eco-system? Discuss the grazing eco-system with example.
8. What is bio-geochemical cycle? Discuss the nitrogen cycle with proper diagram.
9. What is air pollution? Classify them. Discuss the effect of NO$_2$ & SO$_2$ on human health.
10. What is global warming? Discuss it with the help of simple global temperature model.
11. Discuss the mechanism of ozone layer depletion.
12. What is PAN? Discuss the mechanism of formation of PAN.

**ELECTROMAGNETIC THEORY AND TRANSMISSION LINES**

**PAPER CODE: EC 401**

1) A vector field is given by $A = ax yz + ay xz + az xy$. Show that it is irrotational.
2) A point in Cartesian coordinates is given by P(-2,-3,4). Express it into cylindrical co-ordinates.
3) Derive the expressions for:
   i) Load Impedance
   ii) Reflection Coefficient
4) Write short notes on: VSWR, Half Wave Dipole Antenna
5) If a vector, $A$ is $4ax + 2ay + az$. Express it in cylindrical coordinate system.
   a) Smith Chart
   b) Half Wave Dipole Antenna
DIGITAL ELECTRONICS AND INTEGRATED CIRCUITS  
PAPER CODE: EC 402

1. Discuss the comparison of TTL, ECL, MOS and CMOS in terms of power dissipation, fan in, fan out, propagation delay and noise immunity. Draw the CMOS inverter circuit.
2. Discuss in brief RAM, ROM, EPROM, EEROM, PLD, PLA.
3. Discuss implementation of a combinational circuit using ROM.
4. Discuss R-2R ladder type D/A converter.
5. Discuss one type of A/D converter.

B.TECH 4TH SEM – EEE

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Paper Code:- HU401

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PAPER CODE- PH(EE)401

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11. Discuss the mechanism of ozone layer depletion.
12. What is PAN? Discuss the mechanism of formation of PAN.
13. What is adiabatic lapse rate? Prove \( \frac{dT}{dl} = -\frac{g}{c_p} \).

**ELECTRICAL MACHINE I**

**PAPER CODE: EE 401**

1. Discuss a method for 3 phase to six phase conversion with transformers.
2. What is voltage build-up of a dc shunt generator? What are the necessary conditions of voltage build-up?
3. What are the various methods of speed control in three phase induction motor? And all methods describe.
4. A dc shunt generator delivers 40 kW to 240 V when running at 450 rpm. The armature and field resistances are 0.03 ohm and 60 ohm respectively. Calculate the speed of the machine running as a shunt motor and taking 40 kW input at 240 V. Allow 1 V drop per brush.
5. What is the general working principle of induction motor?
6. What is the emf equation of transformer?

**PAPER NAME: MEASUREMENT & MEASURING INSTRUMENTS**

**PAPER CODE: EE 402**

1) Write short note on:-
   a) LVDT
   b) Resistance pressure transducers
   c) Digital energy meter
   d) Digital frequency meter
2) Explain how temperature can be measured with the use of i) RTD ii) Thermistor.
3) Explain type of errors in Electrical measurement.
4) Explain the difference between Dynamometer type wattmeter and induction type wattmeter.
5) Principle of operation PMMC instrument.
6) What are the differences between dual beam CRO & dual trace CRO? What is the function of delay line?
7) Explain what is a cathode ray oscilloscope (CRO)?
8) Describe the following methods for testing of a current transformer:
   i) Mutual inductance method.
   ii) Silsbee’s method.
   iii) Arnold’s method.
9) Derive the equations of balance for an Anderson’s bridge. Draw the phasor diagram for condition under balance.
10) What is phantom loading? Explain with an example how it is more advantageous than testing with direct loading.

**SENSORS AND TRANSDUCERS**

**E1(EEE)-401**

1. Explain the operating principle of photodiode. What is the photomultiplier?
2. What is the hall effect? Describe the working principle, construction and application of hall-effect transducer
3. Define the gauge factor. Prove that GF = 1 + 2α
4. Write the principle of thermocouple.
5. Distinguish between ‘photovoltaic’, ‘photoconductive’, ‘photoemmissive’ cells and suggest the range of wavelength of radiation for which they are suitable
6. Difference between RTD and Thermocouple

**B.TECH 4TH SEM – CSE**

**NUMERICAL METHODS**

**Paper Code: M(CS)-401**

**Answer the following questions**

1) Find the Lagrange’s formula the interpolating polynomial which corresponds to the following data

<table>
<thead>
<tr>
<th>X</th>
<th>f(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>9</td>
</tr>
<tr>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

\[ f(x) = 3x^3 + 6x^2 + 6x + 15 \]

2) Derived the Newton-Raphson Method. Using this formula to find the roots of the equation \( x^2 - 5x + 2 = 0 \) correct up to three places of decimals.

3) Establish the iterative formula for for Gauss-Seidel iterative method.

4) Solve the system of linear equations by Gauss-Jordan’s Matrix inversion method:

\[
\begin{align*}
    x + 3y + 2z &= 17 \\
    x + 2y + 3z &= 16 \\
    2x - y + 4z &= 13 \\
\end{align*}
\]

5) Construct the formula for Confluent Divided Differences.

6) Use Runge-Kutta Method of forth order to compute the numerical values of the differential equation \( \frac{dy}{dx} = x^2 + y^2 ; y(1)=0 \), find y at x = 1.3.

7) Obtain an approximate value of \( \int_0^1 \frac{dx}{1+x^2} \) by Simpson’s One-third rule taking four equal intervals.
Answer the following questions
1. Prove that the Chromatic Polynomial is a polynomial.
2. Every finite integral domain is field.
3) Find the chromatic number of the following graph.

4) The chromatic polynomial of a tree with n vertices is $x(x-1)^{n-1}$.
5) For all planner graphs, the sum of degrees over all faces is equal to twice the number of edges. In symbols, $\sum_i deg(f_i) = 2|E|$, where $f_i$ are the faces of the graph.
6) Prove that Kuratowski’s Second Graph is not planar.
7) Show that every homomorphic image of a commutative ring is commutative.

PAPER NAME: COMMUNICATION ENGINEERING AND CODING THEORY

PAPER CODE: CS401

1. What do you mean by wideband and narrow band FM? Discuss modulation index and percentage of modulation for FM
2. Discuss direct and indirect method of FM generation. What is the drawback of direct method?
3. Draw the circuit of square law modulator and detector. Discuss their operation with mathematical analysis.
4. Discuss operation of balanced ring modulator with mathematical analysis.
5. Discuss the working principal of phase shift method of SSB-SC with mathematical analysis.

SUBJECT: FORMAL LANGUAGE AUTOMATA THEORY

PAPER CODE: CS402

1. Let $L = \{w \in \{a,b\}^*: w$ does not end in $ab\}$
   (a) Show a regular expression that generates $L$.
   (b) Show an FSM that accepts $L$.
2. Let $G$ be a grammar $S \rightarrow 0B|1A,A \rightarrow 0|0S|1AA,B \rightarrow 1|1S|0BB$
   The given string =00110101
   Find a) The Leftmost Derivation
       b) The Rightmost Derivation
       c) Draw the Derivation Tree
3. Construct the finite automation equivalent to the regular expression
   i) $(0+1)^*(00+11)(0+1)^* $ ii) $10+(0+1)0^*1$

5. What is regular expression? What are the identities of regular expression?

6. 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*)*

7. Define Mealy machine and Moore machine.

8. Give a DFA accepting the string over alphabet \(\Sigma 0,1\), such that in each string number of 0’s divisible by 5 and the number of 1’s is divisible by 3.

9. Describe conversation of NFA to DFA with a suitable example.

10. Explain Chomsky Normal Form. Convert the following grammar into Chomsky Normal Form: \(S \rightarrow S(S)/\epsilon\).

**Sub: COMPUTER ARCHITECTURE**
**Paper Code: CS403**

1. Describe Flynn’s classification of computer?
2. Compare RISC and CISC architecture in brief.
3. Differentiate in between 3-address, 2-address, 1-address and 0-address with suitable example.
4. What is instruction cycle? Compare and contrast hardwired vs. micro programmed control unit.
5. What is Von-Neumann architecture? What is a Von-Neumann bottleneck? How can be this reduced?
6. What do you mean by Hazard? State various types of Hazards in brief. Explain arithmetic pipeline with suitable example and diagram.
7. What is cache misses? Write down the techniques to minimize the cache misses?
8. What is coherence? What is cache mapping? What is the difference between associative mapping and set-associative mapping?
9. A computer has 512KB cache memory and 2MB main memory. If the block size is 64 bytes then find subfield for
   a) associative memory
   b) direct mapping
   c) set-associative mapping
10. Differentiate between Vectored and Non-vectored interrupts

**B.TECH 4TH SEM – EE**

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**Paper Code:- HU401**

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**SUB-PHYSICS**

**PAPER CODE- PH(EE)401**

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5. Show that, if a given co-ordinate is cyclic in the Lagrangian, it will also be cyclic in Hamiltonian.
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8. Why $\sin^2 x$ is not an eigen function of the operator $\hat{A} \left( = \frac{d^2}{dx^2} \right)$?
9. Derive the Lagrange’s equations for a particle falling freely under the influence of gravity.
10. What do you mean by normalised wave function?

**SUBJECT: THERMAL POWER ENGINEERING**

**PAPER CODE: ME(EE)-411**

1. Prove that for natural draught $h=353H[(1/Ta) – \{(m+1)/m\}1/Tg]$
2. 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.
3. Derive expression for optimum pressure ratio at maximum power output in Brayton cycle.
4. What are the particulates? Describe in detail how particulate emissions are caused.
5. Explain velocity compounded impulse steam turbine showing pressure and velocity variations along the axis.
6. Derive the expression for maximum blade efficiency in a single stage impulse turbine.
7. Prove that maximum flow rate per unit area through a nozzle occurs when the ratio of pressure at throat to inlet pressure is equal to $\left( \frac{2}{n+1} \right)^{n/(n-1)}$ where n= isentropic index of expression.
8. Derive the expression of efficiency of Dual cycle with P-V, T-S diagram.
9. Explain with sketch working principle of Electrostatic precipitator.
10. 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 gas
   c. Base diameter of chimney

**SUB-BASIC ENVIRONMENTAL ENGINEERING & ELEMENTARY BIOLOGY**

**PAPER CODE: CH401**
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13. What is adiabatic lapse rate? Prove \( \frac{dT}{dl} = -\frac{g}{c_p} \).

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**PAPER CODE: EE 401**

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**PAPER CODE: EE 402**

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SUB-BASIC ENVIRONMENTAL ENGINEERING & ELEMENTARY BIOLOGY

PAPER CODE: CH401

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16. Define pollutant and contaminant. Give one example of each. What is environmental pollution? What are the natural and man made activities that cause environmental pollution?
17. Define population growth. Prove that in exponential growth the doubling time and half life time are equal.
18. What is sigmoidal curve? What is ZPG? Derive the rate constant for logistic population growth.
19. What are the different steps involved in EIA study? Define food chain. What are the different types of food chain? Give one example each.
20. What is ecosystem? Discuss the grazing ecosystem with example.
21. What is bio-geochemical cycle? Discuss the nitrogen cycle with proper diagram.
22. What is air pollution? Classify them. Discuss the effect of NO\textsubscript{2} & SO\textsubscript{2} on human health.
23. What is global warming? Discuss it with the help of simple global temperature model.
24. Discuss the mechanism of ozone layer depletion.
25. What is PAN? Discuss the mechanism of formation of PAN.
26. What is adiabatic lapse rate? Prove \( \frac{dT}{dl} = -\frac{g}{c_p} \).

SUB-SENSORS & TRANSDUCERS

PAPER CODE: EI 401

1. Explain the operating principle of photodiode. What is the photomultiplier?
2. What is the hall effect? Describe the working principle, construction and application of hall-effect transducer.
3. Define the gauge factor. Prove that \( GF = 1 + 2\alpha \)
4. Write the principle of thermocouple.
5. Distinguish between ‘photovoltaic’, ‘photoconductive’, ‘photoemissive’ cells and suggest the range of wavelength of radiation for which they are suitable.
6. Difference between RTD and Thermocouple.

SUB-MICROPROCESSOR & COMPUTER ARCHITECTURE

PAPER CODE: EI 402

1. Draw and explain the pin diagram of 8085 microprocessor.
2. Write and draw the flags of 8085 microprocessor.
3. Write the accumulator bit pattern of SIM and RIM instruction.
4. Draw and explain the architecture block diagram of 8085 microprocessor.
5. Discuss the operations of PUSH and POP instructions.
SUB-MICROPROCESSOR & COMPUTER ARCHITECTURE
PAPER CODE: EE 402(EI)
1. Draw and explain the pin diagram of 8085 microprocessor.
2. Write and draw the flags of 8085 microprocessor.
3. Write the accumulator bit pattern of SIM and RIM instruction.
4. Draw and explain the architecture block diagram of 8085 microprocessor.
5. Discuss the operations of PUSH and POP instructions.

B.TECH 6TH SEM – CE

SUB: PRINCIPLES OF MANAGEMENT
PAPER CODE:- HU601
1. Define working capital. State its importance. Explain the factors that influence working capital of a firm.
2. What is marketing mix? What are the elements of marketing mix? Why these marketing mix elements are important in marketing management?
3. Define TQM. Explain its characteristics. What are the advantages and disadvantages of TQM?
4. Give a short note on:
   (a) SWOT Analysis
   (b) Training and Development
   (c) Sources of Finance
5. What is performance appraisal? Briefly explain different Performance appraisal techniques.

Sub: HIGHWAY ENGINEERING
Paper Code: CE-601
1. Explain the PIEV theory
2. What is SSD? Explain with relevant formula.
3. Discuss the process of designing the transition curves.
4. What is super elevation and curve resistance?
5. The speed of overtaking and overtaken vehicle are 70 and 40 kmph respectively on a two way traffic road the average acceleration during overtaking may be assumed as 0.99m/sec^2
6. What are transition curves? Explain summit and valley curve with figures.
7. Explain ‘ESWL’ briefly explain the graphical method determination of ‘ESWL’
9. Compute the equivalent radius of resisting section of 20cm thick slab given that the radius of contact area wheel load is 15 cm.

10. What are the Recommendations of the jayakar committee?

**DESIGN OF STEEL STRUCTURE**

**CE-602**

What are the criteria to be followed for the design of structural steel elements?

2. A tie bar 50mm*8mm is to carry a load of 80KN. A specimen of the same quantity steel of cross sectional area 250mm² was tested in the laboratory. The maximum load carried by the specimen was 125KN. Find factor of safety in the design and the gauge length.

3. What are the conditions used in plastic analysis?

4. Explain with neat sketches the different types of riveted joints used in steel structures

5. What is lower bound and upper bound theorem?

6. Find out the value of plastic modulus for a square of side x bent about a diagonal.

7. An angle ISA 75x75x6 can carry an axial load of 85 KN. It is to be connected to a 10 mm thick plate. Design a suitable riveted connection. Also draw a neat sketch.

8. What are the assumptions followed in the riveted joint theory?

9. Calculate the strength of a 20mm diameter bolt of grade 4.6 for the case of a lap joint. The main plates to be jointed are 12mm thick.

10. A web of a plate girder consists of 1000x16-mm plate of grade Fe 410 and is to be provided with a splice at a section where the factored shear and bending moment to be restricted by the web are V=1000 KN and M=350 KNm. The flange plate thickness= 50mm each. Design web splice.

**PLANNING AND CONSTRUCTION MANAGEMENT**

**PAPER CODE: CE-603**

1. What do you mean by notice inviting tender?

2. What are the necessary fire fighting equipments used in a construction site?

3. Explain about excavators, rollers and dozers.

4. Differentiate between PERT and CPM network.

5. What is event and activity in network? Explain with figure.

6. Write specifications, plan breakdown and prepare network for the project of casting a concrete beam over verandah opening.

7. What is arbitrator? What are his qualifications?

8. What do you mean by building planning? Explain in detail.

9. What is tender form and contract document?

10. What are the steps for project planning, scheduling and controlling?

**Sub: PRESTRESSED CONCRETE**

**Paper Code: CE-604B**

1. What is the principle of post tensioning?

2. What is shrinkage of concrete? What are the factors affecting creep?
3. What are the advantages of prestressed concrete poles?

4. Explain the concept of cracking moment.

5. In a prestressed concrete beam of cross-section 200 mm × 300 mm and span 6 m, an initial prestressing force of 400 KN is applied at an eccentricity of 70 mm, by tendons of area 400 mm². Assuming $E_s = 2\times10^5$ N/mm² and $E_c = 0.333\times10^5$ N/mm², anchor slip is 1.5 mm, creep coefficient in concrete $\Theta = 1$, shrinkage of concrete = 0.0002 and creep loss in steel = 3%, find the total percentage loss of stress in the tendons.

6. What is the difference between pre tensioning and post tensioning?

7. How do you compute the loss of stress due to anchorage slip?

8. Describe the mix design procedure in Indian standard method in detail.

9. Explain the various types of composite construction of the pre stressed members

10. Explain the condition for deflection due to self weight and imposed loads.

**Sub:- HUMAN RESOURCE MANAGEMENT**

**Paper Code:- CE605B**

Q. **Answer the following questions.**

1. Explain the skills required for a successful HR manager.

2. What are the major principles of wages and salary administration?

3. What are the broad objectives of performance appraisal?

4. Explain the steps of HRP process.

5. Define collective bargaining? Discuss the features of collective bargaining?

6. What are the causes of industrial dispute?

7. What do you mean by Management by Objectives (MBO)?

8. What do you mean by the concept of workers participation Management?

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**B.TECH 6TH SEM – ME**

**PRODUCTION & OPERATION MANAGEMENT**

**PAPER CODE- HU-611(ME)**

**Answer the following Questions**

1. Differentiate PERT and CPM.

2. Define Production. What are the characteristics of production system? Explain three levels of management decision with example.

3. Give a short note on:
   a. Bills of Materials (BOM)
   b. Critical Path Method (CPM)
   c. Material Requirement Planning (MRP)
4. Explain crashing of project network with an example.
5. In the table given below a list of activities for a project with the optimistic, pessimistic, and most likely times are given develop a network diagram for the project activities. Calculate the probability of finishing the project in 30 days.

<table>
<thead>
<tr>
<th>Activity</th>
<th>t₀</th>
<th>tₘ</th>
<th>tₚ</th>
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<td>6</td>
<td>18</td>
</tr>
</tbody>
</table>

**SUB: IC ENGINE**

1. Can one use solid fuels for IC engines? If so how?
2. Draw a sketch of pintaux nozzle and discuss its merits and demerits.
3. A diesel engine has a compression ratio of 15 and heat addition at constant pressure takes place at 6% of stroke. Find the air standard efficiency of the engine. Take γ for air as 1.4.
4. Briefly explain the stages of combustion in SI engines elaborating the flame front propagation.
5. Clearly explain the various wet sump lubrication system.
6. Derive an expression for air fuel ratio of a simple carburettor.
7. Explain with a neat sketch the principle of exhaust turbocharging of a single cylinder engine.
8. What is meant by abnormal combustion? Explain the phenomena of knock in SI engines.
9. Describe D-MPFI and L-MPFI injection system.
10. A gas engine having a cylinder 250 mm bore and 450 mm stroke has a volumetric efficiency of 80%. Air gas ratio equals 9:1, calorific value of fuel 21000 kj per m³ at NTP. Calculate the heat supplied to the engine per working cycle. If the compression ratio is 5:1, what is the heat value of the mixture per working stroke per m³ of total cylinder volume?
11. The compression ratio and expansion ratio of an oil engine working on the dual cycle are 9 and 5 respectively. The initial pressure and temperature of the air are 1 bar and 30°C. The heat liberated at constant pressure is twice the heat liberated at constant volume. The expansion and compression follow the law pV^{1.25} = constant. Determine:
    (i) Pressures and temperatures at all salient points.
    (ii) Mean effective pressure of the cycle.
    (iii) Efficiency of the cycle.
    (iv) Power of the engine if working cycles per second are 8.
    Assume: Cylinder bore = 250 mm and stroke length = 400 mm.

12. During the trial of a single cylinder, four stroke oil engine, the following results were obtained. Cylinder diameter 20 cm, stroke 40 cm, mean effective pressure 6 bar, torque 407 Nm, speed 250 rpm, oil consumption 4 kg/h, calorific value of fuel 43 MJ/kg, cooling water flow rate 4.5 kg/min, air used per kg of fuel 30 kg, rise in cooling water temperature 450C, temperature of exhaust gases 4200C, room temperature 200C, mean specific heat of exhaust gas 1 kJ/kg k, specific heat of water 4.18 kJ/kg k. Find the ip, bp and draw up a heat balance sheet or the test in kJ/h.
1. State the conditions under which use of positive and negative rake angles are recommended.
2. Explain various types of chips.
3. Define rake angle, clearance angle, cutting edge angle, inclination angle and nose radius.
4. Explain how you have to improve the machinability.
5. Proved \( \gamma_x = \gamma_0 = \gamma_n \) where \( \gamma_x \) = side rake, \( \gamma_0 \) = orthogonal rake, \( \gamma_n \) = normal rake.
6. Find the time required on a shaping machine for completing one cut on a plate 200mmx300mm if the cutting speed is 10mm/unit. The return to cutting time ratio is 2:3. Assume approach =50mm, over travel =25mm, allowance on either side of the plate width =5mm and feed/cycle = 1mm.
7. How is tool life defined? State the factor effecting tool life.
8. Explain briefly the term cutting speed, feed and depth of cut.
9. Different between orthogonal cutting and oblique cutting.
10. What are the factors influence the cutting temperature?
11. Describe the region of heat generation in metal cutting with figure.
12. During state turning of a 24 mm diameter of steel bar at 300 rpm with an HSS tool, a tool life of 9 min. was obtained. When the same bar was turned at 250 rpm the tool life increase to 48.5 min. what will be the tool life at 280 rpm?
13. During orthogonal machining with a cutting tool having a 12\(^\circ\) rake angle, the chip thickness is measured to be0.44mm, the uncut thickness being 0.18 mm. determine shear plane angle and shear strain.
15. Explain various function of cutting fluid.
16. Describe various characteristic of cutting tool material.

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**MACHINE DESIGN**

**CODE- ME603**

1. What is autofrettage? Describe compounding for pre-stressing the cylinder and also classify main types of clutches and brakes.
2. Explain the term 'Force analysis in Bevel Gears'
3. Explain the term 'Stresses in a flywheel Rim'.
4. Explain Multi-Plate clutch with neat sketch.
5. Distinguished Between Journal Bearing and Rolling contact Bearing.
6. Explain the term 'Bearing life'
7. Write a short note on Load Carrying Capacities of Bearings.
8. A single dry disc clutch having both sides effective is required to transmits 12.5 KW at 1000 rpm. The intensity of pressure is 0.06 MPa and \( \mu = 0.25 \). The ratio of mean of mean radius to radial face width is 4. Find mean radius, radial face width, inner radius and outer radius of friction disc. Assume uniform wear.
9. Determine the force required to press fit a cylindrical roller bearing on a shaft 40 mm diameter. The outer diameter of inner race is 50 mm, and its length is 23 mm. The maximum interference is 3 microns. Take \( \sigma_y = 300 \) MPa \( \times \), for the shaft; \( E = 2.1 \times 105 \) MPa for shaft and race, Poisson's ratio = 0.3 and co-efficient of friction = 0.15. Also check for maximum stress at the race.
10. A pair of straight bevel gear connecting two shafts at right angle has pinion teeth 24, and gear teeth 48. The module at the outside diameter is 6 mm, and face width 50 mm. The gears are made of grey cast iron FG220. The pressure angle is 20\(^\circ\). The gear teeth generated. The pinion speed is 300 rpm. Taking a service factor of 1.5 and FOS of 2, find
   a. Beam Strength of the tooth
b. Static Strength of the tooth

c. Wear Load

d. Rated power that the gear can transmit, if $\sigma_{es} = 550$ MPa. ($P = 10.19$ kW)

**SUB: REFIRIGERATION & AIR CONDITIONING**

**PAPER CODE: ME-604(A)**

1. Explain Air Refrigerator working on Bell-Coleman cycle with P-V and T-S Diagram and state the COP of the Bell Coleman cycle.
2. Explain the Effect of Subcooling and superheating.
3. Explain Actual Vapour Compression Cycle with diagram.
4. What is simple vapour absorption system? State how its efficiency can be improved.
5. Explain the Term Volumetric Efficiency for Compressor and also state its derivations.
6. Write a short note on Zone System of Air Conditioning.
7. What is an air-handling system? Give Flow Diagram for an air-conditioning system.
8. What is heat rejection factor? Explain effect of compression ratio on heat rejection factor.
9. Define Cooling towers. Explain Natural draft cooling and Mechanical draft cooling tower.
11. Write a short note on Bypass Factor.
12. How are air conditioning equipment classified? In what way package units differ from central units?
13. Write a short note on sound absorbing materials.
14. What is function of a duct? Why we use duct in air-conditioning system?
15. How Duct are classified? Explain 'Aspect ratio'.
16. An aircraft moving speed of 1000 Km/h uses simple gas refrigeration cycle for air conditioning. The ambient pressure and temperature are 0.35 bar and $-10^\circ$C respectively. The Pressure ratio of compressor is 4.5. The heat exchanger effectiveness is 0.95. The isentropic efficiencies of compressor and expander are 0.8 each. The cabin pressure and temperature are 1.06 bar and $25^\circ$C. Determine temperatures and pressures at all points of the cycle. Also find the volume flow rate through compressor inlet and expander outlet for 100 TR. Take $cp = 1.005$ KJ/Kg K; $R = 0.287$ KJ/Kg K and $(cp/cv) = 1.4$ for air.
17. In a house, the temperatures of the window on a day in winter is $5^\circ$C. When the temperatures in the room is $23^\circ$ C, and the barometric pressure is 748.8 mm Hg, what would be maximum relative humidity that could be maintained in the room without condensation on the window panes? Under these conditions find the partial pressures of the water vapour and air, the specific humidity, and the density of the mixture.

**SUB: TURBOMACHINERY**

**PAPER CODE: ME-605C**

1. The velocity of water at the outlet of a conical draft tube attached to a Francis turbine is 1.6 m/s. The velocity of water at the inlet of the draft tube, which is 5m above the tail race level, is 5.5 m/s. If the loss of head due to friction in the draft tube is 40% of the velocity head of water at outlet of the tube, find the the pressure head at inlet to the draft tube.
2. A hydro Turbine is required to give 25 MW at 45m head and 90 rpm runner speed. The laboratory facilities available, permit testing of 20 KW model at 5m head. What should be the model runner speed & model to prototype scale ratio.
3. A Pelton wheel has a mean bucket speed of 10m/s with a jet of water flowing at the rate of 800 l/s under a head of 35m. The bucket deflects the jet through an angle of 160°. Calculate the power given by water to the runner & hydraulic efficiency. Assume co-efficient of velocity as 0.98
4. For isentropic flow through the nozzle derives the relation
\[ \frac{dA}{A} = \left[ \frac{M^2 - 1}{M^2 - 1} \right] \frac{dV}{V} \]

5. A radial flow hydraulic turbine is required to be designed to produce 25 MW under a head of 16 m at a speed of 90 rpm. A geometrically similar model with an output of 30 KW & a head of 5 m is to be tested under dynamically similar conditions. At what speed must the model run? What is the required runner diameter ratio between the model & prototype & what is the discharge through the model, if its efficiency is 90%.

6. What is an air vessel? Describe the function of the air vessel for reciprocating pump. What is cavitation? How it can be minimized?

7. A centrifugal pump is to discharge 0.215 m³/s at a speed of 1500 rpm against a head of 30 m. The impeller diameter is 300 mm, its width at outlet is 50 mm, & manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller.


9. Explain the specific speed of turbine. Draw the performance characteristic curve of Pelton turbine, Francis turbine, Kaplan turbine

B.TECH 6TH SEM – ECE

SUB: PRINCIPLES OF MANAGEMENT
PAPER CODE:- HU601

1. Define working capital. State its importance. Explain the factors that influence working capital of a firm.
2. What is marketing mix? What are the elements of marketing mix? Why these marketing mix elements are important in marketing management?
3. Define TQM. Explain its characteristics. What are the advantages and disadvantages of TQM?
4. Give a short note on:
   a. SWOT Analysis
   b. Training and Development
   c. Sources of Finance
5. What is performance appraisal? Briefly explain different Performance appraisal techniques.

PAPER NAME: DIGITAL COMMUNICATION
PAPER CODE:EC601

1. Write down sampling theorem. Discuss different methods of sampling.
2. For the data bit 10110001, draw the waveforms for ASK, FSK, PSK, QPSK.
3. Explain the need of pulse stuffing and word stuffing in TDM. Discuss briefly the concept of code division multiplexing signal
4. Explain QPSK demodulation operation
5. What is Nyquist criterion for Inter-symbol interference?

Paper Name: DIGITAL SIGNAL PROCESSING
Paper code: EC602
1. Find the DFT of the sequence \{1, -1, 1, 0, 2, 2, 0, 0\}
2. Find the convolution between two sequences \(x(n) = \{1,1,0,2\}\) \(h(n) = \{0,-1,2,1\}\)
3. Write the sampling theorem.
4. What is causal and time variant system? Explain with an example.
5. Write the properties of ROC of ‘Z’ transform.

**PAPER NAME: TELECOMMUNICATION SYSTEM.**

**PAPER CODE: [EC-603]**

1. What do you mean by Switching system? Explain.
2. Compare Twisted pair cable, Co-axial cable & Fibre optic cable in terms of data rate and bandwidth.
3. Explain the schematic structure of an Optical fibre. How can you classify Optical fibre? Discuss their characteristic features.
4. What are the limitations of Fibre Optic cable?
5. What are the advantages of the automatic switching system over manual switching system?
6. What do you mean by IN-Channel signalling & Common Channel signalling?
7. What are the demerits of ‘Crossbar system’?
8. Short Note- ‘Pulse Dialling’.
9. A silica optical fibre with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.45 and a cladding refractive index of 1.44, Determine ---
   a) The critical angle at the core-cladding interface.
   b) N.A for the optical fibre.

**PAPER NAME: INFORMATION THEORY & CODING**

**PAPER CODE: EC 604B**

1) Describe syndrome decoding with the help of Generator Matrix (G), or with any example of it.
2) What are Hamming Codes? Describe the concepts of Hamming Codes.
3) Define Coset and Coset Leaders.
4) Let us consider \((n,k)\) block as \((3,2)\) binary code ‘C’ and a Generator Matrix (G) is given by
   \[
   G = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}
   \]
   Now find the cosets of C.
5) Construct a standard array with the help of codeword.
   \[C = \{\ 0000, 1011, 0101, 1110 \}\] Using \(a_1, a_2\) and \(a_3\) as coset Leaders.
6) Describe the decoding techniques with standard array.
7) Given, \(C = \{0000, 1011, 0101, 1110\}\) and received vector \((R), R = 1011.\) Find error vector \((E)\) and estimated codeword \((C)\) from standard array.
8) Describe shortly the concepts of error correcting capability and error detecting capability of a code, with examples.
9) Discuss algebraic properties of cyclic code.
10) Describe Generator Polynomial of Cyclic Code.

**Sub: OBJECT ORIENTED PROGRAMMING**

**Paper Code: EC605A**

1. Describe the Java features.
2. Describe various Operators.
3. Syntax with example:
   i) Simple if statement          ii) if-else statement
   iii) Nested if-else statement  iv) else if ladder
4. Describe with example Switch case.
5. Syntax with example: i) while   ii) do-while   iii) for   iv) Nested for loop.
6. What is Constructors? Describe with example.
7. What is Methods Overloading? Describe with example.
8. What is Inheritance? Describe with example about Single Inheritance.
9. Describe with example One Dimensional Arrays.
10. Describe with example Two Dimensional Arrays.

**B.TECH 6TH SEM – EE**

**SUB: PRINCIPLES OF MANAGEMENT**

**PAPER CODE:- HU601**

1. Define working capital. State its importance. Explain the factors that influence working capital of a firm.
2. What is marketing mix? What are the elements of marketing mix? Why these marketing mix elements are important in marketing management?
3. Define TQM. Explain its characteristics. What are the advantages and disadvantages of TQM?
4. Give a short note on:
   a. SWOT Analysis
   b. Training and Development
   c. Sources of Finance
5. What is performance appraisal? Briefly explain different Performance appraisal techniques.

**CONTROL SYSTEM-II**

**PAPER CODE- EE-601**

1) Draw the block diagram of MIMO systems
2) Write short on effect of pole zero cancellation in Transfer function.
3) Define State, State Variables, State Vector and State Space.
4) State the properties of state transition matrix?
(5) What are the advantages of state space techniques?
(7) Find out the Describing Function of Dead-zone with saturation.
(8) For the discrete time system \( x(k+2) + 5x(k+1) + 6x(k) = u(k), \quad x(0) = x(1) = 0 \). Find the state transition matrix.
(9) Explain the Harmonic linearization.
(10) A system is described by the matrices \( A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix}, b= \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, c=\begin{bmatrix} 1 & 2 & 0 \end{bmatrix} \) then determine the transfer function.

**SUBJECT: ELECTRICAL POWER SYSTEM-11**
**PAPER CODE: EE- 602**

1. Derive the swing equations for non-coherent machines.
2. Explain with a neat diagram the application of Merz-price circulating current principle for the protection of alternator.
3. Explain different method of arc extinction in a circuit breaker.
5. What do you understand by sequence network? What is their importance in unsymmetrical fault calculation?
6. Explain transient stability, equal area criteria.
7. Explain substation equipments and accessories.

**SUBJECT: POWER ELECTRONICS**
**PAPER CODE: EE- 603**

1) Draw the V-I characteristics of a thyristor? What is the effect of gate current on the characteristics? Explain.
2) Discuss gatetriggering of a thyristor.
3) Draw and explain dynamic or switching characteristics of an SCR.
4) What is a cycloconverter? What benefits does it offer in comparison to inverter?
5) With the help of schematic diagram and relevant waveforms, explain the operation of 3- \( \phi \) to 1- \( \phi \) cycloconverter.
6) Draw and explain the switching characteristics of power MOSFET.
7) Write short notes on any two of the following :
   a) Explain type-D chopper.
   b) Different turn-on methods of SCR
8) What is the need of commutation circuit? Describe in brief the operation of an impulse commutation circuit.
9) Explain the operation of a Buck Converter with necessary diagram and waveforms.
10) Explain with the help of circuit diagram, the principle of operation of Boost converter.

**Sub: OBJECT ORIENTED PROGRAMMING**
**Paper Code: EE604C**
1. Describe the Java features.
2. Describe various Operators.
3. Syntax with example:
   i) Simple if statement    ii) if-else statement
   iii) Nested if-else statement   iv) else if ladder
4. Describe with example Switch case.
5. Syntax with example: i) while    ii) do-while    iii) for    iv) Nested for loop.
6. What is Constructors? Describe with example.
7. What is Methods Overloading? Describe with example.
8. What is Inheritance? Describe with example about Single Inheritance.
9. Describe with example One Dimensional Arrays.
10. Describe with example Two Dimensional Arrays.

**Sub: DIGITAL SIGNAL PROCESSING**
**Paper Code: EE605C**

1. Define system stability with an example. what is antialiasing effect?
2. write the properties of ROC of a Z transform.
3. Find the convolution between two sequence x(n)={1,0,0,-1} h(n)={0,-1,0,1}
4. Find the Z transform of x(n)=(1/2)^n u(n)
5. What is energy signal? Check the signal energy or power x(n)= (2)^n u(n)

**B.TECH 6TH SEM – EEE**

**SUB: PRINCIPLES OF MANAGEMENT**
**PAPER CODE:- HU601**

1. Define working capital. State its importance. Explain the factors that influence working capital of a firm.
2. What is marketing mix? What are the elements of marketing mix? Why these marketing mix elements are important in marketing management?
3. Define TQM. Explain its characteristics. What are the advantages and disadvantages of TQM?
4. Give a short note on:
   a. SWOT Analysis
   b. Training and Development
   c. Sources of Finance
5. What is performance appraisal? Briefly explain different Performance appraisal techniques.

**SUBJECT: ELECTRICAL POWER SYSTEM-11**
**PAPER CODE: EEE- 601**
1. Derive the swing equations for non-coherent machines.
2. Explain with a neat diagram the application of Merz-price circulating current principle for the protection of alternator.
3. Explain different method of arc extinction in a circuit breaker.
5. What do you understand by sequence network? What is their importance in unsymmetrical fault calculation?
6. Explain transient stability, equal area criteria.
7. Explain substation equipments and accessories.

**CONTROL SYSTEM**

**PAPER CODE- EEE-602**

1. State the difference between Block diagram and SFG.
2. What are the steps used for the construction of SFG from Block Diagram.
3. Define Transfer Function. What is Open Loop and what is Closed Loop control system? Explain in brief with Examples.
4. What is Masson Gain formula? Distinguish between Open Loop and Closed Loop control system.
5. Using Masson Gain formula draw the Signal Flow Graph for the system whose block diagram is shown below also determine the overall gain-

![Signal Flow Graph Diagram](image)

6. State the properties of SFG

7. What are the various rules for drawing Block Diagram.

**POWER ELECTRONICS**

**PAPER CODE- EEE-603**

1) Draw the V-I characteristics of a thyristor? What is the effect of gate current on the characteristics? Explain.
2) Discuss gate triggering of a thyristor.
3) Draw and explain dynamic or switching characteristics of an SCR.
4) What is a cycloconverter? What benefits does it offer in comparison to inverter?
5) With the help of schematic diagram and relevant waveforms, explain the operation of 3-ϕ to 1-ϕ cycloconverter.
6) Draw and explain the switching characteristics of power MOSFET.
7) Write short notes on any two of the following:
   a) Explain type-D chopper.
   b) Different turn-on methods of SCR
8) What is the need of commutation circuit? Describe in brief the operation of an impulse commutation circuit.
9) Explain the operation of a Buck Converter with necessary diagram and waveforms.
10) Explain with the help of circuit diagram, the principle of operation of Boost converter.

**Sub: OBJECT ORIENTED PROGRAMMING & JAVA**

**Paper Code: EEE604B**

1. Describe the Java features.
2. Describe various Operators.
3. Syntax with example:
   i) Simple if statement  
   ii) if-else statement  
   iii) Nested if-else statement  
   iv) else if ladder
4. Describe with example Switch case.
5. Syntax with example: i) while ii) do-while iii) for iv) Nested for loop.
6. What is Constructors? Describe with example.
7. What is Methods Overloading? Describe with example.
8. What is Inheritance? Describe with example about Single Inheritance.
9. Describe with example One Dimensional Arrays.
10. Describe with example Two Dimensional Arrays.

**SUBJECT: COMMUNICATION ENGINEERING**

**PAPER CODE: EEE-605B**

A. What is delta modulation. Why we use ADM technique?
B. Write the short note of ISI.
C. What do you mean by sampling? State and prove sampling theorem.
D. Draw the pattern 1011100011111 ASK, PSK, FSK
E. Draw and explain the PCM technique with block diagram.

**B.TECH 6TH SEM – CSE**

**SUB: PRINCIPLES OF MANAGEMENT**

**PAPER CODE: HU601**

1. Define working capital. State its importance. Explain the factors that influence working capital of a firm.
2. What is marketing mix? What are the elements of marketing mix? Why these marketing mix elements are important in marketing management?
3. Define TQM. Explain its characteristics. What are the advantages and disadvantages of TQM?
4. Give a short note on:
   a. SWOT Analysis
   b. Training and Development
   c. Sources of Finance
5. What is performance appraisal? Briefly explain different Performance appraisal techniques.

**SUBJECT: DATA BASE MANAGEMENT SYSTEM**

**PAPER CODE: CS601**

1. What is Data dictionary? What do you mean by unary operations in Relational algebra? Give example.
2. Discuss the purpose of BCNF and describe how BCNF differs from 3NF. Provide an example to illustrate your answer.
3. With proper example explain – i) Generalization & ii) Aggregation.
4. Discuss the usefulness of ACID properties to ensure integrity during transaction process.
5. Briefly describe the 3-layer architecture of DBMS.
6. Consider a BANK database having customer, loan, account, employee and branch as entity types. Each banks of branch allows customers to open accounts and borrow loans. A customer can open more than one account and one account may also belong to one or more customers (joint account). Design an E-R diagram for the BANK database.
7. What do you mean by Weak Entity Set in E-R diagram?
8. Differentiate between Super key, Candidate Key and Primary Key.
9. Mention the advantages of use of Database Management System over the use of simple file based system for an software based organization.
10. Why we need foreign key? Discuss the foreign key provides referential integrity of the Database system

**Sub: COMPUTER NETWORKS**

**Paper Code: CS602**

1. Applying CRC algorithm, determine the checksum and the transmitted frame for the bit stream 11010111 and for the generator polynomial \(x^3 + x^2 + 1\).
2. Explain about WAN.
3. Compare UDP and TCP.
4. Explain DNS.
5. Differentiate between static IP address and dynamic IP address.
6. Find the expressions for average delay and throughput for both pure ALOHA and slotted ALOHA.
7. Describe the functions of network layer?
8. Explain Star Topology with proper diagram.
9. What is congestion? How does it occur?
10. Calculate the minimum hamming distance from the following table:

<table>
<thead>
<tr>
<th>Dataword</th>
<th>Codeword</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>0000</td>
</tr>
<tr>
<td>001</td>
<td>0011</td>
</tr>
<tr>
<td>010</td>
<td>0101</td>
</tr>
<tr>
<td>011</td>
<td>0110</td>
</tr>
<tr>
<td>100</td>
<td>1001</td>
</tr>
<tr>
<td>101</td>
<td>1010</td>
</tr>
<tr>
<td>110</td>
<td>1100</td>
</tr>
<tr>
<td>111</td>
<td>1111</td>
</tr>
</tbody>
</table>
**Sub: OPERATING SYSTEM**

**Paper Code: CS603**

1. Difference between process and program? Describe the process state.
2. What is deadlock? Necessary conditions for deadlock.
3. Short notes on a) bounded buffer problem  
   b) Dining philosopher problem
4. Difference between multiprogramming and multi-tasking?
5. What is called semaphore and critical section problem?
6. Consider the following set of processes:

<table>
<thead>
<tr>
<th>Process</th>
<th>CPU Burst-time</th>
<th>Priority</th>
<th>Arrival Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>10</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>P2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>P3</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>P4</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>P5</td>
<td>5</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

   Draw the Gantt chart using FCFS, RR (ts = 3) scheduling. Calculate average waiting time in each case.

7. What is effective access time? A paging system with the page table is stored in main memory. If memory reference takes 200 ns, 200 how long does a paged memory reference take? If we add TLBs and 75% hit is successful, what is the effective memory reference time? (Assume that finding page-table entry in the TLBs take zero time, if the entry is there).

   b) What is compaction? What are its drawbacks?

   c) Mention the advantages and disadvantages of demand paging

   a)

**Sub: COMPUTER GRAPHICS**

**Paper Code: CS604B**

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.

   9. a) Suppose a window has its lower left corner at (-2,-1) and upper right corner at (3, 2).

      Using the above algorithm find the visible portion of the line joining points (-3,1), (1,3).

      b) Discuss window to viewport Coordinate transformation.

   10. a) Find out an expression for Bezier curve.

      b) Find the equation of Bezier curve which pass through points (0,0) and (-2,1) and is Controlled through points (7,5) and (2,0).
Sub: MULTIMEDIA TECHNOLOGY  
Paper Code: CS605C

1) What is hypertext and hypermedia?
2) What are the different data types of multimedia?
3) Explain following file formats of image i) JPEG     ii) TIFF
4) Explain the steps for creating of a multimedia presentation.
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 MIDI software and hardware.
9) What are the different data types of compression? Explain about them.
10) Explain MIDI message.

B.TECH 8TH SEM – CE

Sub: ORGANISATIONAL BEHAVIOUR  
Paper Code: HU801

Q. Answer the following questions.

1. State the managerial grid as developed by Blake and Mouton.
2. How do you define Attitude? What are the factors that influence personality?
3. What are the contributing fields of OB?
4. “Leadership is not the same as management”. Discuss.
5. Discuss briefly the force field analysis model to explain how the change process works.
6. How is behavioural theory on leadership different from contingency theory of leadership?
7. What are the possible sources of conflict?
8. What are the different stages of group development?

Sub: ENVIRONMENTAL POLUTION AND CONTROL  
Paper Code: CE-801A

1. What do you mean by self cleaning properties of environment w.r.t air pollution control?
2. Mention the basic methods of treatment for waste water
3. Explain about enviorment impact assessment.
5. What is primary and secondary treatment for pollution?
6. Mention the effects of noise and air pollution.
7. Explain the following laws-water act and motor vehicle act.
8. Give a note on probable environmental impact of a thermal power plant & a mining industry.
9. Differentiate between the following:
   a) Particulates and aerosols  b) Super-adiabatic and sub-adiabatic.
10. What is population density and population forecasting?

Sub: PAVEMENT DESIGN
Paper Code: CE-802D

1. Discuss the various approaches taken for design of pavement.
2. What is flexible and rigid pavement?
3. What is stopping sight distance? Explain with formula
4. Write short notes on curves in hill roads.
5. A circular load of radius 16cm with uniform contact pressure of 7.5 kg/cm$^2$ is applied on the surface of a homogeneous elastic mass. Determine the vertical stress under the centre of the load at a depth of 48cm from the surface using the i) formula ii) stress distribution chart.
6. What are the stresses acting in concrete pavements?
7. Draw a typical cross section of highway in embankment.
8. What are the methods to reduce the accidents in roads?
9. What is the recommendation of jayakar committee?
10. What are the different types of gradients used in the highways?

B.TECH 8TH SEM – CSE

Sub: ORGANISATIONAL BEHAVIOUR
Paper Code: HU801

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8. What are the different stages of group development?

Sub: CRYPTOGRAPHY & NETWORK SECURITY
Paper Code: CS801D

1. What is the need of data encryption? Explain it.
2. Why SHA is more secure than MD5?
3. Explain the RLE method with an example?
4. How does GSM security work?
5. Is it possible to combine symmetric key and asymmetric key cryptography? Justify your answer.
6. What do you mean by 2-factor authentication? What is the importance aspect the establishes trust in digital signature? What is the difference between Active and Passive attack? Give example.
7. Describe the RSA key generation and encryption and decryption algorithm? State the difference between stream and block ciphers? How SSL is different from SHTTP? Explain with suitable example.
8. What is access control? How it is differ from availability?
9. How can be Caesar chipper cracked? What is the main feature of polygram substitution chipper? State the principle behind one time pad?
10. What are the model of network security?

Sub: E-COMMERCE
Paper Code: CS802E

1) Describe the component of EDI in electronic market?
2) What legal issues are associated with internet commerce? Explain them
3) What are the types/variations of CRM?
4) Explain about Virtual Auction.
5) Explain different types of digital documents.
6) How risk is handled in e-Payment system?
7) Explain how smart cards and credit cards have roles in e-commerce application.
8) Explain the working principle of DES algorithm
9) What do you mean by e-cash?
10) What is electronic market?

B.TECH 8TH SEM – EEE
Sub: ORGANISATIONAL BEHAVIOUR
Paper Code: HU801

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PAPER NAME: FACTS & HVDC TRANSMISSION
PAPER CODE: EEE 801D

1. Explain the design transient stability margin can be improved by enhancing synchronizing torque. Derive the necessary equations.
2. Explain the protection provided for DC line.
3. What are the limitations of manual control of a DC line operation?
4. Name the different types of equidistant pulse control and explain them in detail
5. Explain the operation of STATCOM.
6. Explain the operation of UPFC with relative diagram.

PAPER NAME: SOFTWARE ENGINEERING
PAPER CODE: EEE 802A

1. Describe Classical Waterfall Model.
2. Describe Iterative Waterfall Model.
3. Describe Prototyping model.
4. Describe Spiral model.
5. Describe Basic COCOMO Model.
6. Short note: Complete COCONO model.
7. Describe PERT Chart.
8. Describe Risk management.
10. Write the software requirements specification.

B.TECH 8TH SEM –ECE

Sub: ORGANISATIONAL BEHAVIOUR
Paper Code: HU801

Q. Answer the following questions.

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6. How is behavioural theory on leadership different from contingency theory of leadership?
7. What are the possible sources of conflict?
8. What are the different stages of group development?

SATELLITE COMMUNICATION AND REMOTE SENSING
SUBJECT CODE: EC 801 C

1) What are the frequency allocations for Satellite Services?
2) What are the problems for Orbital and Space Craft systems and mention the drawbacks?
3) Discuss the multiple access (FDMA, TDMA and CDMA) techniques broadly and describe the comparisons between the multiple access techniques.
4) What is Transponder and why it is used in Satellite systems?
RENEWABLE ENERGY
PAPER CODE: EC802C

1. What are the difference between Tidal Energy and Wave Energy? Discuss about the impact of tidal energy on environment.
2. Describe the scenario and prospects of geothermal energy in India?
3. What are the advantages and disadvantages of nuclear fission energy?
4. Discuss about the prospects of generation of biomass energy in India.
5. Short notes: i) Open cycle MHD system
   ii) Limitations of OTEC plants
6. What are three conversion technologies for geothermal energy conversion? Discuss about any one of the technologies.
7. Discuss the principle of solar collector. Classify different types of solar thermal collector. What are its main advantages?
8. Write the advantages and disadvantages of concentrating collectors over flat-plate types of solar collectors.

B.TECH 8TH SEM –ME
Sub: ECONOMICS FOR ENGINEERS
Paper Code: ME801(HU)

Answer the following Questions

1. The following details on the cash flows of two projects A and B.

<table>
<thead>
<tr>
<th>Year</th>
<th>Project A cash flows (Rs.)</th>
<th>Project B cash flows (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4,00,000</td>
<td>5,00,000</td>
</tr>
<tr>
<td>1</td>
<td>2,00,000</td>
<td>1,00,000</td>
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<tr>
<td>2</td>
<td>1,75,000</td>
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<tr>
<td>3</td>
<td>3 25,000</td>
<td>3,00,000</td>
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<tr>
<td>4</td>
<td>2,00,000</td>
<td>4,00,000</td>
</tr>
<tr>
<td>5</td>
<td>1,50,000</td>
<td>2,00,000</td>
</tr>
</tbody>
</table>

Cost of capital is 12% p.a. Compute PBP, NPV and PI for A and B and suggest which project should be accepted and why.
2. (a) Differentiate elaborately Absorption Costing and Marginal Costing.
(b) Variable cost per unit is Rs.12. Selling price per unit is Rs.20. Fixed expenses is Rs.60,000. Find BEP and what will be the selling price per unit if the BEP is brought down to 6000 units?

3. What is the importance of Ratio Analysis and Capital budgeting methods in an organization?

4. Give a short note on:
   (d) Average Rate of Return (ARR)
   (e) Balance Sheet
   (f) Power sizing model of cost estimation.

5. Explain various advantages and disadvantages of Capital Budgeting Appraisal criteria.

**Sub: ENERGY CONSERVATION & MANAGEMENT**

**Paper Code: ME802C**

1. Explain various type of energy resource.
2. Explain various type of renewable energy.
3. Explain Hubbert’s model for oil reserve.
4. What do you mean total energy concept explain CHP cycle with their application.
5. Name various types of commercial waste heat recovery device.
6. Write a short note about wastage heat exchanger.
7. Explain about heat pipes and air compressor.

**Sub: AUTOMOBILE ENGINEERING**

**Paper Code: ME803D**

1. How an automobile can be classify? Describe basic component and parts of automobile.
2. Draw the diagram fuel mixing and circuit control system.
3. Describe classification of carburetor. Explain working principle of simple carburetor & Zenith carburetor with neat sketches.
4. Explain advantages and disadvantages of petrol injection system.
5. Explain working principle and line diagram of common rail and individual injection system.
6. Explain various component of water cooling system.
7. With the help of neat sketches, explain the construction & working of (a) A.C. Mechanical fuel pump & (b) S,U. Electrical fuel pump.
8. Enlist the common troubles experienced in the fuel supply system of an engine. Locate their possible causes & suggest measure to remedy these.
9. Describe with neat sketches the construction & working function of (a) constant mesh gear box & sliding mesh gear box.

10. Explain with neat sketches the final drive also Hotch-kiss drive in automobile system.

11. Showing line diagram of wiring system of lighting in an automobile system.

12. Draw the layout of Mastervac power assisted brakes. Explain the construction & working of main components of this system.

13. What is perfect steering. Discuss in detail the Ackermann steering mechanism.

14. Explain with neat sketch the construction of a propeller shaft. Explain the necessity of differential in automobile.

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**B.TECH 8TH SEM – EE**

**Sub: ORGANISATIONAL BEHAVIOUR**

**Paper Code: HU801**

Q. Answer the following questions.

1. State the managerial grid as developed by Blake and Mouton.
2. How do you define Attitude? What are the factors that influence personality?
3. What are the contributing fields of OB?
4. “Leadership is not the same as management”. Discuss.
5. Discuss briefly the force field analysis model to explain how the change process works.
6. How is behavioural theory on leadership different from contingency theory of leadership?
7. What are the possible sources of conflict?
8. What are the different stages of group development?

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**Sub: HVDC TRANSMISSION**

**Paper Code: EE801A**

1. (a) Explain the causes of reactive power absorbed by HVDC converter substation.
   (b) With a neat sketch, explain about thyristor controlled Reactor.
2. (a) Compare simultaneous and sequential methods of power flow analysis.
   (b) Draw the flow chart for AC/DC load flow.
3. How is Total Harmonic Distortion estimated in a circuit? Explain the relevance of THD to a HVDC system.
4. Explain the importance of a HVDC converter station, in the whole scheme of HVDC transmission.
5. Give the necessity of smoothing reactor in a HVDC system and list out main functions of it.
6. List out basic types of faults that can occur in converters.

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**Sub: SENSORS & TRANSDUCERS**

**Paper Code: EE802B**

1. Discuss briefly the use of platinum in metal resistance thermometric sensor.
2. Describe the operating principle of optical pyrometer with proper diagram. Also mention its range and advantages.
3. Draw the diagram of LVDT and explain its electro-mechanical characteristics and mention some advantages and disadvantages of it.

4. What is Piezoelectric effect? What are the materials used for Piezoelectric transducer?

5. Explain the principle of piezoelectric transducer with diagram.

6. Write short notes-
   i) Differences between Vilari effect and Wiedemann effect
   ii) RTDs
   iii) Geigen Counter
   iv) Smart Sensors.

7. State the working principle of Thermocouple. Mention name along with their temperature range and composition of two commonly used thermocouple. Name two IC type temperature sensors. Explain any of them with circuit diagram.