

INSTITUTE OF SCIENCE & TECHNOLOGY

ASSIGNMENT QUESTION

B.TECH-1ST SEM (ALL STREAM)

PAPER NAME: ENGLISH LANGUAGE & TECHNICAL COMMUNICATION

PAPER CODE HU-101

1. Choose the correct alternative for the following.

- A. Memo is the commonly short form for- i)Memory ii) Memorise iii) Memorandum iv) Memoir
- B. Everybodyentitled to one month's salary as bonus. i) were ii) is iii) are iv) be
- C. If I king, I would be the happiest man on earth. i) am ii) was iii) were iv) be
- D. He succeeded perseverance and sheer hard work. i) By reason of ii) by dint of iii) in the event of iv) instead of
- E. The work ishis capacity. i) under ii) above iii)below iv) beyond
- F. He was found.....desperately for his life. i)Fights ii) fighting iii) fought iv) fight
- G. One who knows everything is called: i)Omniscient ii) Omnipotent iii) Omnipresent iv) intelligent
- H. The boots are.....the shelf. i) in ii) down iii) under iv)over.

2. Do as directed.

- a) Someone stole the purse. (Change the voice)
- b) He tells me the truth. (Make it complex)
- c) The brave alone can deserve the fair. (Turn into negative)
- d) The moment which is lost is lost forever. (Make it simple)
- e) He is too old to do this. (Omit "too" & "to")

3. Define: Sender, Receiver. Message.

4. Discuss the features of technical communication

5. What is basic process of communication?

6. How communication processes work? What is feedback?

7. Explain model of communication with a diagram.

8. Write a job application and provide your Resume in response to the following advertisement on 1st September, 2017 in The Telegraph. An MNC has vacancy for the post of an Assistant Engineer where the company would be recruiting a fresher with a B.Tech degree in Electrical engineering. Apply within 15 days to the Advertiser, Box no. 4716, The Telegraph, Kolkata 700001.

9. You are the Secretary of the Sports Department of your college. The inter-college football tournament is going to be held very shortly. Notify the students about the details of it.

10. Write an essay on any one: - a) Pleasure of reading b) The uses of paper.

PAPER NAME : PHYSICS-I

PAPER CODE : PH-101

- 1. Potential energy of a particle of mass m is given by $\frac{1}{2} m\omega^2 x^2$, where ω is constant .Show that the particle executing S.H.M.
- 2. What is resonance? What is the physical significance of logarithmic decrement of a damped oscillatory system?

- Two straight and narrow parallel slits are 0.3 cm apart are illuminated by a monochromatic sources of wavelength 5.9×10^{-5} cm. Fringes are obtained at a distance of 30cm from the slit. Find the width of the fringes.
- What is critical damping?
- Distinguish interference and diffraction.
- Write down the condition for sustained interference.
- Explain, in interference phenomenon total energy is conserved.
- What is temporal and spatial coherence.

PAPER NAME : CHEMISTRY

PAPER CODE : CH-101

- State the first law of thermodynamics and derive its mathematical form.
- Prove that $C_p - C_v = R$ for one mole of ideal gas.
- Derive the work obtained in case of one mole of ideal gas expanded isothermally and reversibly.
- Show that adiabatic curve is steeper than isothermal curve.
- State Hess's law of constant heat summation.
- Derive Kirchhoff's equation.
- Derive the expression for first order reaction and hence show that the first order reaction is never complete.
- Explain Pseudounimolecular reaction with one example and hence show that it follows first order kinetics.
- Write down the Arrhenius equation and explain all the terms. Plot $\log K$ Vs. $1/T$ and find out its slope.
Derive the integrated form of Arrhenius equation.

PAPER NAME : MATHEMATICS -I

PAPER CODE: M101

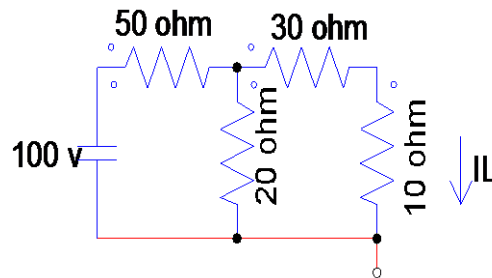
Answer the following questions.

- Test the convergence of the series $\sum_{n=1}^{\infty} \frac{n!2^n}{n^n}$.
- $\iint \sqrt{4x^2 - y^2}$ over the triangle formed by the straight lines $y = 0$, $x = 1$ and $y = x$.
- Find the equation of the sphere having the circle $x^2 + y^2 + z^2 - 10y + 4z - 8 = 0$, $x + y + z = 6$ as a great circle.
- Find the reduction formula for $\int_0^{\pi/2} \sin^m x \cos^n x dx$; $m (> 1)$, $n (> 1)$ being positive integers.
- Find the rank of the matrix $\begin{bmatrix} -1 & 2 & -1 & 0 \\ 2 & 4 & 4 & 2 \\ 0 & 0 & 1 & 5 \\ 1 & 6 & 3 & 2 \end{bmatrix}$.
- Verify Stoke's theorem for $\vec{F} = (2x - y)\hat{i} - yz^2\hat{j} - y^2z\hat{k}$ = where S is the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$ and C is its boundary.

PAPER NAME: BASIC ELECTRICAL & ELECTRONICS ENGG.-I

PAPER CODE: ES-101

- (1) State and prove maximum power transfer theorem for dc network. Show that under maximum power transfer efficiency is 50%
- (2) Explain KVL & KCL with proper example.
- (3) State and explain Norton theorem and superposition theorem.
- (4) Draw comparison between electrical and magnetic circuit.
- (5) A Wheatstone bridge consists of $AB=4\Omega$, $BC=3\Omega$, $CD=6\Omega$ and $DA=5\Omega$. A 2.4v battery is connected between point B and D. A galvanometer of 8Ω resistance is connected between A and C. Using Thevenin's theorem find the current through galvanometer.
- (6) Define resistance, reactance and impedance.
- (7) Find the load current from the circuit using Norton and Thevenin theorem.



Part-2: ELECTRONICS

1. Write down the continuity equation of the semiconductor.
2. Short Note: Zener diode.
3. Draw and Write the operation of n-p-n transistor?
4. Draw the full wave bridge rectifier with its operation.
5. Write the mass action law? what is extrinsic semiconductor?
6. Short Note: Fermi level

PAPER NAME : ENGINEERING MECHANICS

PAPER CODE : ME-101

1. Given initial velocity v_0 & angle of projection Θ of a projectile. Find the equation that defines y as a function of x . Eliminate time from the kinematic equation State and prove varignon's Theorem of coplanar forces.
2. Determine the horizontal force P to be applied to a block weighing 2500N to hold it in position, the inclined plane is smooth & makes 30° with the horizontal.
3. An I-section has the following dimensions in mm units.

Bottom flange	= 350x100
Top flange	= 250x50
Web	= 300x50

Determine the moment of inertia of the I-section about centroidal x-x axis
Passing through its centroid & parallel to base.
4. Describe the following
 - i. Cone friction
 - ii Angle of repose
 - ii. A body resting on a rough horizontal plane, required a pull of 200N inclined at 30° to the plane just to move it. It was found that a push of 250 N inclined at 30° to the plane just to move it. Determine the weight of the body & the co-efficient of friction.
5. Two bodies weighing 300N & 450N are hung to the ends of a rope passing over an ideal pulley. How much distance the blocks will move in increasing the velocity of system from 2m/s to 4m/s? how much is the tension in the string? Use work energy method.
6. Define moment. Calculate moment of inertia of a quadrant of a circle.

7. What do you mean by the term
 - a. Centre of gravity
 - b. Moment of inertia
 - c. Transmissibility of a force
8. A force given by $F = 3i + 2j - 4k$ is applied at the point $P(1, -1, 2)$. Find the moment of the Force F about the point $O(2, -1, 3)$ & about origin.
9. State and prove
 - i. Lami's theorem.
 - ii. Polygon law of forces.
 - iii. Find the least initial velocity with which a projectile is to be projected so that it clears a wall 6m height located at a distance of 4m, & strikes the ground at a distance of 5m beyond the wall. The point of projection is at the same level as the foot of the wall.
10. A bullet is fired from a height of 120m at a velocity of 360 kmph at an angle of 30° upward. Neglecting air resistance, find
 - i. Total time of flight
 - ii. Horizontal range of the bullet
 - iii. Maximum height reached by the bullet, and Final velocity of the bullet just before touching the ground.

B.TECH-3RD SEM (CSE)

PAPER NAME:-VALUE AND ETHICS IN PROFESSION

PAPER CODE : HU 301

1. Discuss science, technology and engineering as social and professional activity.
2. Give an account of the problems relating to technology transfer process.
3. What is sustainable development? State the main objectives of sustainable development.
4. What is club of Rome? What are its objectives?
5. How does technology effect the environment?
6. Briefly discuss any five problems of man-machine interactions.
7. Write a short note on sub-assembly line and final assembly line.

PAPER NAME:-PHYSICS-II

PAPER CODE : PH 301

1. For an electric potential $V = (x^2 + y^2 + z^2)^{-1/2}$, calculate the electric field at (1,1,1).
2. Write down the time independent Schrodinger equation in one dimension and in three dimension.
3. State Biot-Savarts law.
4. Write down the operator form of energy and momentum in one dimension.
5. Define divergence, curl of a vector. Give its physical significance.
6. Show that $[\hat{x}, \hat{p}_x] = i\hbar$.
7. Derive equation of continuity, $\vec{\nabla} \cdot \vec{j} + \frac{\partial \rho}{\partial t} = 0$.
8. State and prove ampere's circuital law. Prove that $\vec{\nabla} \times \vec{E} = \mu_0 \vec{j}$.
9. Use Gauss' law to find the electric field intensity inside and outside of a charged solid sphere.

10. What is wave function? Give its physical interpretation.

PAPER NAME : CHEMISTRY-II

PAPER CODE : CH-301

1. 'Population never grows exponentially for ever' – Explain with suitable curve.
2. What do you understand by the term 'Maximum sustainable yield'? Prove that $N = \frac{K}{2}$ for maximum sustainable yield.
3. What is Acid Rain? What are its causes? What are the effects of Acid Rain?
4. What are the different components of ecosystem? Write down the different components of aquatic ecosystem?
5. What is Food Chain? Describe the different types of Food Chain with example.
6. Describe the phosphorus cycle with neat sketch.
7. What is Green House effect? Name major Green House gases. What are the effects of Green House gases on global climate?
8. What is Ozon Hole? How does it happen chemically in the stratosphere?
9. What are ventilation coefficient and maximum mixing depth? How many types of plume can be expected? Why does the shape of plume differ?
- 10 Write short notes on:
 - (i) EIA
 - (ii) Earth's Albedo
 - (iii) Ventury Scrubber
 - (iv) Hydrological Cycle
 - (v) Temperature Inversion.

PAPER NAME: ANALOG AND DIGITAL ELECTRONICS

PAPER CODE: CS 301

1. Explain the 4:1 multiplexer. Construct a 16:1 MUX using two 8:1 MUX.
2. Describe the 3 to 8 line decoder.
3. Explain the pin diagram of 555 timer.
4. Explain full adder & half subtractor circuit with truth tables.
5. Write the difference between A/D & D/A converters.
6. What are the advantages of feedback? How many types of feedback are present? explain.
7. Write the differences between sequential and combinational circuits.

PAPER NAME: DATA STRUCTURE & ALGORITHM

PAPER CODE: CS302

1. Insert the following keys into a AVL tree.
64, 1, 44, 26,13,110,89,85,20
Then delete the following keys. 85, 1
2. Explain DFS with suitable example

3. Define the following: Connected graph, Tree, linked list.
4. Write the algorithm for binary search.
5. Convert the following infix to postfix expression using Stack
 $4+3*10/6+7-4/2+5^3$
6. Construct a tree from following
 INORDER: D B F E A G C L J H K
 POSTORDER: D F E B G L J K H C A
7. Explain the tower of Hanoi problem of recursion of 3 peg and 3 disks
8. Show the stages in growth of a 4 order B-tree when the following keys are inserted in the given order.

 74, 72, 19,84 , 51, 10, 35, 18, 60, 76, 58, 19, 45.
9. What is asymptotic notation? Define different notation associated with complexity.
10. Write the algorithm for Merge Sort.

PAPER NAME: COMPUTER ORGANIZATION

PAPER CODE: CS 303

1. a) What do you mean by pipeline hazards?
 b) Describe structural hazards
2. a) Describe RISC and CISC with the help of block diagram.
 b) Compare RISC and CISC.
3. a) What do you mean by hardware and micro program control unit?
 b) Describe the difference between hardware and micro program control unit.
4. a) What is cache Memory?
 c) Describe hit ratio and miss ratio.
 d) Compare sRAM and dRAM.
5. a) Describe the Booth's algorithm with a suitable architectural diagram.
 b) Show the booth's multiplication algorithm from the given numbers M= -6 and Q=7.
6. Write short notes(any two):
 i) UMA model.
 ii) Inclusion
 iii) Super scalar architecture.
7. a) Explain about von-numan architecture?
 b) Discuss about bottleneck of von-numan architecture.
8. a) Write down the different types of Addressing modes.
 b) Explain the operations addressing modes with the example.
9. a) Describe about Floppy disk, hard disk and Magnetic tapes.
 b) Write down the difference between EPROM and EEPROM.
10. a) Booth's Multiplication of (6*4).
 b) Division of (5/2).

B.TECH-3RD SEM

(ECE)

PAPER NAME : NUMERICAL METHODS

PAPER CODE: M(CS)-301

Answer the following questions:

1. Construct the iterative scheme of Gauss's Elimination method for solving a system of Linear Algebraic Equations.
2. Find the Lagrange's formula the interpolating polynomial which corresponds to the following data

X	-1	0	2	5
f(x)	9	5	3	15

3. Use Runge-Kutta Method of fourth order to compute the numerical values of the differential equation $\frac{dy}{dx} = x^2 + y^2$; $y(1)=0$, find y at $x = 1.3$.
ans: $y(1.3) = 0.41357$
4. Solve the system of linear equations by LU-factorization method:
 $2x - 6y + 8z = 24$
 $5x + 4y - 3z = 2$
 $3x + y + 2z = 16$
5. Deduce Simpson's $\frac{1}{3}rd$ rule from Newton-Cote's quadrature formula.
6. Prove that the n th order divided difference of a polynomial of degree n is constant.
7. 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.

PAPER NAME : MATHEMATICS-3

PAPER CODE: M-302

Answer the following questions.

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

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

3. For the functions defined by $f(z) = \sqrt{|xy|}$, show that the Cauchy-Riemann Equations are satisfied at $(0, 0)$ but the function is not differentiable and analytic at that point.
4. 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.
5. Using Parseval's Identity on Fourier cosine transform show that

$$\int_0^{\infty} \frac{dx}{(x^2 + a^2)(x^2 + b^2)} = \frac{\pi}{2ab(a+b)}.$$

6. Obtain the Fourier series to represent the function $f(x) = x^2$, $-\pi \leq x \leq \pi$.

Hence show that $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots \infty = \frac{\pi^2}{6}$.

SUBJECT: CIRCUIT THEORY & NETWORKS

SUBJECT CODE: EC-301

(1) For an RL series circuit with $R=2$ ohm and $L=1$ H and no initial current in the inductor, a voltage $v=4e^{-t}$ volt is applied at $t=0$. Find the expression for the resulting current in the circuit for $t \geq 0$ using L.T. method.

(2) Determine the Laplace Transform of R-L-C series circuit when step response is applied on its input.

(3) A function in Laplace domain is given by

$$I(s) = \frac{s+1}{s(s^2+4s+4)}$$

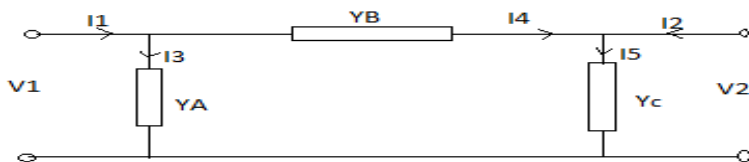
Obtain its Inverse Laplace Transform.

(4) A capacitor of $5\mu\text{F}$ being charged initially to 10V is connected to a resistance of $10\text{K}\Omega$ in series and is allowed to discharge through it by switching of a switch K. Find the expression of discharging current when step response input is applied in it.

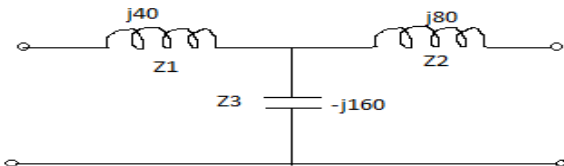
(5) Determine the condition of Reciprocity and Symmetry in Z-parameter representation.

(6) Calculate the different parameters in h-parameter representation.

(7) Find the Y-parameters of the following π -circuit and draw the Y-parameter model.



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



PAPER NAME: SOLID STATE DEVICE

PAPER CODE: EC302

- 1) Explain the principle of operation of a solar cell and define 'photovoltaic emf' and fill factor.
- 2) Why is Gunn diode called hot electron device ?
- 3) Define avalanche resonance frequency of an Impatt diode. What is the main limitation of impatt diode ?
- 4) What is difference between a general purpose diode and a tunnel diode. Draw symbols and equivalent circuit of it. Draw also V-I characteristics.

- 5) What is effective mass ? what do you mean by carrier drift and diffusion. Describe in brief 'Hall effect ' with proper diagram.
- 6) Explain the working principle of a Zener diode and its use as a reference voltage device.

SUBJECT: SIGNALS AND SYSTEMS

PAPER CODE: EC303

1. Find the z- transform and ROC of the signal.
 $x(n)=a^n u(n)-b^n u(-n-1); |b|>|a|$
2. Whether the following system is linear and Causal. Justify your Answer.
 $y(t)=x^2(t-1)+2$
3. What is the relation between DTFT and z-transform?
4. Find the inverse Z-transform of $X(z)=\frac{z(z^2-4z+5)}{(z-1)(z-2)(z-3)}$ For ROC: i) $2<|z|<3$ ii) $|z| < 1$.
5. Define ergodic process Explain the difference between Power spectral density and Energy Spectral Density
6. Write short note a) Mapping of s-plane into z-plane b) Discrete LTI system

SUB: ANALOG ELECTRONICS

PAPER CODE: EC304

1. Draw and discuss circuit of Monostable multivibrator using IC 555 timer.
2. Discuss h-model of CE transistor amplifier.
3. Draw instrument amplifier, log and antilog amplifier using OPAMP and discuss their operations.
4. Draw circuit of voltage divider bias and discuss the effect on stability..
5. Write short note on
 - (i) Integrator circuit
 - (ii) Barkhausen Criterion
 - (iii) Positive feedback amplifier.

B.TECH-3RD SEM

(EE & EEE)

PAPER NAME : NUMERICAL METHODS

PAPER CODE: M(CS)-301

Answer the following questions:

1. Construct the iterative scheme of Gauss's Elimination method for solving a system of Linear Algebraic Equations.
2. Find the Lagrange's formula the interpolating polynomial which corresponds to the following data

X	-1	0	2	5
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3. Use Runge-Kutta Method of fourth order to compute the numerical values of the differential equation $\frac{dy}{dx} = x^2 + y^2$; $y(1)=0$, find y at $x = 1.3$. ans: $y(1.3) = 0.41357$

4. Solve the system of linear equations by LU-factorization method:

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5. Deduce Simpson's $\frac{1}{3}rd$ rule from Newton-Cote's quadrature formula.

6. Prove that the n th order divided difference of a polynomial of degree n is constant.

7. Derive 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.

PAPER NAME : MATHEMATICS-3

PAPER CODE: M-302

Answer the following questions.

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

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

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

4. 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.

5. Using Parseval's Identity on Fourier cosine transform show that

$$\int_0^{\infty} \frac{dx}{(x^2 + a^2)(x^2 + b^2)} = \frac{\pi}{2ab(a+b)}$$

6. Obtain the Fourier series to represent the function $f(x) = x^2, -\pi \leq x \leq \pi$.

Hence show that $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots \infty = \frac{\pi^2}{6}$.

SUB: ANALOG ELECTRONICS

PAPER CODE: EC(EE)301

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2. Discuss h-model of CE transistor amplifier.
3. Draw instrument amplifier, log and antilog amplifier using OPAMP and discuss their operations.
4. Draw circuit of voltage divider bias and discuss the effect on stability..
5. Write short note on

- (iv) Integrator circuit
- (v) Berkhausen Criterion
- (vi) Positive feedback amplifier.

PAPER NAME: DIGITAL ELECTRONICS
PAPER CODE: EC(EE)-302

1. State De-Morgan's theorem.
 Prove that, $A+BC = (A+B)(A+C)$
2. Realise the logic expression using basic gates only:

$$Y = ABC + \bar{B}\bar{C} + \bar{C}\bar{A}$$
3. Design OR gate using NAND gates.
4. Simplify the following Boolean function using K-Map.

$$Y = \sum_m(0,2,3,6,7) + \sum_d(8,10,11,15)$$
5. Realise the logic expression using basic gates only:--

$$Y = (A+B)(A+C)$$
6. Obtain the canonical sum of product form of the function:

$$Y(A,B,C) = A + BC$$
7. Realise the logic expression using basic gates only:--

$$Y = AB + \bar{B}\bar{C} + \bar{C}\bar{A}$$

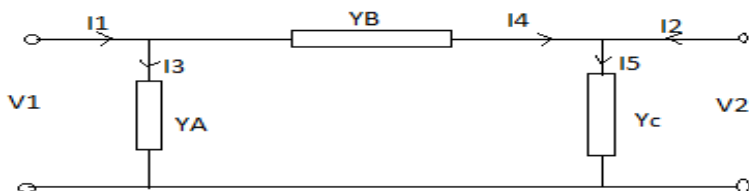
SUBJECT: ELECTRIC CIRCUIT THEORY
SUBJECT CODE: EE-301

- (1) For an RL series circuit with $R=2$ ohm and $L=1$ H and no initial current in the inductor, a voltage $v=4e^{-t}$ volt is applied at $t=0$. Find the expression for the resulting current in the circuit for $t \geq 0$ using L.T. method.
- (2) Determine the Laplace Transform of R-L-C series circuit when step response is applied on its input.
- (3) A function in Laplace domain is given by

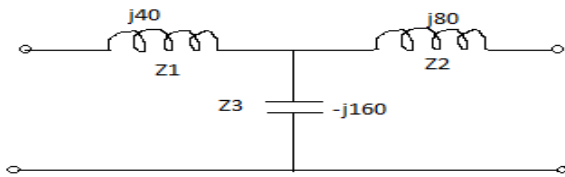
$$I(s) = (s+1)/s(s^2+4s+4)$$

Obtain its Inverse Laplace Transform.

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



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



SUBJECT: FIELD THEORY

SUBJECT CODE: EE-302

- (1) What do you mean by Skin effect ? If the skin depth is 80 micro meter at 4 MHz in a certain conducting medium, calculate the skin depth if the frequency is changed to 16 MHz.
- (2) What do you mean by propagation constant?
- (3) Deduce the equation for Plane waves in loss less and lossy dielectric medium.
- (4) Obtain pointing theorem for conservation of energy in electromagnetic fields.
- (5) Derive the transmission line equations for loss less system and find out the characteristics impedance.

B.TECH-3RD SEM

(ME)

PAPER NAME:-VALUE AND ETHICS IN PROFESSION

PAPER CODE : HU 301

1. Discuss science, technology and engineering as social and professional activity.
2. Give an account of the problems relating to technology transfer process.
3. What is sustainable development? State the main objectives of sustainable development.
4. What is club of Rome? What are its objectives?
5. How does technology effect the environment?
6. Briefly discuss any five problems of man-machine interactions.
7. Write a short note on sub-assembly line and final assembly line.

PAPER NAME:-PHYSICS-II

PAPER CODE : PH 301

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3. State Biot-Savarts law.
4. Write down the operator form of energy and momentum in one dimension.
5. Define divergence, curl of a vector. Give its physical significance.
6. Show that $[\hat{x}, \hat{p}_x] = i\hbar$.
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8. State and prove ampere's circuital law. Prove that $\vec{\nabla} \times \vec{E} = \mu_0 \vec{j}$.

9. Use Gauss' law to find the electric field intensity inside and outside of a charged solid sphere.
10. What is wave function? Give its physical interpretation.

PAPER NAME : CHEMISTRY-II

PAPER CODE : CH-301

1. 'Population never grows exponentially for ever' – Explain with suitable curve.
2. What do you understand by the term 'Maximum sustainable yield'? Prove that $N = \frac{K}{2}$ for maximum sustainable yield.
3. What is Acid Rain? What are its causes? What are the effects of Acid Rain?
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10. Write short notes on:
 - (i) EIA
 - (ii) Earth's Albedo
 - (iii) Ventury Scrubber
 - (iv) Hydrological Cycle
 - (v) Temperature Inversion.

PAPER NAME:-APPLIED THERMODYNAMICS

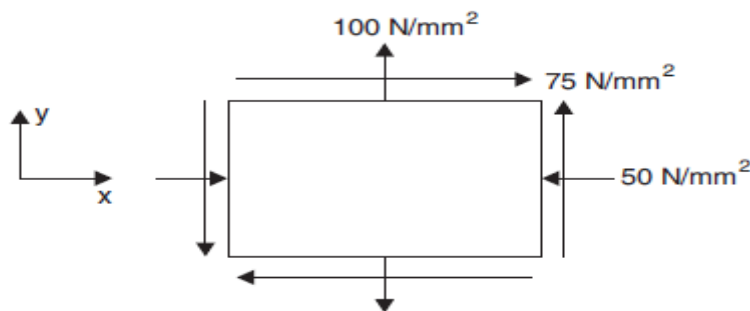
PAPER CODE - ME301

1. Derive the expression for COP in case of heat pump.
2. Derive the 2nd law of thermodynamics.
3. Discuss the concept of PMM1 .
4. Show that work is a path function and not the property of system.
5. Derive the expression for the work done for closed system for all possible proceses.
6. What do you mean by Air-standard cycle? What are the assumptions for the air standard cycles?
7. Derive the expressions for thermal efficiency for Otto cycle.
8. A mass of 8 kg gas expands within a flexible container so that the p–v relationship is of the form $pv^{1.2} = \text{constant}$. The initial pressure is 1000 kPa and the initial volume is 1 m³. The final pressure is 5 kPa. If specific internal energy of the gas decreases by 40 kJ/kg, find the heat transfer in magnitude and direction.
9. A household refrigerator is maintained at a temperature of 2°C. Every time the door is opened, warm material is placed inside, introducing an average of 420 kJ, but making only a small change in the temperature of the refrigerator. The door is opened 20 times a day, and the refrigerator operates at 15% of the ideal COP. The cost of work is Rs. 2.50 per kWh. What is the monthly bill for this refrigerator? The atmosphere is at 30°C.
10. 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.

PAPER NAME: STRENGTH OF MATERIAL

PAPER CODE: ME 302

1. What is bulk modulus? Prove $E = 3K(1 - 2/m)$
Where, E = Young's modulus, K = Bulk modulus, $1/m$ = Poisson's ratio
2. At a point in a stressed element, the normal stress in two mutually perpendicular directions are 45 Mpa and 25 Mpa both tensile. The complementary shear stress in these directions is 15 Mpa. Determine the maximum and minimum principle stresses.
3. A beam 10 m long carries two point load 3 kN at left end and 5 kN at right end other 2 kN/m uniformly distributed load distributed 6 m long start from 2 m apart at left end. The beam has two support one is 2 m apart from left end other 2 m apart from right end. Draw the shear force bending moment diagram and find maximum bending moment and point of contraflexures if any.
4. A open coil helical spring made of 10 mm diameter wire has 15 coils of 50 mm radius with a 20° angle of helix. Determine the deflection of the spring, when subjected to an axial load of 300 N. Take young's modulus is 200 Gpa and modulus of rigidity 80 Gpa.
5. What is modulus of section? A rectangular beam, simply supported over a span of 4 m, is carrying a uniformly distributed load of 50 kN/m. Find the dimension of the beam, if depth of the beam section is 2.5 times its width. Take maximum bending stress in the beam section as 60 Mpa.
6. A rectangular bar 2 m long and 12.5 mm thick uniformly tapers from 100 mm at one end to 20 mm at the other. If the bar is subjected to a tensile force of 25 kN, find its deformation. Take modulus of elasticity 200 Gpa.
7. Define strut and column. What are the assumptions in the Euler's column theory?
8. Derive the relation between slope, deflection and radius of curvature.
9. Derive the relation when a circular bar subjected to torque $\tau/R = C\theta/l$.
Where, τ is shear stress, R is radius of circular shaft, l is length of shaft, θ is angle of twist.
10. Derive the equation strain energy store in a body due to shear stress.
11. State of stress at a point in a material is as shown in the Fig. . Determine
 - (i) principal stresses
 - (ii) maximum shear stress
 - (iii) plane of maximum shear stress and
 - (iv) the resultant stress on the plane of maximum shear stress



12. A pipe of 100 mm diameter is carrying a fluid under pressure of 4 Mpa. What should be the minimum thickness of pipe, if maximum circumference of pipe material is 12.5 Mpa.

PAPER NAME : ENGINEERING MATERIALS

PAPER CODE : ME303

1. Write short-notes on the followings:
 - a) Brittleness

- b) Fatigue ,
- c) Hardenability ,
- d) Electrical conductivity
- e) Thermal conductivity
- 2. Define alloy steel. Why the alloying elements are added to steel?
- 3. Explain the effect of nickel, chromium and cobalt on the properties of steel.
- 4. Explain with the help of a diagram, the following heat treatment process –
 - (i) Annealing, (ii) hardening, (iii) normalizing
- 5. What is powder metallurgy? Give a brief description of powder metallurgical process with the aid of a block diagram.
- 6. What are the different types of plastics? State their properties.
- 7. Name the synthetic rubbers which are commonly used. Explain any one of them.
- 8. State the difference between destructive and non-destructive test of a specimen.
- 9. Explain the stress-strain diagram of a ductile material.
- 10. with reference to Iron-Carbon phase diagram, explain the following :-
 - i) α -ferrite ii) austenite iii) pearlite iv) cementite
- 11. What is eutectoid? What is the composition of eutectoid steel?
- 12. Draw the following planes and directions in a FCC structure (001), (102), (010), (020), (101).
- 13. Calculate the atomic packing factor of BCC crystal. The Bragg's angle corresponding to the first order reflection from (111) planes in a crystal is 30° when x rays of wavelength of 1.75 angstrom are used. Calculate the atomic spacing ($n=1$).
- 14. State the purpose of heat treatment. Name the different annealing processes.
- 15. What are the tropical alloys of copper used in engineering? Describe briefly their composition and uses.
- 16. Define a unit cell of a space lattice. What lattice constants define a unit cell?

B.TECH-3RD SEM

(CE)

PAPER NAME:-VALUE AND ETHICS IN PROFESSION

PAPER CODE : HU 301

1. Discuss science, technology and engineering as social and professional activity.
2. Give an account of the problems relating to technology transfer process.
3. What is sustainable development? State the main objectives of sustainable development.
4. What is club of Rome? What are its objectives?
5. How does technology effect the environment?
6. Briefly discuss any five problems of man-machine interactions.
7. Write a short note on sub-assembly line and final assembly line.

PAPER NAME:-PHYSICS-II

PAPER CODE : PH 301

10. For an electric potential $V = (x^2+y^2+z^2)^{-1/2}$, calculate the electric field at (1,1,1).
11. Write down the time independent Schrodinger equation in one dimension and in three dimension.
12. State Biot-Savarts law.
13. Write down the operator form of energy and momentum in one dimension.
14. Define divergence, curl of a vector. Give its physical significance.
15. Show that $[\hat{x}, \hat{p}_x] = i\hbar$.

16. Derive equation of continuity, $\vec{\nabla} \cdot \vec{j} + \frac{\partial \rho}{\partial t} = 0$.

17. State and prove ampere's circuital law. Prove that $\vec{\nabla} \times \vec{E} = \mu_0 \vec{j}$.

18. Use Gauss' law to find the electric field intensity inside and outside of a charged solid sphere.

10. What is wave function? Give its physical interpretation.

PAPER NAME : CHEMISTRY-II

PAPER CODE : CH-301

1. 'Population never grows exponentially for ever' – Explain with suitable curve.

2. What do you understand by the term 'Maximum sustainable yield'? Prove that $N = \frac{K}{2}$ for maximum sustainable yield.

3. What is Acid Rain? What are its causes? What are the effects of Acid Rain?

4. What are the different components of ecosystem? Write down the different components of aquatic ecosystem?

5. What is Food Chain? Describe the different types of Food Chain with example.

6. Describe the phosphorus cycle with neat sketch.

7. What is Green House effect? Name major Green House gases. What are the effects of Green House gases on global climate?

8. What is Ozon Hole? How does it happen chemically in the stratosphere?

9. What are ventilation coefficient and maximum mixing depth? How many types of plume can be expected? Why does the shape of plume differ?

10. Write short notes on:

(i) EIA

(ii) Earth's Albedo

(iii) Ventury Scrubber

(iv) Hydrological Cycle

(v) Temperature Inversion.

PAPER NAME: SOLID MECHANICS

PAPER CODE: CE-301

1. Find the total strain energy stored in the bar, when it is subjected to a gradual load of 70 KN. Also find the total strain energy stored in the bar, when the bar is made of uniform cross section of the volume under the same load. Take $E=200\text{Gpa}$.

2. A rectangular body $400\text{mm} \times 50\text{mm} \times 40\text{mm}$ is subjected to a shear stress of 60 Mpa. Calculate the strain energy stored in the body. Take $C= 80\text{Gpa}$. Define – proof resilience and modulus of resilience.

3. What is frame? Classify frame. Write assumptions taken for forces in the members of a perfect frame.

4. A simply supported beam of 3m span carries two loads of 5KN each at 1m and 2m from the left hand support. Draw the shear force and bending moment diagrams for the beam.

5. An overhanging beam ABC loaded with 4.5 KN/m with whole beam. Distance between A and B is 3m and B to C is 1m. Calculate point contra flexure.

6. A beam of square section is used as a beam with one diagonal horizontal. Find the maximum shear stress in the cross section of the beam. Also sketch the shear stress distribution across the depth of the section.

7. A hollow rectangular masonry pier is 1.2m x 0.8 m wide and 150mm thick. A vertical load of 2 MN is transmitted in the vertical plane bisecting 1.2m side and at an eccentricity of 100mm from the geometric axis of the section. Calculate the maximum and maximum stress intensities in the section.

8. Derive an expression for deflection of a cantilever beam with a gradually varying load. A simply supported beam of 2m span carries a point load of 20 KN at its mid point. Determine the maximum slope and deflection of the beam. Take flexural rigidity of the beam as $500 \times 10^9 \text{ N-mm}^2$.
9. In a close coiled spring, the diameter of each coil is to be 10 times that of the spring and the maximum shear stress is not to exceed 60 N/mm^2 . Maximum permissible deflection under a load of 400N is 10 cm. Taking the shear modulus as $9 \times 10^4 \text{ N/mm}^2$, determine the number of coils, the diameter of the coil

PAPER NAME: SURVEYING

PAPER CODE: CE-302

1. Write short notes:
 - a) Base line,
 - b) Tie line,
 - c) Check line
 - d) True meridian,
 - e) Magnetic meridian,
 - f) Assumed meridian,
 - g) Difference between prismatic compass and surveyor's compass
2. a) What is contour line? Define the terms 'contour interval' and 'horizontal equivalent'
b) What are all the methods of contouring? Describe in brief.
3. a) What is the fundamental difference between surveying and levelling?
b) Write short note on Sensitiveness of bubble tube
4. Write short notes
 - a) Base line,
 - b) Tie line,
 - c) Check line
 - d) True meridian,
 - e) Magnetic meridian,
 - f) Assumed meridian
5. a) What is contour line? Define the terms 'contour interval' and 'horizontal equivalent'
b) What are all the methods of contouring? Describe in brief.
c) Describe following processes in plane table survey with relative merits and demerits:
6. a) Orientation by magnetic needle and by back sighting.
b) What are the different accessories of plane table surveying?
7. Write short notes
 - a) Levelling staff
 - b) Compensating and cumulative error in chaining
 - c) Optical square
 - d) Fly levelling
 - e) Isogonic and agonic lines
8. the following consecutive reading were taken with a levelling instrument at interval of a 20m 2.375,1.730,0.615,3.450,2.835,2.070,1.835,0.985,0.435,1.630,2.255 and 3.630 m. The instrument was shifted after the fourth and eight reading. The last reading was taken on BM of RL 110.200m find the RL of point
9. a) What is closing error in a traverse? Describe with a sketch how such an error is adjusted.
b) What is bench mark?

10. A steel tape was exactly 30 m long at 20°C when supported throughout its length under a pull of 10 kg. A line was measured with this tape under a pull of 15 kg and at a mean temperature of 32°C and found to be 780 m long. The cross-section area of the tape = 0.03 m² and its weight = 0.693 kg. $\alpha = 11 \times 10^{-6}$ per °C and E for steel = 2.1×10^6 kg/cm². Compute the true length of the line if the tape was supported during the measurement
i) at every 30 m ii) at every 15 m
11. a) What is the trapezoidal rule? What is the consideration and limitation of this rule?
b) State Simpson's rule. What is the consideration and limitation of this rule?
12. The following are the bearings observed in traversing with a compass in an area where local attraction was suspected. Calculate the interior angles of the traverse and correct them if necessary.

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

13. The following particulars were noted while measuring the area of a figure with a planimeter.
- IR and FR were 8.652 and 6.798 respectively.
 - The tracing arm was set to the natural scale.
 - The zero of the dial passed the index mark once in the anticlockwise direction.
 - Constant $c = 20$
 - Scale of the map is 1 cm = 10 m
 - The anchor point was inside the figure
 - What is a planimeter?

PAPER NAME: BUILDING MATERIALS & CONSTRUCTION

PAPER CODE: CE-303

- Draw the successive courses of bricks in English bond for one brick wall, one and half brick thick wall, two brick wall, two and half brick wall.
- Define the following terms—header, stretcher, perpend, bat, queen closer.
- State the various ingredients present in cement with their percentages. Also explain the role of each ingredient.
- List the various types of walls along with description used in brick masonry.
- What is Portland slag cement and Portland pozzolana cement? Define the standard consistency and heat of hydration.
- What are acoustics? What are heat insulating materials? State its function.
- State the various sound absorbing materials with short description of each.
- What are the objects of plastering? What are the factors to be considered for selection of type of plaster?
- State the difference between lime and cement plaster. What are the remedies for plaster defects?

10. What is pointing? State the mortar used for pointing.
11. State the uses of lime. List the precautions to be taken for handling of lime.
12. What is softwood, hardwood, exogeneous tree and endogenous trees? Give example for each.

**B.TECH-5TH SEM
(CSE)**

PAPER NAME: ECONOMIC FOR ENGINEERING.

PAPER CODE : HU 501

1. What is depreciation? Explain various causes of depreciation. Discuss various depreciation methods.
2. What are the advantages and disadvantages of Net Present Value, Internal Rate of Return, Pay Back Period, Accounting Rate of Return and Profitability Index?
3. Explain decision making process in details. Discuss any one estimating model in details.
4. Discuss various causes and effects of inflation. Give short note on: (a) Life cycle costing, (b) Debt repayment, (c) Power sizing model of cost estimation.
5. The following details on the cash flows of two projects A and B.

Year	Project A cash flows (Rs.)	Project B 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 A and B and suggest which project should be accepted and why.

**SUB: DESIGN AND ANALYSIS OF ALGORITHM
PAPER CODE: CS 501**

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

2. Write the algorithm for Merge Sort.
3. Define P class, NP class, NP complete class and NP hard class of problems.
What is the relation between them?
4. Describe an algorithm for Greedy Knapsack.
5. What is greedy algorithm? Describe the concept of knapsack problem with the help of an example.
6. Write the steps of sorting the following numbers using radix sort.

342, 354, 897, 23, 134, 3456, 576, 876, 234, 98

7. Describe BFS with the help of an example.
8. Write short notes the followings
 - a) Recursion Tree
 - b) Heap creation Technique
9. Find the optimal parenthesization of a matrix-chain product whose sequence of dimension is $\langle 5, 10, 31, 2, 5, 50, 6 \rangle$

SUBJECT: MICROPROCESSOR & MICROCONTROLLER

PAPER CODE: CS 502

1. Draw and explain the minimum and maximum mode operation of 8086 microprocessor
2. Explain clearly the function of DAA instruction .
3. Draw and explain the block diagram of 8259 .
4. Write the difference between :-
 - a) RAM & ROM
 - b) SRAM & DRAM
5. Explain the flag register of 8085 & control word register of 8255.
6. Write a program that adds 16bit data .Store the result and carry in two different register pair.

PAPER NAME : DISCRETE MATHEMATICS

PAPER CODE: CS-503

Answer the following questions.

1. Prove that the Chromatic Polynomial is a polynomial.
2. Write down the perfect matching of K_6 .
3. Find the remainder when the sum $1!+2!+3!+ \dots +500!$ is divided by 12.
4. Draw the Hasse diagram for the partially ordered set $S = \{2, 3, 5, 30, 60, 120, 180, 360\}$ under the relation division. Hence find maximal, minimal, greatest and least element, if exists.

5. How many three digit number can be formed from the six digits 2, 3, 5, 6, 7 and 9 if repetitions are not permitted? How many of these are less than 400? How many of these are even?
6. The chromatic polynomial of a tree with n vertices is $x(x-1)^{n-1}$.
7. Prove that the congruence relation is an equivalence relation.

SUB: OBJECT ORIENTED PROGRAMMING WITH JAVA

PAPER CODE: CS-504D

1. What are literals in java? What is the difference between java and c++ in respect of language functions?
2. What is parametric and non-parametric constructor? Explain both with a suitable program.
3. What is string buffer class? Explain with a suitable program.
4. What is delegation model in java applet?
5. Discuss the differences between the following:
 - i) Throw and throws clause
 - ii) Abstract classes and interfaces
 - iii) Applet and application programming in java
 - iv) Method overloading and method overriding
 - v) Final and finally
6. What do you mean by exception? Write program to handle user defined exception. What do you mean by thread? What is runnable interface? Explain it through a program.
7. Write short notes on (any three)
 - a) Interface
 - b) Abstraction
 - c) Inheritance
 - d) Encapsulation
 - e) Virtual method table
8. What do you mean by parameter passing? What is call by value and call by reference? Write a down two programs to define call by value and call by reference.
9.
 - a) Discuss the role of the following methods in java:
 - i) Public void jain() throws interrupted exception
 - ii) Getdocumentbase()
 - iii) String int length()
 - iv) Boolean equals (string str)
 - b) Explain whether java supports multiple inheritance or not. What do you mean by JVM?
10. What is JVM? Explain the process of compilation and interpretation in JAVA.

B.TECH-5TH SEM

(ECE)

PAPER NAME:ECONOMIC FOR ENGINEERING.

PAPER CODE : HU 501

1. What is depreciation? Explain various causes of depreciation. Discuss various depreciation methods.
2. What are the advantages and disadvantages of Net Present Value, Internal Rate of Return, Pay Back Period, Accounting Rate of Return and Profitability Index?
3. Explain decision making process in details. Discuss any one estimating model in details.
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Compute PBP, NPV and PI for A and B and suggest which project should be accepted and why.

SUB: ANALOG COMMUNICATION

PAPER CODE: EC 501

1. Discuss different types of noise in communication systems.
2. Write short note- super heterodyne receiver
3. Discuss AM generation technique.
4. Discuss with block diagram TDM and FDM.
5. Discuss direct and indirect method of FM modulation.
6. Write short notes on
 - (i) VCO
 - (ii) PLL

SUBJECT: MICROPROCESSOR & MICROCONTROLLER

PAPER CODE: EC 502

1. Draw and explain the minimum and maximum mode operation of 8086 microprocessor
2. Explain clearly the function of DAA instruction .
3. Draw and explain the block diagram of 8259 .
4. Write the difference between :-
 - a) RAM & ROM

- d) SRAM & DRAM
5. Explain the flag register of 8085 & control word register of 8255.
6. Write a program that adds 16bit data .Store the result and carry in two different register pair.

SUBJECT: CONTROL SYSTEM

SUBJECT CODE: EC-503

1. Determine the stability of a system having following characteristics equation:
 $s^6+s^5+5s^4+3s^3+2s^2-4s-8=0$
2. Determine the stability of a system having following characteristics equation:
3. $s^4+3s^3+s^2-3s+2=0$
4. Determine the range of K for that the system will be stable
 $G(s)=K/[s\{s(s+10)+T\}]$
5. Sketch the root locus plot for the open loop transfer function of a unity feedback control system given by

$$G(s)H(s) = \frac{k}{s(s+1)(s+3)}$$
 - a) Determine the value of k for the damping ratio $\xi = 0.5$.
 - b) Determine the value of k for marginal stability.
 - c) Find the frequency of sustained oscillation at marginal stability condition
6. Write short notes on the following
 - a) AC servomotor
 - b) Routh-Hurwitz criterion for determination of stability of a system
 - c) Necessity of PID control

SUB: DATA STRUCTURE & C

PAPER CODE: EC504B

1. Insert the following keys into a AVL tree.
 64, 1, 44, 26,13,110,89,85,20
 Then delete the following keys. 85, 1
2. Explain DFS with suitable example
3. Define the following: Connected graph, Tree, linked list.
4. Write the algorithm for binary search.
5. Convert the following infix to postfix expression using Stack
 $4+3*10/6+7-4/2+5^3$
6. Construct a tree from following
 INORDER: D B F E A G C L J H K
 POSTORDER: D F E B G L J K H C A
7. Explain the tower of Hanoi problem of recursion of 3 peg and 3 disks
8. Show the stages in growth of a 4 order B-tree when the following keys are inserted in the given order.

 74, 72, 19,84 , 51, 10, 35, 18, 60, 76, 58, 19, 45.
9. What is asymptotic notation? Define different notation associated with complexity.
10. Write the algorithm for Merge Sort.

B.TECH-5TH SEM

(EE)

PAPER NAME:ECONOMIC FOR ENGINEERING.

PAPER CODE : HU 501

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Compute PBP, NPV and PI for A and B and suggest which project should be accepted and why.

SUB: ELECTRICAL MACHINE-II

PAPER CODE: EE-501

- (1) Why single phase induction motor does not have the starting torque?
- (2) Describe the construction and working principle of shaded pole motor
- (3) Explain the double revolving field theory?
- (4) Why a universal motor is called universal?
- (5) Write short notes on:
 - a) Capacitor start capacitor run induction machine
 - b) Split phase motor
- (6) find out the equivalent circuit of a single phase induction machine based on two revolving field theory?

SUBJECT: ELECTRICAL POWER SYSTEM-1
PAPER CODE: EE- 502

1. Define corona. What are the different factors affecting corona? What are the advantages and disadvantages of corona?
2. Discuss the advantages of high voltage transmission.
3. How is transmission lines classified? Define regulation of a transmission line.
4. What is Ferranti effect? Explain with phasor diagram.
5. What is tariff? What are the desirable characteristics of tariff? Discuss in details the different types of tariff.
6. Write short notes on followings:
 - (a) Diesel power plant
 - (b) Skin effect and bundle conductor
 - (c) Methods of improving string efficiency
 - (d) Nominal T-method

SUBJECT: CONTROL SYSTEM-I
SUBJECT CODE: EE-503

1. Determine the stability of a system having following characteristics equation:
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2. Determine the stability of a system having following characteristics equation:
 $s^4+3s^3+s^2-3s+2=0$
3. Determine the range of K for that the system will be stable
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4. Sketch the root locus plot for the open loop transfer function of a unity feedback control system given by
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 - a) Determine the value of k for the damping ratio $\xi = 0.5$.
 - b) Determine the value of k for marginal stability.
 - c) Find the frequency of sustained oscillation at marginal stability condition
5. Write short notes on the following
 - d) AC servomotor
 - e) Routh-Hurwitz criterion for determination of stability of a system
 - f) Necessity of PID control

SUBJECT: MICROPROCESSOR & MICROCONTROLLER
PAPER CODE: EE 504C

1. Draw and explain the minimum and maximum mode operation of 8086 microprocessor

2. Explain clearly the function of DAA instruction .
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4. Write the difference between :-
 - e) RAM & ROM
 - f) SRAM & DRAM
5. Explain the flag register of 8085 & control word register of 8255.
6. Write a program that adds 16bit data .Store the result and carry in two different register pair.

B.TECH-5TH SEM (EEE)

PAPER NAME:ECONOMIC FOR ENGINEERING. PAPER CODE : HU 501

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Compute PBP, NPV and PI for A and B and suggest which project should be accepted and why.

SUB: ELECTRICAL MACHINE-II PAPER CODE: EEE-501

- (1) Why single phase induction motor does not have the starting torque?
- (2) Describe the construction and working principle of shaded pole motor

- (3) Explain the double revolving field theory?
- (4) Why a universal motor is called universal?
- (5) Write short notes on:
 - a) Capacitor start capacitor run induction machine
 - b) Split phase motor
- (6) find out the equivalent circuit of a single phase induction machine based on two revolving field theory?

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1. Define corona. What are the different factors affecting corona? What are the advantages and disadvantages of corona?
2. Discuss the advantages of high voltage transmission.
3. How is transmission lines classified? Define regulation of a transmission line.
4. What is Ferranti effect? Explain with phasor diagram.
5. What is tariff? What are the desirable characteristics of tariff? Discuss in details the different types of tariff.
6. Write short notes on followings:
 - (e) Diesel power plant
 - (f) Skin effect and bundle conductor
 - (g) Methods of improving string efficiency
 - (h) Nominal T-method

SUB: DIGITAL SIGNAL PROCESSING

PAPER CODE: EEE503

1. Prove that an LTI system is BIBO stable if the ROC of system function includes the unit circle.

2. Find the Z-transform and ROC of the signal,

$$x(n) = \left(\frac{1}{3}\right)^{n-2} u(n-1)$$

3. Find linear convolution of following two sequence using Overlap-save method

$$x(n) = \{1, -1, -1, 2, -2, -2, 3, -1, 2, 1, 2\} \text{ and } h(n) = \{1, 2, 1\}.$$

4. Determine the convolution , $X(n)=\{1,2,\underline{3},0,5\}$; $h(n)=\{1,\underline{2},1,2,1\}$

5. a) What is zero padding? What are its uses?

b) What is the sufficient condition for the existences of DTFT?

SUBJECT: MICROPROCESSOR & MICROCONTROLLER

PAPER CODE: EEE 504C

1. Draw and explain the minimum and maximum mode operation of 8086 microprocessor
2. Explain clearly the function of DAA instruction .
3. Draw and explain the block diagram of 8259 .

4. Write the difference between :-
 - g) RAM & ROM
 - h) SRAM & DRAM
5. Explain the flag register of 8085 & control word register of 8255.
6. Write a program that adds 16bit data .Store the result and carry in two different register pair.

B.TECH-5TH SEM

(CE)

PAPER NAME:ECONOMIC FOR ENGINEERING.

PAPER CODE : HU 501

1. What is depreciation? Explain various causes of depreciation. Discuss various depreciation methods.
2. What are the advantages and disadvantages of Net Present Value, Internal Rate of Return, Pay Back Period, Accounting Rate of Return and Profitability Index?
3. Explain decision making process in details. Discuss any one estimating model in details.
4. Discuss various causes and effects of inflation. Give short note on: (a) Life cycle costing, (b) Debt repayment, (c) Power sizing model of cost estimation.
5. The following details on the cash flows of two projects A and B.

Year	Project A cash flows (Rs.)	Project B 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 A and B and suggest which project should be accepted and why.

PAPER NAME: FOUNDATION ENGINEERING

PAPER CODE:CE-501

1. A 6m high vertical wall supports a saturated cohesive backfill ($\phi_u=0$) with horizontal surface. The top 3m of the backfill weighs 18kn/m^3 .the bulk unit weight and apparent cohesion of the bottom 3m of the backfill are respectively 20kn/m^3 and 24kn/m^3 .what is the likely depth of tension cracks behind the wall? If tension cracks develop, what will be the total active pressure? Draw the pressure distribution diagram and determine the point of application of the resultant pressure.

2. What are the assumptions of Rankin's theory? Derive the expression of earth pressure for dry or moist backfill with no surcharge. (Active earth pressure, Rankin's theory)
3. Explain the concept of plastic equilibrium of soils and also draw the active and passive states of earth pressure using Mohr's stress circle.
4. What is the effect of water table on bearing capacity?
5. What are the characteristics of general, local and punching shear failure?
6. A square footing 2.5m by 2.5m is built in a homogeneous bed of sand of unit weight 20kn/m^3 and having an angle of shearing resistance of 36° . the depth of the base of footing is 1.5m below the ground surface. Calculate the safe load that can be carried by a footing with a factor of safety 3 against complete shear failure. Use terzaghi's analysis.
7. What is pile driving? What are the different types of hammers used in pile driving?
8. Design a friction pile group to carry a load of 3000kn including the weight of the pile cap at a site where the soil is uniform clay to a depth of 20m, underlain by rock. Average unconfined compressive strength of the clay is 70kn/m^2 . the clay may be assumed to be of normal sensitivity and normally loaded, with liquid limit 60%. a factor of safety of 3 is required against shear failure.
9. Describe plate load test.
10. What is site investigation and soil exploration? List the different types of boring methods.

PAPER NAME: DESIGN OF RC STRUCTURE

PAPER CODE:CE-502

1. Write the assumptions taken in limit state design collapse for flexure. Differentiate between working stress and limit state method.
2. What is moment of resistance? Find the moment of resistance of a beam 250x500 mm effective, reinforced on tension side with four 20mm \varnothing bars. Assume concrete M15 and mild steel.
3. An R.C.C. beam is constructed with M15 grade concrete and mild steel. The size of the beam is 250x 450mm effective. If it is subjected to a factored moment of 50 KN-m. Find the area of steel required.
4. A doubly reinforced beam 250x 600mm overall has to resist a factored moment of 210 KN-m. Find amount of steel required on compression and tension side, if cover on the both sides is 50mm. Concrete M15 and mild steel.
5. Design a RCC slab of dimension 4 m \times 5 m whose adjacent edges are continuous and remaining two edges are discontinuous, against a live load of 3.5 KN/m² M20 concrete and Fe 415 grade steel should be used. Apply 'Limit state method of design' as per IS 456.
6. Design a square footing of a column of size 300 mm \times 300 mm carrying an axial compressive force. The footing will be placed on a soil having bearing capacity of 120 KN/m². Use M20 concrete and Fe415 grade steel. Apply 'Limit state method of design' as per IS 456.
7. Calculate the load carrying capacity of a RCC column of dimension 250 \times 400 reinforced with 8 nos 16 Fe415 HYSD bars. Effective length of the column = 5m. Apply 'Limit state method of design' as per IS 456.
8. Find M_u of a T beam with the following data. $b_f=1250\text{mm}$, $D_f=100\text{mm}$, $b_w=250\text{mm}$, $d=650\text{mm}$, $A_{st}= 2800\text{mm}^2$, $f_y=415\text{ N/mm}^2$, $f_{ck}= 20\text{ N/mm}^2$.
9. A beam 300x1010mm effective has a span of 7m. Total load on the beam is 45KN/m. Tensile steel is 6-22mm \varnothing bars. If concrete M15 and mild steel are used. Design shears reinforcement.

10. What is anchorage length? A S.S.B is 25x50 cm and has 2-20mm TOR bars going into the support. If the S.F at the centre of support is 110KN at working loads, determine the anchorage length. Assume M20 mix and Fe 415 grade TOR steel.
11. Design a column footing with the following data. Load on column=1600 KN, column size=500x500mm, bearing capacity of soil= 300 KN/m². Concrete M20 and steel Fe 415.

PAPER NAME: CONCRETE TECHNOLOGY

PAPER CODE:CE-503

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

PAPER NAME:ENGINEERING GEOLOGY

PAPER CODE:CE-504

1. What do you mean by river erosion and river sedimentation?
2. What are folds, faults and joints?
3. What are earthquakes? Define focus and epicentre related to earthquake.
4. How the sedimentary rocks are formed?
5. Explain the various physical properties of minerals.
6. What is geology? State its importance in civil engineering.
7. Explain the engineering considerations of faults and joints.
8. State the engineering properties of rocks.
9. What are landslides? What are the measures to prevent it?
10. What are the factors on which forms of igneous rocks depend? What are sills and dykes?

B.TECH-5TH SEM

(ME)

PAPER NAME:-PRINCIPLES OF MANAGEMENT

PAPER CODE : HU511

1. Describe in details the various training methods? How does training differ from development?

2. Write short note on: (a) New Product Development, (b) Six Sigma, (c) TQM, (d) Brand Management.
3. How Marketing Research can make an impact on firm's betterment? Explain various functions of Marketing.
4. State the managerial grid as developed by Blake and Mouton. How is behavioral theory on leadership different from contingency theory of leadership? Briefly discuss any one contingency theory of leadership.
5. Define working capital. State its importance. Explain the factors that influence working capital of a firm. Discuss different Finance functions.

PAPER NAME: DYNAMICS OF MACHINES

PAPER CODE: ME-501

1. Calculate the whirling speed of a shaft 20mm diameter & 0.6m long carrying a mass of 1 kg at its mid point. The density of shaft material is 40Mg/m^3 young's modulus of elasticity is 200Gpa. Assume the shaft to be freely supported.
2. What are the difference between flywheel and governor? What is the sensitiveness of governor?
3. The torque developed by an engine is given by the following equation:

$$T = 20250 + 4200 \sin 2\alpha - 2500 \cos 2\alpha$$
 Where T is the torque in N-m and α is the crank angle from the inner dead centre position. The resisting torque of the machine is constant throughout the work cycle. The coefficient of speed fluctuation is 0.03. The engine speed is 350 rpm. A solid circular steel disk, 60 mm thick, is used as a flywheel. The mass density of steel is 7800 kg/m^3 . Calculate the radius of flywheel disk.
4. A punching machine carries out 8 holes per min. Each holes of 45 mm diameter in 35 mm thick plate requires 15 Nm of energy/ mm^2 of the seared area. The punch has a stroke of 85mm. Find the power of the motor required if the mean speed of the flywheel is 20 m/s. If total function speed is not exit 2.83% of the mean speed. Determine the mass of the flywheel.
5. The arms of a Hartnell governor are of equal length. When the sleeve is in the mid position, the masses rotated in a circle with a diameter of 300 mm (the arms are vertical in the mid position) . Neglecting friction, the equilibrium speed for this position each 400 rpm. Maximum variation of speed taking friction into account, is to be 2.5% of the mid position speed or a maximum sleeve movement of 30 mm. The sleeve mass is 4 kg and the friction at the sleeve 35N. Assuming that the power of the governor is sufficient to over cum the friction by 1.5% change of speed on each side of the mid position, find (neglecting obliquity effect of arms), the
 - I. Mass of each rotating ball
 - II. Spring stiffness
 - III. Initial compression of spring.
6. Describe Hartnell governor function and deduce a relation to find the stiffness of spring.
7. Show that the ratio of successive amplitudes of oscillations is constant in damped vibratory system.
8. What do you mean by whirling of shafts? Explain critical speed.
9. Explain in what way the gyroscopic couple affects the motion of an aircraft while taking a turn.

10. A small turbine rotor & its shaft are equivalent to a shaft of 200 cm long & 20 cm dia. It carries three discs weighing 200kg, 350kg, & 475kg at 35cm, 43cm & 60cm from left end bearing. The total deflection under the loads are found to be 0.022cm, 0.015cm & 0.013cm respectively. Neglect the weight of the shaft, determine the critical speed by energy method & compare it with the Dunkerley's method.
11. Establish an expression for the natural frequency of free transverse vibrations for a simply supported beam carrying a number of point loads, by
 a) energy method ;
 b) Dunkerley's method
12. A weight of 40 kg suspended from a spring produces a statical deflection of 1.2 cm & when in motion it experiences a viscous damping force with value of 20 kg at a velocity of 25 cm/s. calculate the periodic time of Damped vibration. If the weight is then subjected to a periodic disturbing force having a maximum value of 25 kg & making 2 cycles/s, find the amplitude of ultimate motion.
13. Define magnification factor. Deduce an expression for the magnification factor. What do you understand by over damped, under damped & critical damped vibration.

PAPER NAME: HEAT TRANSFER
PAPER CODE: ME 502

List of Question

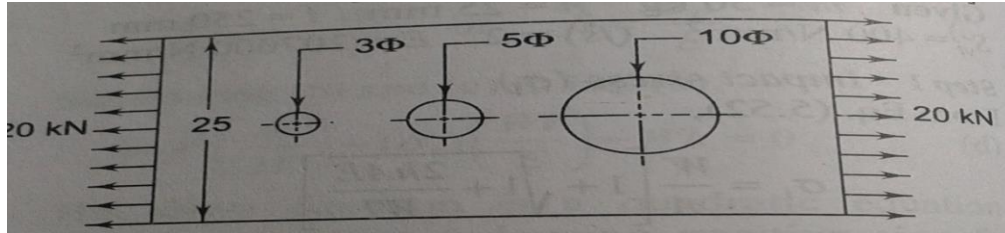
- 1) Derive 1-D equation and also write expression for 2-D and 3-D equation.
- 2) Explain Critical thickness of insulation and derive with neat sketch.
- 3) Explain the Fourier's law for Isotropic materials.
- 4) Define Radiation and law of Radiation.
- 5) Explain Emissive Power, intensity of radiation, irradiation, and radiosity in detail and if necessary derive its expression.
- 6) Explain the Concept of Black and Gray Bodies for the case of Radiation.
- 7) Define Heat Exchanger and its types of heat exchanger with neat sketch.
- 8) Explain Newton's law of cooling and also its significance of heat transfer coefficient.
- 9) Explain natural and Forced Convection with valid example.
- 10) What advantage does the effectiveness of NTU method have over the LMDT method?
- 11) What is the physical significance of thermal diffusivity of a metal?
- 12) Explain the Fourier's law for Isotropic materials.
- 13) Consider a slab of thickness $L=0.25$ m. One surface is kept at 100° C and the other surface at 10° C. Determine the net flux across the slab, if the slab is made from copper. Thermal conductivity of copper may be taken as 387.6 W/m K.
- 14) Explain the modes of heat Transfer.
- 15) One end of a long rod is inserted into a furnace while the other projects into ambient air. Under steady state the temperature of the rod is measured at two points 75 mm apart and found to be 125° C and 88.5° C, respectively, while the ambient temperature is 20° C. If the rod is 25 mm in diameter and h is 23.36 W/m² K. find the thermal conductivity of the rod material.

- 16) If A is thin and long tip loss is negligible, show that the heat transfer from the fin given by $Q = m k A \theta \tanh(ml)$, where $m = (hp/kA)^{1/2}$

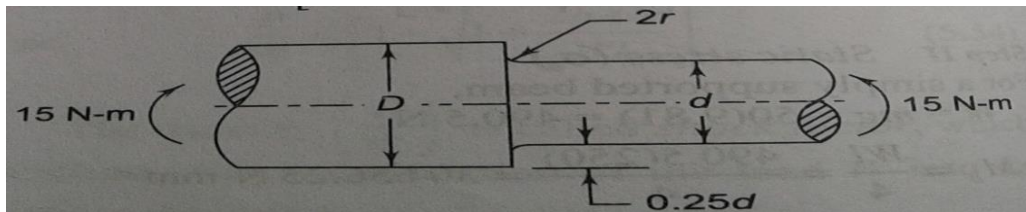
PAPER NAME: DESIGN OF MACHINE ELEMENTS

PAPER CODE: ME 503

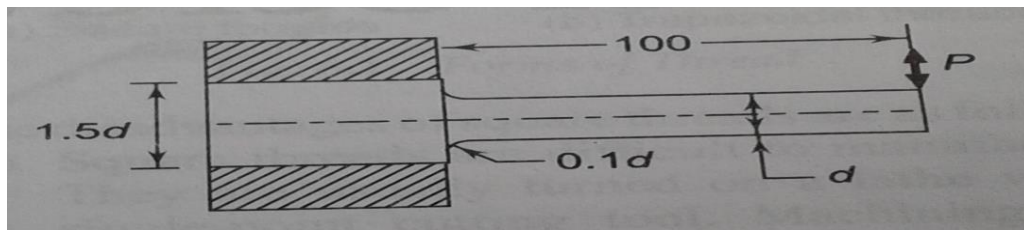
1. A rectangular plate 15 mm thick made of brittle material shown in figure Calculate the stresses at each three holes of 3,5 and 10 mm diameter.



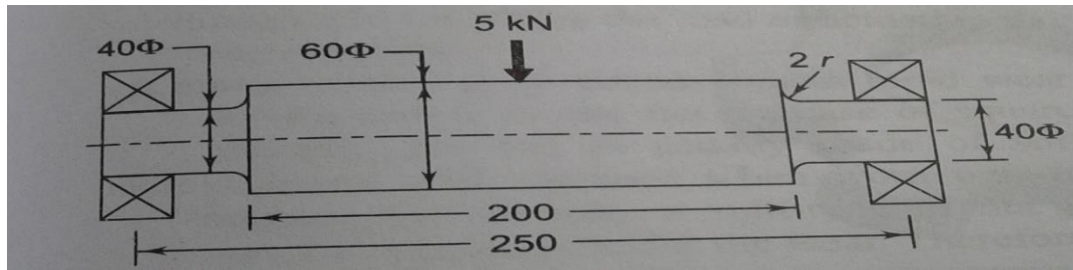
2. A round shaft made of brittle material and subjected to a bending moment of 15N-m is shown in figure . The stress concentration factor is 1.5 and the ultimate tensile strength of the shaft material is 200 N/mm² . Determine the diameter d , the magnitude of stress at the fillet and the factor of safety .



3. A cantilever beam made of steel Fe 540 ($S_{ut} = 540 \text{ N/mm}^2$ and $S_{yt} = 320 \text{ N/mm}^2$) and subject to a completely reversed load (P) of 5 kN is shown in Fig. The beam is machined and the reliability is 50%. The factor of safety is 2 and the notch sensitivity factor is 0.9. Calculate
- Endurance limit at the fillet section
 - Diameter d of the beam for infinite life.

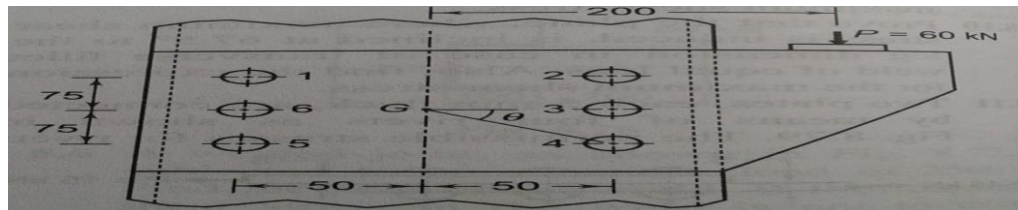


4. A hot rolled steel rod subjected to a torsional load that will vary from -100 kN to +400 kN-m. Determine the diameter of rod using factor safety 1.75 for the material of the rod, take $S_{ut} = 489 \text{ Mpa}$, $S_{yp} = 315 \text{ Mpa}$, surface finish factor 0.68, size factor 0.85, reliability factor 0.6, modifying factor 1.
5. A protected type coupling is used to transmit 15kW at 200 r.p.m. The design torque is 125% of the rate torque. The shafts keys & bolts are made of plain carbon steel 40C8, $S_{yt} = 380 \text{ Mpa}$ & the factor of safety 5. The yield strength in compression can be taken as 150% of the tensile yield strength. The flange are made of cast iron of 200 Mpa and the factor safety is 6. The key is have square cross section. Design the coupling.
6. It is required to select to flat belt drive for a compressor running at 780 r.p.m. which given a 25 kW, 1440 r.p.m. motor, centre distance between the pulley is 3m. The belt is open drive the load correction factor is 1.3, arc correction factor is 1.09. Dunlop high-speed belt rate is 0.0118 kW/mm width ply at 5.08 m/s belt velocity given the belt specification.
7. A shaft carrying a load 5 kN midway between two bearing shown in figure. Determine the maximum bending stress at the fillet section. Assume shaft material to be brittle.

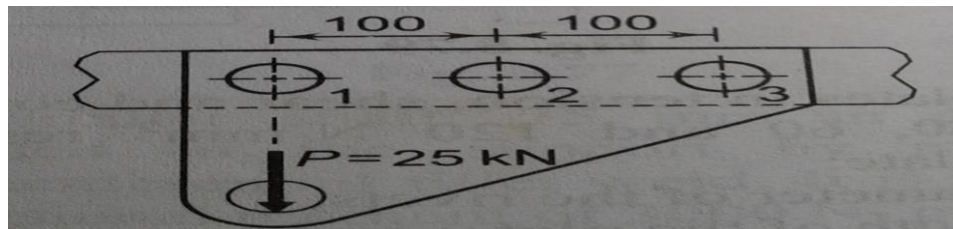


8. A bracket is attached to a vertical column by means of six identical rivets as shown in figure. It is subjected to an eccentric force of 60 kN at a distance of 200 mm from the centre of the column. The maximum permissible shear stress for the rivets is 150 N/mm^2 .

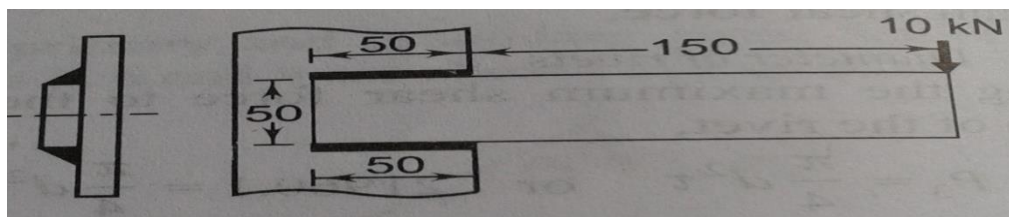
- i) Which rivet subjected to maximum shear force?
- ii) What is the magnitude of maximum force?
- iii) Determine the diameter of rivet.



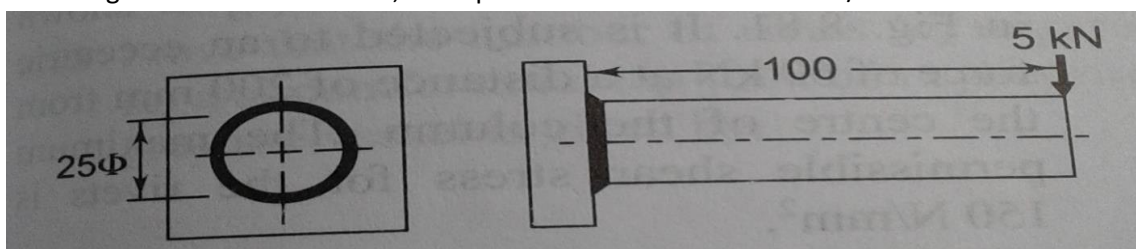
9. A bracket is attached to a horizontal column by means of three identical rivets as shown in figure. The maximum permissible shear stress for the rivets is 60 N/mm^2 .



10. A welded connection of steel plates, as shown in figure is subjected to an eccentric force of 10 kN. Determine the throat dimension of the welds, if the permissible shear stress is limited to 95 N/mm^2 . Assume static condition.



11. A solid circular beam, 25 mm in diameter, is welded to a support by means of a fillet weld as shown in figure. Determine the leg dimension of the weld, if the permissible shear stress is 95 N/mm^2 .



PAPER NAME : METROLOGY AND MEASUREMENT

PAPER CODE : ME-504

1. Distinguish between controllable error and random error
2. Explain piezo-electric crystal type microphone with suitable diagram.
3. Explain with neat sketch the construction and principle of working of a LVDT.
4. 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.
5. Show that the gauge factor F of a resistance strain gauge is given by
$$F = 1 + 2\mu + \{(\delta\rho/\rho)/(\delta L/L)\}$$
Where μ is Poisson's ratio, ρ is the resistivity of the material of wire of strain gauge, and L is the length of the wire.
6. What is comparator? Explain its used and essential parts.
7. A strain gauge is bonded to a beam which is 12cm long and has a cross sectional area of 3.8cm^2 . The unstrained resistance and gauge factor are 220Ω and 2.2 respectively. On the application of load the resistance of the gauge change by 0.015Ω . If the modulus of elasticity for steel is 207GN/m^2 . Calculate
 - i. The change in length of the steel beam.
 - ii. The amount of applied force to the beam.
8. What do you mean by MML and LML?
9. A 200mm sine bar is to set to an angle of $32^\circ 5' 6''$. Find the length of gauge block required using any appropriate set of gauge block.
10. What is comparator? Explain its use and essential parts
11. The following 10 observations in degree Celsius were recorded when measuring a temperature 41.7, 42.0, 41.8, 42.00, 42.1, 41.9, 42.0, 41.9, 42.5, and 41.8. Calculate (a) arithmetic mean, (b) standard deviations, (c) probable error of one reading, (d) probable error of mean, (e) range
 - i. Differentiate between the "Threshold" and "Resolution" giving suitable examples.
 - ii. What is drift? Explain different types of drifts with sketches of input-output relationships in case.
12. Draw block diagram of a closed loop system. Give an example of closed loop system. What are the advantages and disadvantages of closed loop system?

PAPER NAME: ELECTRICAL MACHINES

PAPER CODE: ME505A

- (1) Write down the similarities and dissimilarities between a transformer and three phase Induction motor.
 - (2) Develop the equivalent circuit of a 3 phase Induction motor.
 - (3) Explain the necessity of starter in Dc motor and describe three point starter with a neat sketch.
 - (4) Explain briefly Hopkinton test for determination of efficiency of Dc shunt machine. What are the main advantages and limitation of this test?
 - (5) Derive the emf equation of dc generator, what is back emf?
 - (6) Explain the function of commutator in a Dc machine
-

B.TECH-7TH SEM

(CSE)

PAPER NAME: SOFTWARE ENGINEERING

PAPER CODE: CS701

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

PAPER NAME: COMPILER DESIGN

PAPER CODE: CS702

1. Describe about Cross compiler with example.
2. How the following statement is translated via the different phases of compilation? Explain.
$$\text{MOTION} = \text{DISTANCE} + \text{RATE} * \text{DISPLACEMENT} + 70.$$
3. What is an operator precedence parser? List the advantages and disadvantages of operator precedence parser.
4. What do you mean by Thomson Construction? Explain with an example.
5. What is type checking? Differentiate between Dynamic and Static type checking.
6. Translate the arithmetic expression $a * - (b + c)$
 - i) Postfix notation
 - ii) Syntax tree
7. What is Ambiguous Grammar?
8. Make a comparison between Predictive and Shift Reduce Parser.
9. Describe Issues in the design of a code generator.
10. Describe Context – free grammar.

PAPER NAME: ARTIFICIAL INTELLIGENCE

PAPER CODE: CS703C

1. Describe 15-puzzle algorithm.
2. Describe 8-puzzle algorithm using BFS.
3. Describe 8-puzzle algorithm using DFS.
4. Short note: Tic-Tac-Toe.
6. What is AI? Describe with example.
7. Solve 8-Queen problem. How many distinct and unique cases are there? Give comparison of Propagation Techniques.
8. Convert the following English statements to statements in first order logic :

- i) Every boy or girls is a child
 - ii) Every child gets a doll or a train or a lump of coal
 - iii) No boy gets any doll.
 - iv) No child who is good gets any lump of coal.
 - v) Jack is a boy.
9. Write A* algorithm.
10. Compare the depth-first search and breadth-first search algorithms by writing out their advantage and disadvantages.

PAPER NAME: DISTRIBUTED OPERATING SYSTEM
PAPER CODE: CS704A

- 1) What is distributed operating system?
- 2) Explain about Distributed file system.
- 3) What is replication? Describe Quorum algorithm.
- 4) Explain location transparency and name resolution in DFS.
- 5) Explain Suzuki-Kasami's broadcast algorithm.
- 6) Explain Bully algorithm and discuss the message complexity of this algorithm.
- 7) Explain desirable features of a good message passing system.
- 8) Compare between stateful and stateless servers in VFS.
- 9) Compare between path pushing and edge chasing algorithm?
- 10) Write short note on RPC?

PAPER NAME: INTERNET TECHNOLOGY
PAPER CODE: CSE 705A

- 1) What is the meaning of HTTP in World Wide Web environment?
- 2) Compare between SAX and DOM?
- 3) What are the differences between static mapping and dynamic mapping?
- 4) Explain the life cycle of java applet.
- 5) Differentiate between virus and worm?
- 6) Explain about Digital Signature.
- 7) Explain about Proxy firewall.
- 8) Compare between OSPF and RIP.
- 9) What is packet switching?
- 10) Discuss basic principle of security. Explain active attack and passive attack?

B.TECH-7TH SEM

(ECE)

PAPER NAME: WIRELESS COMMUNICATION AND NETWORKS

PAPER CODE: EC-701

1. Write short notes on wireless communication
2. Write the difference between GSM and CDMA .
3. What is cordless telephony system ?
4. What is the Evolution strategies – First Generation (1G) to Fourth Generation ?
5. Write short notes on the following :
 - a) Transponder and polarization hopping
 - b) Forward and reverse link in CDMA based IS-95 system.
 - c) Noise sources in optical fibre communication
 - d) UMTS architecture.
 - e) Role played by VLR, HLR and AUC during call setup.

PAPER NAME: MICROELECTRONICS AND VLSI DESIGN

PAPERCODE: EC 702

1. Draw operation of NAND Gate (2 input) using CMOS logic.
2. Draw and explain the operation of MOS capacitor with different voltage.
3. State the fabrication steps.
4. What is Moor's law?
5. Write Short notes on
 - (i) Eching
 - (ii) Lithography .

PAPER NAME: COMPUTER NETWORK

PAPER CODE: EC703C

1. Write down the differences between OSI and TCP/IP model.
2. Write the functions of the followings:
 - i)Router
 - ii)Repeater
 - iii)Bridge
3. Briefly explain CSMA/CD
4. Write down the difference between TCP and UDP.
5. Name the flow control mechanism of transport layer protocol. Explain leaky –bucket protocol.
6. What is burst error? What is bit stuffing? What do mean by piggy backing? Given a 10 bit Sequence of 1101110101 and a divisor of 1011. Find the CRC code. What are advantages of IPV6 over IPV4?
7. a. What is pure ALOHA & Slotted ALOHA? Define it with example.
b. Explain CSMA/CA & CSMA/CD.

- c. Features of IPv6 in the context of advanced communication networks.
- 8. a. Compare TCP with UDP.
 - b. Describe Quality of Service (QoS)
 - c. Discuss the methods of closed loop congestion control.
 - d. Compare circuit switching with packet switching.
- 9. How selective repeat ARQ will work for lost frame? In GO BACK-N ARQ show why the window size should be $< 2^m$. Compare bit stuffing with byte stuffing with an example. Find NRZ-I, Manchester and Differential Manchester encoding for the binary data 111001000
- 10. Write short notes on the following
 - a. ARP packet format
 - b. Firewall
 - c. Sliding window protocol
 - d. HDLC frame format
 - e. HTTP

PAPER NAME: RADAR ENGINEERING.

PAPER CODE: EC 704A

1. Derive simple form of radar range equation.
2. what do you mean by blind speed? Physically explain with suitable diagram how staggered PRF increases the first occurrence of blind speed.
3. What do you mean by radar clutter and explain the different types of clutter?
4. Draw and explain the basic block diagram of radar with both transmitter and receiver section
5. Compare MTI radar and Doppler radar.
6. Compare TWT amplifier with klystron amplifier.

PAPER NAME: DATA BASE MANAGEMENT SYSTEM

PAPER CODE: EC705C

1. Discuss that foreign key provides referential integrity of the Database system.
2. Consider a BANK database having customer, loan, account, employee and branch as entity types. Each bank 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.
3. How hierarchical and Network data model differ from relational model? Explain with an example
4. Discuss the usefulness of ACID properties to ensure integrity during transaction process.
5. Mention the advantages of use of Database Management System over the use of simple file based system for an software based organization.
6. Write short notes on any three:
 - a) Triggers.
 - b) Referential Integrity.
 - c) Audit Trails.
 - d) Armstrong's axioms.
7.
 - a). Briefly describe the 3-layer architecture of DBMS
 - b) Write the importance of data independency.

8.
 - a) Explain how table and relation structure can be altered by SQL statement.
 - b) Why we need foreign key? Discuss the foreign key provides referential integrity of the Database system.
9.
 - a) Describe the major components of Entity-Relationship diagram.
 - b) What do you mean by Weak Entity Set in E-R diagram?
 - c) What is composite attribute?
10.
 - a) Define deadlock and live lock in database operation. How deadlock is different from live lock?
 - b) Mention different techniques that are used for deadlock detection and recovery?
 - c) Define multi-value functional dependency and define 4NF.

B.TECH-7TH SEM

(CE)

PAPER NAME: ENVIRONMENTAL ENGINEERING

PAPER CODE: CE-701

1. What do you mean by water demand? What are the factors affecting demand?
2. What are the primary and secondary methods for treatment of the wastewater?
3. Define the following terms-aeration, plain sedimentation, filtration and disinfection.
4. List the procedure for hydraulic design of sewers.
5. What are the physical and biological characteristics of waste water?
6. What is DO, BOD & COD? State the difference between BOD & COD.
7. What is activated sludge process for treatment of waste water?
8. What are the different sources of water?
9. List the impurities present in water. What are the various processes adopted for removing those impurities?
10. What are nomograms? What are the standards for potable water?

PAPER NAME: WATER RESOURCES ENGINEERING

PAPER CODE: CE-702

1. What is duty, delta, and crop period?
2. What is canal irrigation? State the classification of canals.
3. State the design procedure of unlined alluvial channels by Kennedy's method.
4. What are the advantages and disadvantages of canal lining?
5. What are hydrographs? State the characteristics of a hydrograph.
6. What is runoff? State the rainfall-runoff relationship.
7. What are the factors affecting duty? What are the measures for improving duty?
8. List the causes, effects, preventive methods for water logging.
9. State Darcy's law. What is open well and tube well?
10. What are the direct and indirect methods of stream flow measurement?

**PAPER NAME: ADVANCED HIGHWAY & TRANSPORTATION
ENGINEERING**

PAPER CODE: CE-703C

1. What do you mean by apron, runways, taxiways and terminal buildings related to airport?

2. What are the purposes of providing a railway station?
3. What are the requirements of a passenger station yard?
4. What do you mean by rotaries and channelization? Describe the role of each.
5. What are the elements of urban transport planning?
6. What are flag station, crossing station, junction station and terminal station?
7. State the classification of signalling system in railways?
8. What is interlocking? What are the essentials of interlocking?

PAPER NAME: HYDRAULIC STRUCTURES

PAPER CODE: CE-704B

1. What is the difference between weir and barrage? List the different types of weirs.
2. What are the different types of canal falls? Describe in brief.
3. What are the factors governing the selection of a type of dam?
4. How will you determine the line of seepage or phreatic line in a earthen dam?
5. State the various types of forces acting in a gravity dam with neat sketch.
6. Explain the concept of principal and shear stresses acting on a dam.
7. What is the necessity of cross drainage works? What are its types?
8. What are the causes of failure of weirs on permeable foundation and what are the remedies for it?

PAPER NAME:ENGINEERING MATERIALS

PAPER CODE:(CE705A)

1. What is heat treatment, purpose of heat treatment?
2. Explain annealing, normalizing, hardening tempering with purpose.
3. Draw iron carbon diagram and mentioned salient point.
4. What is hardening quenching, ductility toughness, and brittleness.
5. Effects of silicon, sulphur and phosphorous on plain carbon steel.
6. Define a unit cell of a space lattice. What lattice constants define a unit cell?
7. Calculate the atomic packing factor for the FCC structure
8. What is composite, describe about polymers matrix and their applications.
9. Describe metal matrix and ceramic matrix composites, with their properties and application.
10. How polymer is made by polymerization.

B.TECH-7TH SEM

(EE)

PAPER NAME: ELECTRIC DRIVES

PAPER CODE: EE 701

- (1) What are the different advantages of electrical drives?
What are the equivalent value of drive parameter for loads with rotational and translation motion?

- (2) What are the different types of braking of D.C. motor, Induction motor and synchronous motor?
Also determine the energy loss during breaking.
- (3) Explain the 1-phase, 3-phase fully controlled and half controlled D.C. drives.
- (4) Explain the Voltage Source Inverter fed Synchronous motor drive.
- (5) Write short note on the followings:
- (a) Stepper motor drive.
 - (b) Switched Reluctance motor drive.

PAPER NAME: UTILIZATION OF ELECTRIC POWER
PAPER CODE: EE 702

1. State and explain laws of illumination.
2. What do you understand polar curve? How is it useful to an illumination engineer?
3. What are the different types of heating? Discuss any one.
4. With the help of circuit diagrams explain the working of the following light sources.
 - i) High pressure mercury vapour lamp
 - ii) Fluorescent tube
 - iii) Carbon arc lamp
5. Explain with a neat diagram the principle of operation of a sodium vapour lamp. Mention its use.
6. Write a short notes on the following:
 - a) Resistance Oven
 - b) Arc Furnaces
 - c) Coreless Induction Furnace
 - d) Induction Heating
 - e) Dielectric Heating
 - f) Application of Dielectric Heating

PAPER NAME: POWER SYSTEM-III
PAPER CODE: EE 703A

1. What do you mean by FACTS? What are its advantages?
2. Briefly describe different series and shunt connected FACTS controllers for power system.
3. Write short notes on SVC and STATCOM.
4. Why is it necessary to consider the transmission loss in optimum scheduling?
5. What are the different environmental aspects on power generation?
6. Write short notes on any three of the following:

- i) AVR with modern excitation system of the alternator
- ii) Pumped storage plants
- iii) Unit commitment

PAPER NAME: POWER GENERATION & ECONOMICS
PAPER CODE: EE 704C

1. Explain the difference between the unit commitment and the economic dispatch problem.
2. Discuss the basic principle of the dynamic programming method in solving the unit commitment problem.
3. What is the cost of power generation in thermal power plant?
4. Discuss the economic justification of the thermal power plants.
5. Discuss the various types of unit commitment method.
6. Write short notes on followings:
 - (i) Spinning reserve
 - (j) ABT
 - (k) Cross-subsidization

PAPER NAME: COMPUTER NETWORK
PAPER CODE: EE 705A

1. Write down the differences between OSI and TCP/IP model.
2. Write the functions of the followings:
 - i) Router
 - ii) Repeater
 - iii) Bridge
3. Briefly explain CSMA/CD
4. Write down the difference between TCP and UDP.
5. Name the flow control mechanism of transport layer protocol. Explain leaky –bucket protocol.
6. What is burst error? What is bit stuffing? What do mean by piggy backing? Given a 10 bit Sequence of 1101110101 and a divisor of 1011. Find the CRC code. What are advantages of IPV6 over IPV4?
7. a. What is pure ALOHA & Slotted ALOHA? Define it with example.
b. Explain CSMA/CA & CSMA/CD.
- c. Features of IPv6 in the context of advanced communication networks.
8. a. Compare TCP with UDP.
b. Describe Quality of Service (QoS)
c. Discuss the methods of closed loop congestion control.

d. Compare circuit switching with packet switching.
9. How selective repeat ARQ will work for lost frame? In GO BACK-N ARQ show why the window size should be $< 2^m$. Compare bit stuffing with byte stuffing with an example. Find NRZ-I, Manchester and Differential Manchester encoding for the binary data
111001000

10. Write short notes on the following

- a. ARP packet format
- b. Firewall
- c. Sliding window protocol
- d. HDLC frame format
- e. HTTP

B.TECH-7TH SEM

(EEE)

PAPER NAME: VLSI DESIGN

PAPER CODE: EEE 701

1. State the operation of a p-n junction diode.
2. How p-type and n-type semiconductors are made.
3. State the operation of a n-p-n junction transistor.
4. State the mass action law.
5. What is Hall Effect .

PAPER NAME: DIGITAL COMMUNICATION

PAPER CODE: EEE702

1. Define sampling theorem.
2. Differentiate source coding and channel coding.
3. What is probability density function ? Explain it.
4. What is cumulative distribution function ? Explain it.
5. Mention the merits of DPCM. What is the difference between PSK and FSK?
6. What is correlation coefficient?
7. What is auto correlation function ?
8. What is properties of auto correlation function ?

PAPER NAME: ELECTRIC DRIVES

PAPER CODE: EEE-703(A)

(1) What are the different advantages of electrical drives?

What are the equivalent value of drive parameter for loads with rotational and translation motion?

(2) What are the different types of braking of D.C. motor, Induction motor and synchronous motor?

Also determine the energy loss during breaking.

- (3) Explain the 1-phase, 3-phase fully controlled and half controlled D.C. drives.
- (4) Explain the Voltage Source Inverter fed Synchronous motor drive.
- (5) Write short note on the followings:
 - (c) Stepper motor drive.
 - (d) Switched Reluctance motor drive.

PAPER NAME: NON CONVENTIONAL ENERGY

PAPER CODE:- EEE704(C)

1. What is meant by renewable energy source?
2. What is the difference between conventional and non-conventional energy sources?
3. Write advantages and disadvantages of a tidal barrage scheme.
4. What are the advantages and disadvantages of Bio- Diesel over the conventional mineral diesel oil?
5. Discuss briefly the types of Bio-Gas plant
6. Write a short notes on any three of the following:
 - a) Solar power plant.
 - b) OTEC for electric generation.

PAPER NAME: OPERATING SYSTEM

PAPER CODE: EEE705A

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

process	Burst time	Arrival time

P1	3	1
P2	8	0
P3	1	2
P4	5	4
P5	2	5

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

- FCFS
- R.R scheduling where time quantum $q=2$ milliseconds.
- SRTF

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

6. Consider the following snapshot of a system :

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

Answer the following questions using the Bankar's algorithm:

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

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

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

9.

a) What are seek time and latency time?

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

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

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

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

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

B.TECH-7TH SEM

(ME)

PAPER NAME: POWER PLANT ENGINEERING

PAPER CODE: ME 701

1. A) Explain the different types of draught applied in power plant. Why artificial draught is preferred in power plant.
B) How the fan or blower in forced draught differently installed as compared to induced draught system & why? State three advantages of mechanical draught.
2. A) Define boiler efficiency. When is boiler efficiency termed as overall efficiency of the boiler plant?
B) A boiler generates 9 kg of steam per kg of coal burnt at a pressure of 12 bar, from feed Having temperature of 80⁰c. The efficiency of boiler is 85%, factor of evaporation is 1.25,& Specific heat of steam at constant pressure is 3.3KJ/KgK.Calculate:
 - i) Degree of superheat & temperature of steam generated
 - ii) Calorific value of coal in kJ/kgk
 - iii) Equivalent evaporation in kg of steam per kg of coal
3. A) What is circulation ratio? Mention the range of circulation ratio. Derive relationship ratio between CR & TDF.
B)A chimney of height42m.is used for producing a draught of 25mm.of water. The temperatures of ambient air & flue gases are 290⁰c respectively.The coal burnt in combustion chamber contains 85% carbon, 3% moisture & remaining ash.Neglecting losses & assuming the values of burnt products equivalent to the volume of air supplied & complete combustionof fuel. Find the percentage of excess air supplied.
4. A) Derive an expression for the maximum blade efficiency in a single stage impulse turbine.
B) In a single stage impulse turbine,the mean dia of the blade ring is 1m & the rotational speed Is 3500r.p.m. The steam is ejected from the nozzle at 250m/s & the nozzle angle is30⁰.The Blades are equiangular. If the friction loss in the blade is 19%of the kinetic energy corresponding To the relative velocity at the inlet to the blades,what is the power developed when the axial Thrust is on the blade is 90N.
5. A)Define speed ratio, blade velocity coefficient, blade efficiency & stage efficiency in connection With steam.
B) The following data refer to a particular stage of a parson's reaction turbine:
Speed of the turbine =2500r.p.m.;Mean dia of the rotor is 1.5m;
Stage efficiency = 85%; Blade outlet angle =25⁰; Speed ratio=0.8.
Determine the available isentropic enthalpy drop in the stage.
6. A) What is necessity of coal storage? Discuss the different methods used for coal storage at plant. What do you mean by diversity factor? What is the consideration for selecting a site for thermal power plant.
B) the peak load on a 60 MW power station is 45 MW. It supplies power through four transformers, whose connected loads are 17,12,9& 10 MW.The maximum demand on the transformer is 20,16,12 & 8 MW respectively. If annual load factor is 50% & the plant is operating for 68% of the period in a year,find out the following:
 - i) Average load on station
 - ii)Energy supplied per year
 - iii)Demand factor
 - iv)Power station use factor
7. A Pelton turbine is to be designed for the following specification :

Power	=	9650 K
Head	=	350 m

Speed = 750 r.p.m.

Overall efficiency = 85 %

Jet dia. Not to exceed $1/6$ th of the wheel dia.

Determine the following :

i) the wheel dia. ii) dia. Of the jet iii) the number of jet required

PAPER NAME: ADVANCE MANUFACTURING TECHNOLOGY

PAPER CODE: (ME702)

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

PAPER NAME: RENEWABLE ENERGY SYSTEM

PAPER CODE:- ME 703B

- 1) Explain the Ocean Thermal Energy Conversion Method.
- 2) Explain the term the Energy Storage System
- 3) Write a short Note on Development and role of Renewable Sources of Energy.
- 4) What is Extraterrestrial Solar Radiation? Explain the method of Measurement and Estimation of Solar Radiation. If necessary derive the expression.
- 5) Explain solar ponds and Solar Concentrators with neat sketch.
- 6) What is a Solar cell? Explain the Working Principle and application.
- 7) What are Renewable sources of energy? What are sources of Renewable and their on field application?

- 8) Explain Wave Power and Tidal Power in Brief and area of application.
- 9) Explain the term Geothermal energy and its working principle
- 10) State the Types of Turbine Use in Wind Turbine and explain the Power Generation and Power Distribution System of Wind Turbine.
- 11) What is Biomass? What are Types of Biogas Plant? Explain anyone with Detail and neat sketch.
- 12). Explain Flat Plate Collectors, its principle, heat transfer analysis and area of application with neat sketch

PAPER NAME: ADVANCE WELDING TECHNOLOGY
PAPER CODE : ME704B

- 1) Explain and draw the Welding Symbol and joint design.
- 2) Explain the Solid State Welding with neat Sketch.
- 3) Write a short note on friction welding and resistance welding process.
- 4) What are the equipment require for Arc welding process and explain each in brief.
- 5) Write Sort note on Friction Stir welding and Under Water welding Process with neat sketch.
- 6) What are welding method for welding of plastics, ceramics and composites, explain each one in brief.
- 7) Write a Short Note on Welding Automation and Application of Robotic in welding process.
- 8) Write the Welding Metallurgy and Effect of HAZ using different process parameter and characteristic of weldment.
- 9) Write Short note on welding Defects, its causes and what are possible remedies.
Write Short note on Welding testing methods; explain each one with neat sketch
- 10) Write Short note on Welding testing methods; explain each one with neat sketch.

PAPER NAME: OPERATION RESEARCH
PAPER CODE: ME- 705C

List of Question

- 1) Explain the necessity of market research in 'Modern Industry'.
- 2) The rate of use of particular raw material from stores is 20 units per year. The cost of placing and receiving an order is Rs. 40. The cost of each unit is Rs. 100. The cost of carrying inventory in per cent per year is 0.16 and it depends upon the average stock. Determine the economic order quantity.
- 3) A company manufactures two products X and Y. The profit contribution of X and Y are Rs. 3 and Rs. 4 respectively. The products X and Y require the services of four facilities. The capacities of four facilities A, B, C and D are limited and the available capacities in hours are 200 hrs, 150 hrs, 100 hrs and 80 hrs respectively. Product X requires 5, 3, 5 and 8 hours of facilities A, B, C and D respectively. Similarly the requirements of products Y are 4, 5, 5 and 4 hours respectively on A, B, C and D. Find the optimal product mix to maximize the profit. Use graphical method.
- 4) State the difference between product layout and process layout.
- 5) Graphically maximize, Z given by
 $Z = 2X_1 + 3X_2$
 Subject to, $X_1 + X_2 \leq 30$
 when , $12 \geq X_2 \geq 3$
 $X_1 - X_2 \geq 0$
 When $X_1 \leq 20$

$$X_1, X_2 \leq 0$$

- 6)) In a departmental store one cashier is there to serve the customers. And the customers pick up their needs by themselves. The arrival rate is 9 customers for every 5 minutes and the cashier can serve 10 customers in 5 minutes. Assuming Poisson arrival rate and exponential distribution for service rate, find
- 7) How can you determine the standard cost of product ? How standard costing is helpful in budgeting concept ? Name the various types of budgets. Analyze the importance of budgetary control in improving company's performance.
- 8) What is Monte-Carlo simulation ? Discuss various steps involved in Monte-Carlo simulation. State the areas of applications of this type of simulation.
- 9) State the advantages of man-power planning in an organization.
- 10) Differentiate between PERT and CPM.
- 11) Briefly describe *ABC* analysis.
- 12) Write note on Bin Card.
- 13) What are the functions of purchase department ?
- 14) Explain the difference between marketing and selling.
- 15) A company has factories at *A, B, C* which supply warehouses at *M, N, P, Q*. Monthly factory capacities are 70, 90 & 115 respectively. Unit shipping costs are as follows :

From	To			
	M	N	P	Q
A	17	20	13	12
B	15	21	26	25
C	15	14	15	17

Determine the optimum distribution for this company to minimize shipping cost.