

Code: 13SH2201

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

ENGINEERING MATHEMATICS - IV
(Common for EEE & ECE)

Time: 3 hours

Max. Marks: 60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks

SECTION - I

- 1 (a) Find a root of the equation $x^3 - 3x - 5 = 0$, using Bisection method.
(b) Find a root of the equation $x e^x - 2 = 0$, using Newton's method.
- 2 (a) Fit a least squares parabola to the following data

X	0	0.2	0.4	0.7	0.9	1.0
Y	1.016	0.768	0.648	0.401	0.272	0.193

- (b) Find the rank correlation for the following data

X	2	4	5	6	8	11
Y	18	12	10	8	7	5

SECTION - II

- 3 (a) Solve the following equations by Gauss elimination method
 $2x + 2y + z = 12$, $3x + 2y + 2z = 8$, $5x + 10y - 8z = 10$
(b) Solve the following equations by Crout's method
 $x + 2y + 3z = 14$, $2x + 3y + 4z = 20$, $3x + 4y + z = 14$
- 4 (a) Solve the following equations by Gauss - Seidel method
 $28x + 4y - z = 32$, $x + 3y + 10z = 24$, $2x + 17y + 4z = 35$
(b) Solve the system of non-linear equations $x^2 + y = 11$, $y^2 + x = 7$; by Newton-Raphson method

SECTION - III

- 5 (a) Solve $y' = y^2 + x$, $y(0) = 1$ using Taylor's series method and compute $y(0.1)$ & $y(0.2)$
(b) Given $y' = x + \sin y$, $y(0) = 1$, compute $y(0.2)$ and $y(0.4)$ with $h = 0.2$ using Euler's modified method

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

ENVIRONMENTAL STUDIES

(Common for ME & CSE)

Time: 3 hours

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

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SECTION - I

- 1 a) Explain different types of Ecosystem and their Characteristics.
b) Difference between consumptive use and productive use.
- (or)
- 2 a) What are the main threats to biodiversity?
b) Define Scope and Importance of Environmental studies.

SECTION - II

- 3 a) Explain briefly about Rain water harvesting.
b) Discuss the environmental effects of extracting mineral resources.
- (or)
- 4 a) What is deforestation? Describe the effects of deforestation?
b) Impacts on over-utilization of surface and ground water.

SECTION - III

- 5 a) What is Solid Waste Management? Briefly discuss on Solid Waste disposal methods.
b) What is Compost? How does it work.
- (or)
- 6 a) Give details about depletion of the Ozone Layer and its Impacts.
b) Describe the causes, effects and control measures of Air pollution.

SECTION - IV

- 7 a) Write down the effects of urbanization on environment.
b) Identify the interaction between the economy and the environment.
- (or)
- 8 a) What is Green revolution? Explain in detail.
b) Define EIA and explain the functional elements in EIA report.

SECTION - V

- 9
- a) Write about Kolleru lake – aquaculture project as a case study.
 - b) Write a study report on Local Area River.

(or)

- 10
- a) Discuss about the Water (Prevention and control of pollution) Act.
 - b) Write a study report on local common plants.

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

SWITCHING THEORY & LOGIC DESIGN
(Common for EEE & ECE)

Code : 13EC2201

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

SECTION - I

- (a) Convert the binary number 1101.011 into decimal equivalent.
(b) Find the 2's complements of $(1111)_2 - (1010)_2$.
- Generate Hamming code for the given 11-bit message 10001110101 and rewrite the entire message with Hamming code.

SECTION - II

- (a) Simplify the Boolean function using K-map
 $F = \sum m (0, 1, 3, 4, 5, 6, 7, 8, 9) + d (10, 11, 12, 13, 14, 15)$
(b) Simplify the following Boolean expressions using K-map and implement them using NOR gates:
(i) $F(A, B, C, D) = AB'C' + AC + A'CD'$
(ii) $F(W, X, Y, Z) = W'X'Y'Z' + WXY'Z' + W'X'YZ + WXYZ$
- (a) Simplify the following logic expression using K-map method
 $(A' + B + C')(A' + B + D)(C + D)$
(b) Construct a logic circuit using any NAND gates for the following Switching expression
 $F = A + B [AC + B + C'D]$

SECTION - II

- Implement the following function $F(A, B, C, D) = \sum M (0, 1, 3, 4, 7, 10, 12, 14)$ by using
(a) 16:1 MUX (b) 8:1 MUX (c) 4:1 MUX
- (a) Implement the following Boolean function using 8x1 MUX
 $F(A, B, C, D) = \sum m (0, 1, 3, 4, 8, 9, 15)$
(b) Design BCD to xs-3 code converter using logic gates.

SECTION – IV

7. (a) Draw the logic diagram of an SR latch with control input using NAND gates.
(b) Classify the sequential circuits with one example?
8. (a) What is a shift register. Explain the working of serial in-serial out shift register with logic diagram and wave forms.
(b) Convert J-K Flip flop to T-Flip flop.

SECTION – V

9. a) Difference between PROM, EPROM, EEPROM.
b) Explain semiconductor ROM.
10. Explain the architecture of SRAM and DRAM.

Code : 13CS2201

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

DATABASE MANAGEMENT SYSTEMS
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

Section-1

- 1 a. What is meant by database ? Explain different characteristics of database?
b. Explain the history of database?
- 2 a. What are the differences between instances and schemas?
b. Explain data model with suitable examples ?

Section-II

- 3 a. What are the operations of relational algebra?
b. Compare and contrast Tuple Relational Calculus versus Domain Relational Calculus.
- 4 a. Explain Relational Data Model with suitable examples?
b. Explain Integrity constraints with examples?

Section-III

- 5 a. What is meant by normalization? Explain 1NF and 2NF with suitable examples?
b. Compare and Contrast BCNF and 3NF.
- 6 a. Explain Functional Dependency with suitable example.
b. Explain the Multi valued dependencies.

Section-IV

- 7 Write short notes on a) Time-stamp based concurrency control.
b) Optimistic concurrency control.
- 8 a. Explain multiple granularity technique with suitable example.
b. Explain 1) shared lock
2) Binary lock
3) Exclusive lock

Section-V

- 9 a. Explain log recovery with suitable examples.
 - b. Write short notes on 1) Media recovery
2) Check point
-
- 10 a. Explain about shadow paging technique.
 - b. Explain different failures of secondary memory.

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech II Semester

SOIL MECHANICS

(Civil Engineering)

Time : 3 hours

Max Marks: 60

Answer FIVE Questions, Choosing ONE Question from each section

All Questions carry equal marks

SECTION - I

- 1 (a) Define porosity, degree of saturation, air content, specific gravity, density index and plasticity index.
(b) Derive a relation between water content, degree of saturation, void ratio and specific gravity of solids.
- 2 (a) Explain the salient features of Indian Standard Classification system.
(b) If natural water content, liquid limit and plastic limit of soil are 24%, 68% and 28% respectively, and percentage of particles less than 2 micron is 23%, determine (i) Liquidity index (ii) Activity (iii) Consistency index.

SECTION - II

- 3 (a) Define (i) total stress (ii) effective stress (iii) phreatic line (iv) seepage pressure.
(b) A permeameter of 8.2 cm diameter contains a soil of length 35 cm. In a constant head test the loss of head was 116 cm measured between two points of 25 cm apart. The constant discharge was 2.73 ml/sec. Find the coefficient of permeability of soil.
- 4 (a) Derive an expression for coefficient of permeability used in falling head method.
(b) Explain the principles of flow net and critical hydraulic gradient.

SECTION - III

- 5 (a) Describe the Indian Standard light compaction test.
- (b) A circular area on the ground surface is 8 m in diameter and carries a uniformly distributed load of 5 kN/m^2 . Find the vertical stress at depths of 3 m, 5 m, 8 m and 12 m below the centre of loaded area and plot the variation of vertical stress with depth.
- 6 (a) Using Boussinesq's theory, derive an expression for the vertical stress at any point due to point load. State the assumptions.
- (b) A cohesive soil yields a maximum dry density of 18 kN/m^3 at an optimum moisture content of 16 % during Standard Proctor's test. If the specific gravity of solids is 2.65, what is the degree of saturation? What is the theoretical maximum dry density it can be obtained.

SECTION - IV

- 7 (a) Discuss the Terzaghi's theory of one dimensional consolidation and derive the differential equation for it.
- (b) In a consolidation test on a soil, the void ratio of the sample decreases from 1.25 to 1.0 when the pressure is increased from 200 kN/m^2 to 400 kN/m^2 . Calculate the coefficient of consolidation, compression index and coefficient of volume change, if the coefficient of permeability is $8 \times 10^{-8} \text{ cm/sec}$.
- 8 (a) Explain the square root of time fitting method of determining coefficient of consolidation.
- (b) In a laboratory consolidation test, a clay specimen 25 mm thick reaches 90 % consolidation in 600 sec. In the field, a similar clay 5 m thick under double drainage conditions, undergoes an ultimate settlement of 200 mm. What will be the settlement at the end of 100 days.

SECTION - V

- 9 (a) Describe the direct shear test to determine the shear strength of soil.
- (b) A specimen of clean dry cohesionless sand is tested in shear box test. If the sample failed at a shear stress of 50 kN/m^2 when the normal stress was 80 kN/m^2 , determine the angle of internal friction and principal stress at failure.

10 (a) Explain Mohr-Coulomb theory for shear strength of soil and pore pressure parameters.

(b) Following are the results of a series of consolidated drained shear tests.

Test	1	2	3
Cell Pressure (kN/m ²)	100	200	300
Deviator Stress (kN/m ²)	110	152	193

Determine the shear strength parameters.

Code : 13EE2204

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

ELECTRO MECHANICAL ENERGY CONVERSION - II
(Electrical & Electronics Engineering)

Time : 3 hours

Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks

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SECTION - I

- 1 a) Briefly explain the separation of eddy current and hysteresis losses in a transformer.
- b) Explain the conditions that must be fulfilled before two transformers can be operated successfully in parallel.
- 2 a) Explain how 2-winding transformer is realized as auto transformer.
- b) The primary and secondary voltages of an auto transformer are 230 V and 75 V respectively. Calculate the currents in different parts of the winding when the load current is 200 A. Also calculate the saving in the use of Copper.

SECTION - II

- 3 a) State with the help of connection and vector diagrams how a two phase supply can be obtained from a three phase supply.
- b) Two 100 V, single-phase furnaces take loads of 600 kW and 900 kW respectively at a power factor of 0.707 lagging and are supplied from 6600 V, 3 - phase supply through a Scott connected transformer. Calculate the currents in the three phase lines.
- 4 a) Explain the V - V connection of transformers in detail.
- b) Two 3-phase 4400/400 transformers TA & TB having following data:
TA: % impedance/phase referred to secondary= $(1+j3)$, Rated kVA=400
TB:% impedance/phase referred to secondary= $(1+j4)$, Rated kVA=800
Determine the load shared by each transformer and its power factor if the total load is 1000 kVA at 0.8 p.f. lagging.

SECTION - III

- 5 a) Explain the production of rotating magnetic field and the principle of operation of a 3 – phase induction motor.
- b) A 6 pole, 50 Hz 3 – phase induction motor running on full load develops a useful torque of 150 N-m at a rotor frequency of 1.5 Hz. Calculate the shaft power output. If the mechanical torque lost in friction is 10 N-m, determine the rotor copper loss, the input to the motor and the efficiency
- 6 a) Derive the expression for the torque of an induction motor and obtain the condition for maximum torque.
- b) An 8 – pole, 50 Hz, 3 phase induction motor is running at 4% slip when delivering full load torque. It has stand still rotor resistance of 0.1Ω and reactance of 0.6Ω per phase. Calculate the speed of the motor if an additional resistance of 0.5Ω per phase is inserted in the rotor circuit. The full load torque remains constant.

SECTION - IV

- 7 a) What are no load and blocked rotor tests? What sort of losses can be measured by these tests?
- b) Explain the DOL and Star-Delta starting methods.
- 8 Draw the circle diagram for a 400V , 5 H.P delta connected 3-phase induction motor from the following test results(line Values):
No load test: 400V, 3.0 A, $\cos\Phi_0 = 0.2$; SC test: 200V, 12.0A, $\cos\Phi = 0.4$
From the circle diagram determine a) Full load current b) Full load power factor c) Starting torque in terms of full load torque at normal voltage.(Assume the copper losses to be equally divided between the stator and rotor.)

SECTION - V

- 9 Explain briefly the different methods of speed control of 3 –phase induction motors.
- 10 a) A 3-phase squirrel cage induction motor has maximum torque equal to thrice the full load torque. Determine the ratio of starting torque to full load torque if started by a) DOL starter b) Star delta starter. The maximum torque occurs at 0.1 slip
- b) Draw the equivalent circuit of double cage induction motor and derive its torque equation.

Code : 13EC2202

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

RANDOM SIGNALS & STOCHASTIC PROCESSES
(Electronics & Communication Engineering)
Set 2

Time: 3 hours

Max. Marks: 60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks

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SECTION - I

- 1 (a) State and prove total probability and Bay's theorem.
(b) In a single throw of two dice, what is the probability of obtaining a sum of at least 10?
- 2 (a) Compare Chebyshev, Markov's and Chernoff's inequalities.
(b) Urn A contains 5 red marbles and 3 white marbles; Urn B contains 2 red marbles and 6 white marbles. (i) If a marble is drawn from each Urn, what is the probability that they are both of the same color? (ii) If two marbles are drawn from each Urn, what is the probability that all four marbles are of the same colour?

SECTION - II

- 3 (a) What is Probability Density Function? Give its significance and explain how it is different from Cumulative Distribution Function (CDF).
(b) Find the coefficient of variation between X and Y from the following data:

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15
- 4 (a) What is central limit theorem? Give its significance with necessary examples.
(b) If x is a random variable for which $E(X) = 10$ and $\text{var}(X) = 25$, for what possible value of 'a' and 'b' does $Y = aX - b$ have expectation 0 and variance 1?

SECTION - III

- 5 (a) What is correlation function? Give its significance. Distinguish between auto correlation and cross correlation

- (b) The auto correlation function of an aperiodic random process is $R_{XX}(\tau) = \exp(-\tau^2 / (2\sigma^2))$. Find the PSD and average power of the signal.
- 6 (a) What is Markov process? Distinguish it from Poisson processes.
 (b) The cross spectral density of two random process $X(t)$ and $Y(t)$ is $S_{XY}(\omega) = 1 + (j\omega/k)$; for $-k < \omega < k$
 $= 0$; elsewhere, $k > 0$, Find the cross correlation function of two processes?

SECTION - IV

- 7 (a) What do you mean by band pass, band limited and narrowband processes? Give the properties of a band limited process.
 (b) A random process is defined as $Y(t) = X(t) - X(t-a)$, where $X(t)$ is a wide sense stationary process and $a > 0$ is a constant. Find the PSD of $Y(t)$ in terms of the corresponding quantities of $X(t)$.
- 8 (a) What is Additive White Gaussian Noise (AWGN)? How do you find the transfer function of system driven by white noise? Explain in detail.
 (b) An ergodic random process is known to have an auto correlation function of the form $R_{XX}(\tau) = 1 - |\tau|$; $|\tau| \leq 1$
 $= 0$; $|\tau| > 1$
 Show the spectral density is given by $S_{XX}(\omega) = [\sin(\omega/2) / (\omega/2)]^2$

SECTION - V

- 9 (a) Derive equation for finding noise figure of a cascading network of 3 stages. Differentiate noise temperate and noise figure?
 (b) $X(t)$ is a stationary random process with zero mean and auto correlation $R(\tau) = e^{-2|\tau|}$ is applied to RC LPF network. Find mean and PSD of its output.
- 10 (a) What is white noise? How it is different from coloured noise? Explain how can you minimize the mean square error of the signal using Weiner filter
 (b) The Noise figure of an amplifier at room temperature ($T=290^\circ\text{K}$) is 0.2dB. Find the equivalent temperature

Code : 13CE2209

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

STRENGTH OF MATERIALS
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks

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SECTION - I

- 1 A beam of span 10m is simply supported at two points 6m apart with equal overhang on either side. Both the overhanging portions are loaded with a uniformly distributed load of 2KN/m run and the beam also carries a concentrated load of 10 KN at the mid span. Construct the SF and BM diagrams and locate the points of inflexion, if any.
- 2 A cantilever beam of length 10m carries a uniformly varying load of 10 KN/M run at the fixed end to 3 KN/m run at the mid-span and two concentrated loads of 4 KN and 6 KN at 7m and 8m from the fixed end. Draw the SFD and BMD.

SECTION - II

- 3 a State the assumptions made in the theory of simple bending.
b A rectangular beam 300mm deep is simply supported over a span of 4 meters. What uniformly distributed load per meter the beam may carry, if the bending stress is not to exceed 120mm^2 ? Take $I = 8 \times 10^6\text{mm}^4$.
- 4 A T-beam has the following dimensions. Flange = 180mm X 15mm, Web = 160mm deep and 20mm thick. The T-beam is subjected to a shear force of 28kN. Draw shear stress distribution across the depth marking values at salient points.

SECTION - III

- 5 a What is moment area method? Explain the two Mohr's theorems, as applicable to the slope and deflection of a beam.
b A rectangular R.C simply supported beam of length 2 m and cross section 100mm x 200mm is carrying an uniformly distributed load of 10 kN/m through its span. Find the maximum slope and deflection. Take $E = 2 \times 10^4 \text{ N/mm}^2$

Code : 13CS2202

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

**COMPUTER ORGANISATION
(COMPUTER SCIENCE & ENGINEERING)**

Time:3hrs

Max.Marks:60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

SECTION - I

1. (a) A typical CPU may consist of PC (Program Counter) , IR (Instruction register), ALU (arithmetic /logic unit), CU (Control unit) , special –purpose registers such as CCR (condition –code register), and general- purpose registers such as Data registers and Address Registers . Describe the briefly the function of each of these components for an architecture with which you are familiar .
- (b) List various instruction categories based on operation and formats.
2. A relative mode type of instruction is stored in memory at an address equivalent to decimal 750.The branch is made to an address equivalent to decimal 500.
 - (a) What should be the value of the relative address filed of the instruction.
 - (b) Determine the relative address value in address value in binary using 12 bits.
 - (c) Determine the binary value in PC after the fetch phase and calculate the binary value of 500 .Then show that the binary value in PC plus the relative address calculate IN Part (ii) is equal to the binary value of 500

SECTION - II

3. (a) List the key characteristics of memories and any one of them with an example.
- (b) Discuss memory hierarchy with reference to Speed .Size , and Cost
4. (a) Explain in detail about difference types of Main memories.
- (b) List various cache memory management techniques.

(P.T.O)

SECTION - III

5. (a) Compute square root for 172_{10} using binary square root algorithm.
(b) Distinguish between floating point addition and subtraction.
6. (a) For the following statement, tell whether it is true or false. If a statement is "false", briefly explain how so by describing how the statement may most simply be made true with an example? Simply stating the negation of the false statement is not sufficient justification.

"Give a fixed number of bits, 2's complement allows for the representation of the same number of useful values as 1's complement."

- (b) Specify IEEE 754 floating point formats for half, single, double and Quad precision numbers.
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SECTION - IV

7. (a) When large amount of data is to be transferred from CPU, which I/O module can be used. Explain in detail about that I/O module.
(b) Discuss in detail about Micro programmed control unit design
8. (a) Write short note on PCI, SCSI and USB.
(b) List various interrupts and explain.

SECTION - V

9. (a) Discuss about the advantages of instruction pipelining.
(b) List various hazards in pipelining and explain any one of them.
10. (a) Explain super scalar operations in detail.
(b) List various metrics for performance and explain with an example.

Code : 13EE2205

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

GENERATION OF ELECTRIC POWER

(Electrical and Electronics Engineering)

Time : 3 hours

Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section

All Questions carry equal marks

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SECTION – I

- 1 a) Draw a typical layout of thermal power plant and describe the functions of all components.
b) Explain fire tube boilers in detail.
- 2 a) Explain about cooling arrangement in thermal power station.
b) What is “feed water”? What are the problems due to impurities and how they can be eliminated?

SECTION – II

- 3 a) Explain the classification of hydro electric plants.
b) What is a moderator? Name some common moderators and discuss their advantages and limitations.
- 4 a) Explain site selection of nuclear power plant.
b) What do you mean by fission of nuclear fuel?

SECTION – III

- 5 a) Explain concentrating solar energy collector with a neat diagram.
b) Explain role of solar energy in present scenario.
- 6 a) With a neat diagram explain the working of horizontal axis wind mills.
b) Explain with a neat diagram a wind electric generating power plant.

SECTION – IV

- 7 a) Discuss the principles of MHD generation.
b) Write short notes on MHD open loop systems.
- 8 a) Describe an MHD closed loop system.
b) What are the main advantages of an MHD power generation?

SECTION – V

- 9 a) Define demand factor, diversity factor and plant capacity factor?
b) The maximum demand of a generating station is 200 MW. The annual load factor being 60%. Calculate the total electrical energy generated per year.
- 10 a) Briefly explain “two part tariff”.
b) A consumer has an annual consumption of 176400 KWh. The charge is Rs. 150 per KW of maximum demand plus 15 paise per KWh. Find the annual bill if the load factor is 40%.

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B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

APPLIED THERMODYNAMICS - I
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

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SECTION - I

- 1 Draw the configuration diagram, p-v and T-s diagram of a Simple Rankine Steam Power cycle and explain its working principle. How does this cycle's efficiency be augmented using regeneration?
- 2 (a) State the advantages of regenerative cycle over simple Rankine Cycle?
(b) A simple Rankine cycle works between pressures 28 bar and 0.06 bar, the initial condition of steam being dry saturated, calculate the cycle efficiency, work ratio and specific steam consumption.

SECTION - II

- 3 (a) Describe the working of lamont boiler with a neat sketch and write its applications and specifications.
(b) Write the differences between high pressure and low pressure boilers
- 4 (a) Write comparison between fire tube and water tube boilers
(b) Explain the working of an economizer with a neat sketch

SECTION - III

- 5 (a) Steam initially dry and saturated is expanded in a nozzle from 15 bar at 300°C to 1 bar. If the frictional loss in the nozzle is 12% of the total heat drop available, calculate the mass of the steam discharged when exit diameter of the nozzle is 15 mm.
(b) Explain the working of any one of the surface condenser with a neat sketch and write its merits?
- 6 (a) Explain the physical significance of critical pressure ratio in the steam nozzles
(b) A surface condenser is designed to handle 10,000 kg of steam per hour. The steam enters at 0.08 bar (abs) and 0.9 dryness and condensate leaves at the corresponding saturation temperature. The pressure is constant throughout the condenser. Estimate the cooling water flow rate per hour, if the cooling water temperature rise is limited to 10°C.

SECTION - IV

- 7 (a) A single row impulse turbine develops 135 kW at a blade speed of 175 m/s using 2 kg of steam per second. Steam leaves the nozzle at 400 m/s. Velocity coefficient of the blade is 0.9. Steam leaves the turbine blades axially. Determine the nozzle angle, blade angles at entry and exit. Assume no shock at the entrance of the turbine blades.
- (b) The blade height in an axial flow turbine is increased towards the low pressure end why
- 8 (a) The following particulars refer to a stage of a parson's reaction turbine comprising one ring of fixed blades and one ring of moving blades. Mean diameter of the wheel is 60 cm and it is rotating at speed of 3000 rpm. The absolute velocity of steam to the blades is 300 m/s. The blade outlet angle is 20° . the rate of steam flow is 7.6 kg/s. determine the following (a) Blade inlet angle (b) Tangential force on the wheel (c) Power developed and (d) blade efficiency
- (b) What is the effect of blade friction on velocity diagram of steam turbine blading

SECTION - V

- 9 (a) Derive the expression for maximum blade efficiency for a single stage 50% reaction turbine from the fundamentals.
- (b) Name the principal methods of steam turbine governing
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- 10 (a) Define Compounding of a steam turbine? Why it is required? Explain velocity compounding method with a neat diagram.
- (b) With a schematic diagram explain reheat cycle

B.TECH. DEGREE EXAMINATION, APRIL 2015
II B.Tech. II Semester

OPERATING SYSTEMS
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

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SECTION - I

- 1 a Briefly Explain process management and memory management.
b Distinguish between the client-server and peer to peer models of distributed systems.
- 2 a Discuss operating system design and implementation.
b What are the advantages and difficulties in designing operating systems in the layered approach?

SECTION - II

- 3 a Describe the differences among short term, medium term and long terms scheduling.
b What are the benefits of multithreaded programming?
- 4 a Explain different thread libraries in operating system.
b Discuss how the following pairs of scheduling criteria conflict in certain settings
i) Average Turnaround time and maximum waiting time.
ii) CPU utilization and response time.

SECTION - III

- 5 a What is the use of semaphores in solving the reader's writer's problem?
b How deadlock can be avoided? Explain with the help of necessary algorithm.
- 6 Explain in detail about deadlock prevention, deadlock detection and recovery.

SECTION - IV

- 7 a What is page fault? What are the steps in handling page fault?
b Explain briefly about real memory management systems.
- 8 a Why are segmentation and paging sometimes combined into one scheme?
Explain.
b Explain the performance of demand paging.

SECTION - V

- 9 Explain in detail about File system Implementation.
- 10 a Explain about Interrupt-driven I/O cycle.
b Write about
i) Spooling and Device reservation
ii) I/O Scheduling

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

PULSE & ANALOG CIRCUITS
(Common for EEE & ECE)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

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SECTION - I

- 1 (a) Derive the different output equations of a low pass circuit for the different inputs
(i) Ramp (ii) Square wave (ii) exponential
- (b) Prove that an RC circuit behaves as a reasonably good integrator if $RC > 15T$,
Where T is the period of an input 'Em sin ωt '.
- 2 (a) State and prove clamping circuit theorem.
- (b) Explain the operation of negative peak with neat sketches.

SECTION - II

- 3 (a) Explain the operation of Bi-stable multi-vibrator with neat sketch.
- (b) Give the expression for risetime and falltime in terms of transistor parameters and operating currents.
- 4 (a) Explain the operation of mono-stable multi-vibrator with neat sketch.
- (b) . Explain the operation of Schmitt trigger with circuit diagram and waveforms. Define UTP and LTP.

SECTION - III

- 5 (a) A transistor bootstrap ramp generator is to produce a 15V, 5ms output to a 2kohms load resistor. The ramp is to be linear within 2%. Design a suitable circuit using $V_{cc} = 22V$, $-V_{EE} = -22V$ and transistor with $h_{fe}(\min) = 25$. The input pulse has an amplitude of -5V, pulse width = 5ms and space width = 2.5ms.

- (b) Explain how an Schmitt trigger circuit acts as a comparator
- 6 (a) Explain the basic principles of Miller and bootstrap time base generators.
- (b) Why sampling gates are called linear gates?

SECTION - IV

- 7 Explain the Basic operation of CMOS Structure.
- 8 Explain in detail about small signal model for common Source amplifier.

SECTION - V

- 9 (a) Compare different Transformer coupled amplifiers.
- (b) Derive an expression for efficiency in Complementary Class-B push-pull amplifier.
- 10 (a) Explain the operation of class-B push-pull amplifier.
- (b) What is Q-factor and comment on types of Small signal tuned amplifier Q-factors?

Code : 13ME2203

B.TECH. DEGREE EXAMINATION, May 2015

II B.Tech. II Semester

Machine Tools
(Mechanical Engineering)

Time : 3 hours

Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section

All Questions carry equal marks

* * *

SECTION - I

- 1 (a) How do you specify lathe? mention various operations can be performed on lathe.
(b) Differentiate between Turret and Capstan lathe.
- 2 (a) Explain types of work holding devices in lathe and draw figures.
(b) A 600mm long, 50mm diameter 304 stainless steel bar is being reduced in diameter to 40mm in turning on lathe. The spindle rotates at 400 RPM, the tool is travelling at speed of 8mm/min. Calculate the cutting speed, material removal rate, cutting time required.

SECTION - II

- 3 (a) Explain the drill bit nomenclature with the help of neat sketch.
(b) Differentiate between shaper and planner.
- 4 (a) Explain various operations can be performed on drilling machine with the help of neat sketches
(b) Explain the working principle of planner

SECTION - III

- 5 (a) Explain (i) straddle milling (ii) end milling
(b) Explain the principle of operation of gear shaping machine
- 6 (a) Explain milling cutter nomenclature with the help of sketch.
(b) Explain compound indexing with suitable example.

SECTION - IV

- 7 (a) How do you select grinding wheel with necessary example?
(b) Explain push broaching tool with simple figure
- 8 (a) Explain tool and cutter grinding machine
(b) Write short notes on honing

SECTION - V

- 9 (a) Explain the working principle of AJM and mention the empirical relation for MRR
(b) Under what circumstances we prefer non-conventional machining
- 10 (a) Explain the working principle of EDM
(b) Explain the working principle of USM

Code : 13CS2204

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester
SOFTWARE ENGINEERING
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks

* * *

SECTION - I

- 1 a What are software myths?.
- b Explain different types of specialized process models.
- 2 a Explain unified process model?
- b Why are many legacy software systems still being used today?

SECTION - II

- 3 a Construct use case diagram for smart home application. How are these diagrams used in project development?.
- b Explain pattern based software design?
- 4 a Explain the principles of modeling during analysis and design phases?.
- b What is requirements elicitation?

SECTION - III

- 5 a Mention the differences between scenario based and flow based modeling
- b Explain the design concepts of software engineering?
- 6 a Explain analysis modeling approaches in software engineering?
- b Explain the process of creating a behavioral model?

SECTION - IV

- 7 Explain different architectural styles and patterns?
- 8 a How does class based component design helps in modeling phase?
b How do you design conventional components?

SECTION - V

- 9 a Explain the role of debugging in testing process?
b What are the test strategies followed in object oriented software?
- 10 a Explain basis path testing?
b What are the test strategies followed for conventional software?

Code: 13CE2206

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech II Semester

SURVEYING - II

(Civil Engineering)

Time : 3 hours

Max Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section
All questions carry equal marks*

SECTION-I

1. a) Discuss the method of repetition and reiteration with an example
- b) The exterior angles of a traverse were measured during the survey of an area. If the bearing of the line PQ is $45^{\circ}32'40''$, find the bearings of the remaining lines.

Station	P	Q	R	S	T
Ext. angle	$202^{\circ}36'20''$	$250^{\circ}18'40''$	$268^{\circ}20'20''$	$276^{\circ}13'10''$	$262^{\circ}31'30''$

OR

2. a) The included angles of a traverse PQRSTP are given below. Find the deflection angles at each vertex.

Station	P	Q	R	S	T
Defl. angle	$102^{\circ}30'40''$	$124^{\circ}10'40''$	$96^{\circ}08'20''$	$131^{\circ}00'40''$	$86^{\circ}09'40''$

- b) The following readings refer to the reciprocal level taken between two stations P and Q. find the true difference in elevation between P and Q. If the instrument had a collimation error of $0.003/150\text{m}$ and the distance between the stations was 1150m , find the error due to refraction.

Instrument at	Staff reading at	
	P	Q
P	1.425	2.724
Q	1.429	2.504

SECTION-II

3. a) Derive the distance and elevation formula for horizontal line of site using Fixed hair stadia method.

- b) A tachometer was set up at station p and observations were made to two stations Q and R. the vertical angles to Q and R were $6^{\circ}30'$ and $20^{\circ}8'$, respectively. The cross hair readings at Q were 3.102, 3.47, and 3.835 and those at R were 3.215, 3.56, and 3.905. The staff was held vertical in both cases. The instrument constants were 100 and 0.15. The reading from P to a BM of RL 275.35m was 3.255. The horizontal angle QPR measured was $59^{\circ}30'$. Find the distance Q to R, the gradient from Q to R and the RLs of Q and R.

OR

4. a) Determine the distance and elevation formulae for an inclined line of sight with an angle of elevation and an angle of depression when the staff held normal.

SECTION-III

5. If a curve is designated as a 4° curve on a 30m arc, find the tangent distance, length of long chord, length of arc, apex distance, and mid-ordinate if the deflection angle is 36° .

OR

6. Describe how you would set a circular curve by the method of offsets from the long chord with the help of chain and tape.

SECTION-IV

7. a) Describe the basic features of a total station
b) Explain the functional components of GPS

OR

8. a) Explain the procedure to find the height and distances of the given object by using total station
b) Differentiate between the normal GPS and Differential GPS

SECTION-V

9. a) How the overlapping photographs are captured from aerial platform. Explain in brief.
b) Calculate the flying height above terrain, if the focal length is 0.1524m and scale of the photograph is 1:5000

OR

10. Define mosaic. Explain the methods of mosaic construction

Code : 13SH2202

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

ECONOMICS & ACCOUNTANCY

(Common to EEE & ECE)

Time: 3Hrs

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

* * *

SECTION - I

1. What do you mean by Law of Demand? Explain assumptions and exceptions of Law of demand.
2. Define Price Elasticity of Demand. Explain different types of Price Elasticity of Demand with graphs.

SECTION - II

3. What do you mean by Iso-quant? Explain the Law of Returns to scale of production.
4. Define Break -Even point .Explain assumptions and uses of Break-even analysis.

SECTION - III

5. Define Perfect Competition market. Explain how the firm attain equilibrium in Perfect Competition market.
6. Define Price discrimination. Explain how the firm attain equilibrium under Monopolistic Competition market.

SECTION - IV

7. Define Partnership. Explain features, types, advantages and limitations of Partnership business.
8. Define Equity shares. Explain different types of preference shares and Debentures.

SECTION - V

9. Draw the Pro-forma of Trading account, Profit and loss account and Balance sheet .
10. What do you mean by Working Capital? Explain types and determinants of Working Capital.

Code : 13ME2202

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

MACHINE DRAWING
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

*Any dimensions not clear or not given may be suitably
assumed or scaled from the drawing*

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SECTION – I

1. (a) Draw the thread profiles of
 - i) Whitworth
 - ii) Square.
- (b) Draw the square headed bolt with a nut and a washer in a position, take D24.
2. Draw the neat sketch of Woodruff key by taking the shaft diameter $D=20$ mm

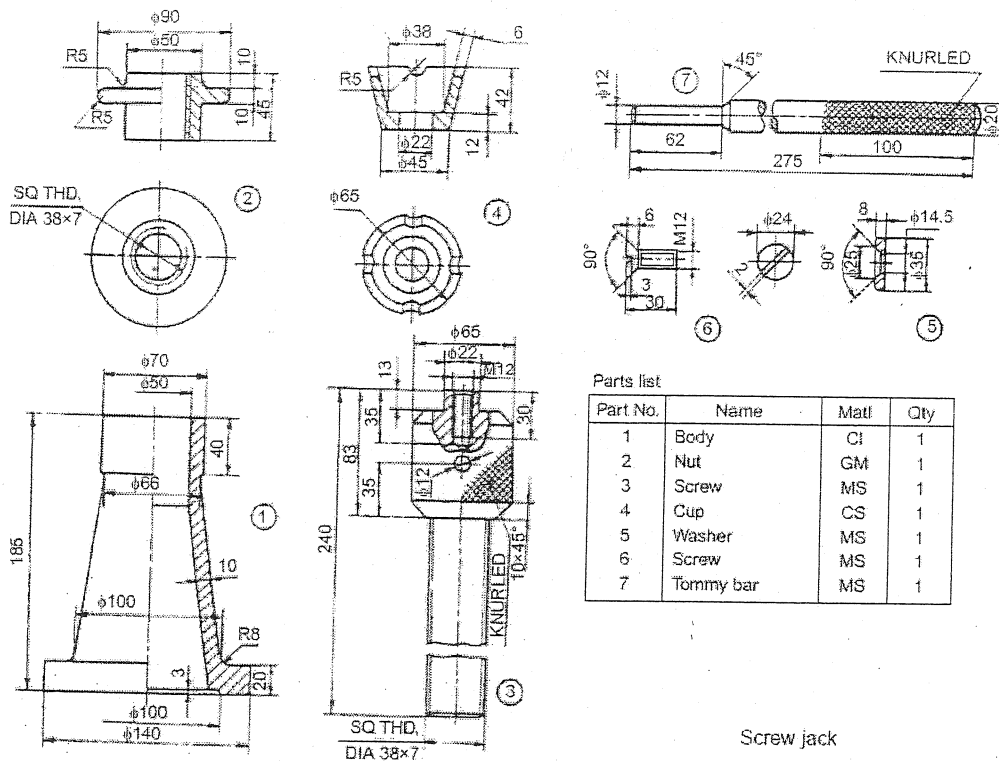
SECTION – II

3. Draw the front & side view flanged Coupling with size D20
4. Draw the dimensional sketch of a single riveted lap joint.

SECTION – III

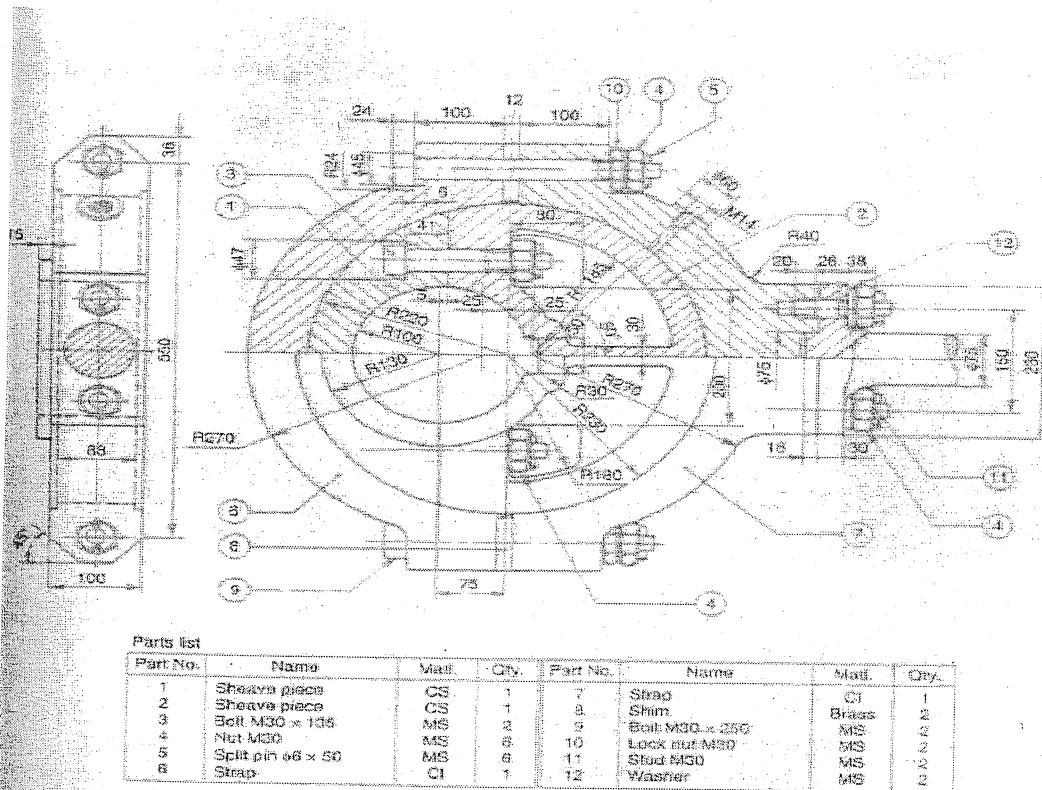
5. Details of Screw Jack are given in below figure ,draw the front view in half section and top view

(P.T.O)



Screw jack

6. Prepare the part drawing for the split sheave eccentric



Code : 13SH2203

B.TECH. DEGREE EXAMINATION, APRIL 2015

II B.Tech. II Semester

**ECONOMICS & ACCOUNTANCY
(Computer Science & Engineering)**

Time: 3Hrs

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks*

* * *

SECTION - I

1. What do you mean by Law of Demand? Explain assumptions and exceptions of Law of demand.
2. Define Price Elasticity of Demand. Explain different types of Price Elasticity of Demand with graphs.

SECTION - II

3. What do you mean by Iso-quant? Explain the Law of Returns to scale of production.
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