(10 CE 08)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR — SECOND SEMESTER

Branch – CE, ECE, ME & CSE

ENVIRONMENTAL STUDIES

(Common to all branches)

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) What are the various components of ecosystems? What role do they play in ecosystem processes?

   (b) Define biodiversity. Describe its various types and explain the need for its conservation.

Or

2. (a) Define ecosystem. Explain the structure and function of an ecosystem.

   (b) What are some of the factors responsible for India's rich biological diversity?

UNIT – II

3. (a) Discuss the environmental problems associated with land resources. (12)

   (b) What are the environmental implications of conventional and non-conventional sources of energy?

Or

4. (a) What is soil erosion? What are its causes? How can soil be conserved?

   (b) Discuss the environmental effects of modern agriculture.

UNIT – III

5. (a) Write short notes on : (12)

   (i) Effects of noise pollution

   (ii) Sources of solid wastes.

   (b) Classify the major sources of air pollution.

Or

6. (a) Discuss the causes and effects of thermal pollution.

   (b) Define land pollution and describe its sources.

[P.T.O]

UNIT – IV

7. (a) What are the objectives of environmental impact assessment? (12)

   (b) What are the major causes of concern about energy in India?

Or

8. (a) Explain the concept of sustainable development.

   (b) What is rain water harvesting? What are the major objectives for rainwater harvesting?

UNIT – V

9. (a) Write short notes on : (12)

   (i) Madhura refinery

   (ii) Kolleru lake aquaculture.

   (b) Write the 'Wild Life Protection Act'.

Or

10. (a) Write note on :

   (i) Water (prevention and control) Act

   (ii) Air (prevention and control) Act.

   (b) Write about the 'silent valley project'.

FOUR YEAR B.TECH. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR — SECOND SEMESTER

Branch – EEE

ELECTROMECHANICAL ENERGY CONVERSION – II

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I (1 × 12 = 12)

1. (a) With help of phasor diagrams explain star/delta and delta/star voltage and current relations.

   (b) A 3ϕ transformer bank consisting of 3 single phase transforms is used to step down the voltage of a 3ϕ, 6600 V transmission line. If the primary line current is 10 A, calculate the secondary line voltage line current and output KVA for the following connections :

   (i) y/Δ and

   (ii) Δ/y. The turns ratio is 12 neglect losses.

Or

2. (a) With the help of neat diagrams explain the method of converting 3 phase to two phase.

   (b) Explain about Delta/Zigzag star connections and their phases diagrams.

UNIT – II (1 × 12 = 12)

3. (a) Explain rotating magnetic field principle of operation with the help of phasor diagrams?

   (b) Derive the equation for maximum torque, maximum output slip for maximum output.

Or

4. (a) Explain with neat diagram the constructional details of a three phase induction motors.

   (b) Write the importance of determining efficiency, losses, equivalent circuit parameters from No load and blocked rotor tests.

UNIT – III (1 × 12 = 12)

5. (a) Write differences between direct load test and indirect load tests.

   (b) Explain the star delta and rotor resistance starters of 3ϕ induction motor.

Or

6. (a) Explain various methods of starting 3ϕ squirrel cage induction motor.

(b) A 440 V, 50 Hz, 4 pole, 3ϕ delta connected motor has a leakage impedance of $(0.3 + j5.5 + 0.25/s)\,\Omega$ phase (delta phase) refined to the stator. The stator to rotor voltage ratio is 2.5. Determine external resistance to be inserted in each star phase of the rotor winding such the motor develops a gross torque of 150 N.m at a speed of 1250 rpm.

UNIT – IV $(1 \times 12 = 12)$

7. (a) Explain pole changing method of consequent poles of speed control in 3ϕ induction motors?

(b) Explain the working of induction generator and give its applications.

Or

8. (a) Explain Torque-slip characteristics for variable f, constant V/f.

(b) Explain equivalent circuit characteristics of a double cage IM?

UNIT – V $(1 \times 12 = 12)$

9. (a) Compare various types of 1ϕ induction motor in terms of construction and performance.

(b) Let $R = 80\ \Omega$ and $X_L = 237.5\ \Omega$ of each wdg of a 50Hz, 1ϕ. capacitor induction motor respectively. Additional *'R'* resistance and *'C'* capacitance are in series with one wdg inorder to achieve a phase difference of 90 degree while both windings carry equal current. Calculate the values of R and C?

Or

10. (a) Explain with help of diagrams about double revolving field theory.

(b) Write a short notes on given 1ϕ induction motors

(i) Shaded pole motor.

(ii) Universal motor.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch - EEE

GENERATION OF ELECTRIC POWER

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

(12 × 1 = 12)

1. (a) What are requirements to be satisfied for the selection of site for thermal power station about any two?

   (b) In brief describe about any two components of TPS.

Or

2. (a) Give the description of thermal power station showing paths of coal, stream, water.

   (b) Write a short notes on turbines, condensers used in TPS.

UNIT – II

(12 × 1 = 12)

3. (a) What are various types of turbines used in Hydro electric plants? Explain with diagrams.

   (b) Write a short notes on pumper storage plants.

Or

4. (a) Explain the principle of operation of nuclear reactor and the production of electrical energy from nuclear power plants.

   (b) Give differences between BWR and FBR.

UNIT – III

(12 × 1 = 12)

5. (a) With a schematic diagram, explain the working of solar power plant.

   (b) What is the importance of this plant in the present energy crisis in the world?

Or

6. (a) Write a short notes on wind power plant.

   (b) What are various applications of wind power plants?

UNIT – IV

(12 × 1 = 12)

7. (a) Give the principle of MHD generation of electrical.

   (b) What are the advantages of MHD generation?

Or

8. (a) What are the parameters governing the MDH generator power output?

   (b) Write a short notes on tidal power generation.

UNIT – V

(12 × 1 = 12)

9. (a) Explain the following terms as applied to power system

   (i) Diversity factor

   (ii) Plant use factor

   (iii) Demand factor.

   (b) Write a short notes on integrated load duration curve.

Or

10. (a) Name different types of tariffs, explain them briefly.

    (b) Explain about cost of generation and their division into fixed, semi fixed and running cost.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch - Civil Engineering

SURVEYING – II

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. Write short notes on :

   (a) Traversing by the method of deflection angles. (6)

   (b) Traversing by the method of direct angles. (6)

Or

2. (a) What do you understand by omitted measurements? What are the various cases? Discuss in brief. (8)

   (b) What are the advantages of the co-ordinate method of plotting over other methods? (4)

UNIT – II

3. (a) Explain in detail about the principle of stadia method. (6)

   (b) Explain how the constants of the theodolite "K" and "C" on be determined. (6)

Or

4. (a) What are the sources of errors in tacheometry? (4)

   (b) The following data were obtained in a tacheometric survey. The staff was held vertically. Multiplying constant = 100. Height of the axis at instrument stations P was 1.560 m and the RL of P was 130.00 m.

Inst at	Staff at	WCB	Vertical angle	Staff reading		
P	Q	12° 25'	0° 0'	1.88	2.25	2.62
	R	60° 45'	15° 10'	1.83	2.15	2.47

   Determine the distance QR and their differences in elevation between Q + R. (8)

UNIT – III

5. (a) Discuss the method of setting out a circular curve two theodolitics. (6)

   (b) What are its advantages and disadvantages over Rankine's method? (6)

Or

6. (a) What are the basic criteria for the design of a transition curve? (4)

   (b) Derive an expression for super-elevation. (8)

[P.T.O]

UNIT – IV

7. (a) Derive an expression for the scale of a vertical photograph. Explain how the ground coordinates and the distances can be obtained from a vertical photograph. (8)

   (b) What is the principles of stereoscopic vision? (4)

Or

8. (a) Write short notes about photomaps and mosaics. (6)

   (b) The average scale of a photograph is equal to 1/6500. The minimum and maximum ground elevations are 170 m and 400 m respectively. If the focal length of the camera is given to be 15cm, calculate the flying height of the aircraft. (6)

UNIT – V

9. (a) Write in detail about the "Total station instrument".

   (b) What are the sources of errors in total station work?

Or

10. (a) Give a brief description of GPS. What are its main basic advantages? (6)

    (b) Write about the fundamentals of GPS positioning. (6)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch - ECE

ANALOG COMMUNICATIONS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Explain the need of modulation.

   (b) Derive expression for DSB-SC.

Or

2. (a) Explain SSB detection method.

   (b) Write notes on need of VSB.

UNIT – II

3. (a) Compare NBFM and WBFM.

   (b) Explain multi tone FM transmission method.

Or

4. (a) Explain FM detection with neat sketch.

   (b) Compare AM and FM.

UNIT – III

5. (a) What is the need of Nyquist rate?

   (b) Derive expression for Nyquist rate.

Or

6. What is aliasing? How it effects signal transmission? How it can be eliminated?

UNIT – IV

7. (a) Explain working of PLL.

   (b) Explain effect of additive noise on phase estimation.

Or

8. (a) Explain working of super hetrodyne receiver.

   (b) Explain the need of AGC.

UNIT - V

9. (a) Give the effect of transmission losses in ACS.

   (b) Compare and contrast angle modulation systems.

Or

10. (a) Explain working of AM transmitter.

    (b) Explain working of AM receiver.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch – CSE

ADVANCED DATA STRUCTURES

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. Explain the following with examples in the context of C++.
   (a) Constructors and destructors.
   (b) Garbage collection and dynamic memory allocation.

Or

2. (a) What is a friend function? Explain the advantages and disadvantages of it.
   (b) What is polymorphism? Explain about different types of polymorphism in C++ with suitable examples.

UNIT – II

3. (a) Discuss briefly the asymptotic notations used for finding the complexity of Algorithms.
   (b) Implement queue ADT using template classes in C++.

Or

4. (a) Explain the ADT operations for array implementation of stack.
   (b) Define a sparse matrix. Explain its representation.

UNIT – III

5. (a) What is skip list? How it is different from a linear linked list?
   (b) Explain with a neat example for the insertion and deletion operations.

Or

6. (a) Define hashing. Explain different types of collision resolution techniques.
   (b) Explain the representation of hash table.

UNIT – IV

7. (a) Discuss in detail about heap sort with example.

   (b) Discuss in detail about realizing a priority queues using heaps.

Or

8. (a) Discuss in detail about the multi way merge.

   (b) Explain in detail the model for external sorting.

UNIT – V

9. (a) Describe the B-trees. Explain the advantages of B-trees.

   (b) Explain the algorithm for right-to-right and left-to-left rotation.

Or

10. Define Binary search tree. Start with binary search tree.

   (a) Insert 15, 5, 20, 14, 30, 22, 2, 4, 3, 7, 9, 18. Draw the tree for each insertion.

   (b) Delete 2, 4, 5 draw tree for each deletion.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch – Mechanical Engineering

MATERIAL SCIENCE AND METALLURGY

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) What are the different types of Bravis lattice? Explain. (6)

   (b) Explain the concept of Ternary diagram. (6)

Or

2. (a) What is coordination number? Find the packing factor for SC, BCC and FCC systems. (6)

   (b) What is phase diagram? Explain the importance of phase rule. (6)

UNIT – II

3. (a) Describe the classification of mechanical tests. (6)

   (b) Describe the principle of impact test. (6)

Or

4. (a) Draw stress-strain diagram for ductile materials. (6)

   (b) Explain the Fick's law of diffusion. (6)

UNIT – III

5. (a) Write a short note on :

   (i) Isomorphus system

   (ii) Solid state reaction. (6)

   (b) Explain the following with neat diagrams.

   (i) Eutectic system

   (ii) Peritectoid system. (6)

Or

6. Draw a neat sketch of Fe – Fe_3 C diagram and label all phases in it. (12)

UNIT – IV

7. (a) Explain the following :

   (i) Dual phase steels

   (ii) Stock resisting steels. (6)

   (b) Explain the properties and applications of the following :

   (i) High carbon steel

   (ii) Super alloys. (6)

Or

8. (a) Explain briefly the effect of combined carbon and free carbon. (6)

   (b) What is chilled cast iron? Describe its properties and applications. (6)

UNIT – V

9. (a) Explain the significance of TTT diagram in heat treatment of steel.

   (b) Describe the martensite transformation.

Or

10. (a) Explain various finishing process used for sintered components. (6)

    (b) Explain various applications of powder metallurgy. (6)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR / SECOND SEMESTER

Branch – Civil Engineering

BUILDING PLANNING AND DRAWING

Time : 3 Hours *Max. Marks : 60*

PART A – (30 marks)

Answer any TWO questions.

1. (a) Write down the terms used in building drawing as per NBC.

   (b) What are the functional requirements of a residential building?

2. (a) What do you understand by principles of planning of a building?

   (b) Explain the significance of aspect and prospect for residential buildings.

3. (a) What do you understand term "Vaastu"? Explain the importance of Vaastu saastra in building construction.

   (b) What is the difference between law and bye-laws?

PART B – (30 marks)

4. (a) Draw the conventional signs for the following.

   (i) Timber

   (ii) Copper alloys.

   (iii) White lead

   (iv) Stone masonry.

   (b) Draw to scale the elevation and section of a glazed window for 1200 mm high and 2000 mm wide opening in a brick wall of 300 mm thick. Assume other data.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch - EEE, ECE & EICE

CIRCUITS AND NETWORKS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. Derive expression for three phase power.

Or

2. Derive relations between star and delta circuits.

UNIT – II

3. Derive equation for transient response of RL DC circuit.

Or

4. Derive equation for transient response of RC DC circuit.

UNIT – III

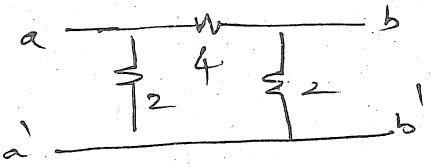
5. Derive necessary conditions for driving point and transfer functions.

Or

6. Explain time domain response from pole zero plots with example.

UNIT – IV

7. Find Z parameters for the circuit shown :



Or

8. Derive Y parameters in terms of *n* parameters.

UNIT – V

9. Realize LC imittance functions by foster and Cauer method.

Or

10. Explain the conditions of reliability.

(10 CE 09)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR / SECOND SEMESTER

Branch – Civil Engineering

FLUID MECHANICS - I

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each unit.

UNIT – I

1. (a) Write in detail about the relation between shear and pressure gradients in laminar flow. (6)

   (b) Oil of viscosity 0.1 Pas, and specific gravity 0.90, flows through a horizontal pipe of 25 mm diameter. If the pressure drop per meter length of the pipe is 12 kpa, determine

   (i) The rate of flow;

   (ii) The shear stress at the pipe wall;

   (iii) The Reynolds number of the flows and

   (iv) The power required per 50 m length of pipe to maintain the flow. (6)

Or

2. (a) Using Hagen-Poiseuille equation, derive an expression for the head loss in a pipe of diameter "D" and length "L" in terms of Reynolds number and velocity head. (8)

   (b) For Laminar flow of an oil having dynamic viscosity $\mu = 1.766 pa.s$ in a 0.3 m diameter pipe, the velocity distribution is parabolic with a maximum point velocity of $3m/s$ at the centre of the pipe. Calculate the shearing stresses at the pipe wall and within the fluid 50 mm from the pipe wall. (4)

UNIT – II

3. (a) How is head loss in commercial pipes determined? (4)

   (b) A smotth brass pipeline 75 mm in diameter and 900 m, long carries water at the rate of 7 *lts* per second. If the kinematic viscosity of water is 0.0195 stakes, calculate the loss of head, wall shearing stress, center line velocity, shear stress and velocity at 25 mm from the center line and the thickness of the laminar sublayer. Take $P = 1000 kg/m^3$. (8)

Or

4. (a) What is a compound pipe (or) pipes in series? How would you determine the equivalent size of a compound pipe? (6)

   (b) Write short notes about branching pipes. (6)

[P.T.O]

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch – CSE

COMPUTER ORGANIZATION

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Explain the various phases of instruction cycle in a basic computer.

   (b) Explain different types of computers.

Or

2. (a) Explain performance issues of a computer.

   (b) What are the basic functional units of a computer? Explain the operational concepts of a computer with a neat sketch.

UNIT – II

3. (a) Explain synchronous and asynchronous bus in an input operation with timings diagrams.

   (b) What are interrupts? How are they handled?

Or

4. (a) Differentiate between isolated versus memory mapped I/O.

   (b) Explain with block diagram the DMA transfer in a computer system.

UNIT – III

5. (a) Explain the basis for Booths multiplication algorithm along with its constituent steps. What type of numbers it will work?

   (b) Multiply (+15) with (–13) using Booths algorithm.

Or

6. (a) Discuss about RAM and ROM chips with necessary block diagram and briefly explain about associative memory.

   (b) Describe the terms :

   (i) Latency

   (ii) Replacement algorithm

   (iii) With reference to cache memory.

UNIT – V

9. (a) Explain the working principles of reciprocating pump with sketches. (6)

(b) Show that the maximum inertia head in a reciprocating pump without air vessel is given by $\mu_a = \frac{l}{g} \times \frac{A}{a} w^2 r$ with usual notation. (6)

Or

10. (a) Explain in detail about the multistage pumps with neat sketch. (8)

(b) What are the advantages of centrifugal pumps over reciprocating pumps? (4)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch – Mechanical Engineering

HYDRAULIC MACHINES AND CONTROL SYSTEMS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Derive the equation for force on the curved plate when the plate is moving in the direction of jet.

   (b) A jet of water of diameter 7.5 cm strikes a curved plate at its centre with a velocity of 20 m/s. The curved plate is moving a velocity of 8 m/s in the direction of jet. The jet is deflected through an angle of 165° assuming the plate smooth.

   Find :

   (i) Force exerted on plate in direction of jet

   (ii) Power of jet

   (iii) Efficiency of jet.

Or

2. Find an expression for the efficiency of a series of moving curved vanes when a jet of water strikes the vanes at one of its tips. Prove that maximum efficiency is when $u = v$ and value of maximum efficiency is 50%.

UNIT – II

3. Obtain an expression for work done per second by water on a runner of pelton wheel. Hence derive an expression for maximum efficiency of pelton wheel giving the relation between jet speed and bucket speed.

Or

4. (a) What is Draft tube? Describe with sketch two different types of draft tube.

   (b) A Kaplan turbine develops 24647.6 kW power at an average head of 39 mts. Assuming a speed ratio of 2, flow ratio of 0.6 diameter of boss equal to 0.35 times the diameter of runner and an overall efficiency of 90%.

   Calculate the diameter, speed and specific speed of turbine.

UNIT - III

5. (a) Derive the expression for specific speed of a centrifugal pump.

   (b) The diameters of an impeller of a centrifugal pump at inlet and outlet are 30 cm and 60 cm respectively. The velocity of flew at outlet is 2 m/s. and vanes are set back at an angle of 45° at outlet. Determine minimum starting speed of pump if manometric Efficiency is 70%.

Or

6. (a) Explain briefly main parts of centrifugal pump.

   (b) Explain model testing of centrifugal pumps.

UNIT - IV

7. (a) Explain with neat sketch main parts and working of Reciprocating pump.

   (b) A double acting reciprocating pump running at 40 rpm is discharging 1.0 m^3 of water per minute the pump has a stroke of 400 mm. The diameter of piston is 200 mm. The delivery and suction head are 20 m and 5 m respectively. Find the slip of pump and power required to drive pump.

Or

8. Explain variation of velocity and acceleration in the suction and delivery pipes due to acceleration of piston.

UNIT - V

9. (a) Explain with neat sketch hydraulic press.

   (b) Hydraulic lift working principle with neat sketch.

Or

10. Explain briefly about :

   (a) Hydraulic torque converter

   (b) Hydraulic intensifier.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR — SECOND SEMESTER

Branch – CSE

NUMERICAL METHODS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I (1 × 12 = 12)

1. (a) Find the root of the equation $x^3 - 2x - 5 = 0$ using the bisection method.

   (b) Using Regula-falsi method, compute the real root of $xe^x - 2 = 0$

Or

2. (a) Find the cube root of 41, using Newton-Raphson method.

   (b) Find by Horner's method, the root of the equation $x^3 + x - 1 = 0$.

UNIT – II (1 × 12 = 12)

3. (a) Apply Gauss-Jordan method to solve the equations, $x + y + z = 9$; $2x - 3y + 4z = 13$, $3x + 4y + 5z = 40$.

   (b) Solve by the factorization method :

   $x + 2y + 3z = 14$; $2x + 3y + 4z = 20$; $3x + 4y + z = 14$.

Or

4. (a) Solve $5x + 2y + z = 12$, $x + 4y + 2z = 15$, $x + 2y + 5z = 20$ by Gauss-Seidal method.

   (b) Solve by Relaxation method, the equations $9x - 2y + z = 50$, $x + 5y - 3z = 18$, $-2x + 2y + 7z = 19$.

UNIT – III (1 × 12 = 12)

5. (a) Given sin 45° = 0.7071, sin 50° = 0.7660, sin 55° = 0.8192, sin 60° = 0.8660; find sin 52°. Using Newton's forward formula.

   (b) Using Gauss's forward formula, evaluate $f(3.75)$ from the table.

x :	2.5	3	3.5	4	4.5	5.0
y :	24.145	22.043	20.225	18.644	17.262	16.047

Or

6. (a) Use Lagranges interpolation formula to find the value of y where $x = 10$, if the following values of x and y are given

x:	5	6	9	11
y:	12	13	14	16

(b) Using Newton's divided difference formula to find $f(x)$ from the data.

x:	0	1	2	4	5	6
$f(x)$:	1	14	15	5	6	19

UNIT – IV $(1 \times 12 = 12)$

7. (a) Find $y'(0)$ and $y''(0)$ from the following data :

x:	0	1	2	3	4	5
y:	4	8	15	7	6	2

(b) Calculate $\int_0^{\pi/2} \sin x \, dx$ by Simpson's $\frac{1}{3}$ rule, sing 11° ordinates.

Or

8. (a) Find the value of $\int_4^{5.2} \log_e x \, dx$ by Weddle's rule.

(b) Using following data, find x for which y is minimum and find this value of y.

x:	0.60	0.65	0.70	0.75
y:	0.6221	0.6155	0.6138	0.6170

UNIT – V $(1 \times 12 = 12)$

9. (a) Using Picard's method, obtain a solution for $\frac{dy}{dx} = x^2 + y^2$ for $x = 0.4$, given that $y = 0$ when $x = 0$.

(b) Using R-K method of order 4, find $y(0.2)$ for $\frac{dy}{dx} = x + y^2$, given that $y = 1$ when $x = 0$.

Or

10. (a) Apply Milne's method, to find a solution of the differential equation $y' = x - y^2$ in the range $0 \le x \le 1$ for $y = 0$ at $x = 0$.

(b) Solve the partial differential equation $\nabla^2 u = -10(x^2 + y^2 + 10)$ over the square with sides $x = 0 = y$, $x = 3 = y$ with $u = 0$ on the boundary and mesh length = 1.

(10 SH 14)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch – EEE, ECE AND EICE

ENGINEERING MATHEMATICS – IV

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I (1 × 12 = 12)

1. (a) Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position correct to three decimal places.

   (b) Develop a recurrence formula for finding $\sqrt{N}$, using Newton-Raphson method and hence compute $\sqrt{32}$ to four decimal places.

Or

2. (a) Fit a parabola $y = a + bx + cx^2$ to the following data :

x :	2	4	6	8	10
y :	3.07	12.85	31.47	57.38	91.29

   (b) Find the correlation coefficient between x and y from the given data.

x :	78	89	97	69	59	79	68	57
y :	125	137	156	112	107	138	123	108

UNIT – II (1 × 12 = 12)

3. (a) Solve $2x + y + z = 10$, $3x + 2y + 3z = 18$, $x + 4y + 9z = 16$ by Gauss-elimination method.

   (b) Solve $3x + 2y + 7z = 4$, $2x + 3y + z = 5$, $3x + 4y + z = 7$ by factorization method.

Or

4. (a) Solve $2x + y + 6z = 9$, $8x + 3y + 2z = 13$, $x + 5y + z = 7$ by Gauss-seidal method.

   (b) Solve the non-linear equations $x^2 - y^2 = 4$, $x^2 + y^2 = 16$ numerically with $x_0 = y_0 = 2.828$ using Newton-Raphson method carryout two iterations.

UNIT – III

(1 × 12 = 12)

5. (a) Find the value of y when $x = 0.1$, if $\frac{dy}{dx} = x - y^2$ and $y = 1$ at $x = 0$ using Taylor's series.

(b) Using Euler's method, find an approximate value of y corresponding to $x = 1$, given that $\frac{dy}{dx} = x + y$ and $y = 1$ when $x = 0$.

Or

6. (a) Use R-K method of order 4, compute $y(1.2)$ in steps of 0.1, given that $\frac{dy}{dx} = x^2 + y^2$ and $y(1) = 1.5$.

(b) Given $2\frac{dy}{dx} = (1 + x^2)\, y^2$ and $y(0) = 1$, $y(0.1) = 1.06$, $y(0.2) = 1.12$, $y(0.3) = 1.21$, evaluate $y(0.4)$ by Milne's predictor – corrector method.

UNIT – IV

(1 × 12 = 12)

7. (a) (i) Is the function defined as follows a density functions?

$$f(x) = e^{-x}, \quad x \geq 0$$
$$= 0, \quad x < 0$$

(ii) If so, determine the probability that the variate having this density will fall in the interval (1, 2)?

(iii) Also find the cumulative probability function $F(2)$?

(b) Four coins are tossed. What is the expectation of the number of heads?

Or

8. (a) The probability that a pen manufactured by a company will be defective is $\frac{1}{10}$. If 12 such pens are manufactured, find the probability that

(i) Exactly two will be defective

(ii) Atleast two will be defective

(iii) Non will be defective.

(b) If the probability of a bad reaction from a certain injection is 0.001, determine the chance that out of 2,000 individuals more than two will get a bad reaction.

(10 SH 13)

UNIT – V

$(1 \times 12 = 12)$

9. (a) Using Newton's forward formula, find the value of $f(1.6)$ if

x:	1	1.4	1.8	2.2
$f(x)$:	3.49	4.82	5.96	6.5

(b) Apply Lagrange's method to find the value of y when $x = 15$ from the data

x:	5	6	9	11
$f(x)$:	12	13	14	16

Or

10. (a) From the following table find the values of $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 2.03$

x:	1.96	1.98	2.00	2.02	2.04
y:	0.7825	0.7739	0.7651	0.7563	0.7473

(b) Compute the values of $I = \int_0^1 \frac{dx}{1+x^2}$ using the trapezoidal rule with $h = 0.5, 0.25$ and $h = 0.125$. Then obtain a better estimate by Romberg's method. Compare with the true value.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR / SECOND SEMESTER

Branch – Civil Engineering

HIGHWAY ENGINEERING - I

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each unit.

UNIT – I

1. (a) What are the different modes of transportation? Explain the specific functions of each of them.

   (b) Explain the role of transportation in rural development in India.

Or

2. (a) Briefly discuss the historical development of road construction.

   (b) Explain briefly the modified classification of road system in India as per the Third Twenty year road development plan, 1981-2001.

UNIT – II

3. (a) What are the various planes to be prepared after the planning surveys are carried out?

   (b) What are the points to be considered in a new highway project?

Or

4. (a) What are the various requirements of an ideal highway alignment? Discuss briefly.

   (b) Discuss the general principles in the realignment of a highway and explain how the work is carried out.

UNIT – III

5. (a) Discuss the effects of shape of camber and the effects providing step cross fall.

   (b) Enumerate the factors governing the width of carriage way. State the IRC specifications for width of carriage way for various classes of roads.

Or

6. (a) Explain sight distance and factors causing restrictions to sight distance. Explain the significance of stopping, intermediate and overtaking sight distances.

   (b) Calculate the stopping sight distance for a design speed of 100 kmph. Take the total reaction time 2.5 second and the coefficient of friction = 0.35.

UNIT – IV

7. (a) Derive an equation for finding the superelevation required of the design coefficient of lateral friction is "f".

   (b) Design the superelevation required at a horizontal curve of radius 300 m for speed of 60 kmph. Assume suitable data.

Or

8. (a) Discuss the factors that govern the length of summit curves.

   (b) Explain the factors based on which the length of curve is designed.

UNIT – V

9. (a) What are the desirable properties of bituminous mixes?

   (b) What are the steps in bituminous mix design? Discuss briefly.

Or

10. Discuss the principles, applications and limitations of direct shear, triaxial and unconfined compression test.

(10 ME 07)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch - Mechanical Engineering

APPLIED THERMODYNAMICS – I

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Compare between fire-tube and water-tube boilers.

   (b) With a neat sketch explain about Babock and Wilcox water-tube boiler.

Or

2. (a) Explain briefly about Benson boiler with neat sketch and give its advantages.

   (b) What is pressurised water reactor? Explain with neat sketch.

UNIT – II

3. (a) Explain briefly about boiler mountings.

   (b) In a steam turbine steam at 20 bar, 360° C is expanded to 0.08 bar. It then enters a condenser, where it is condensed to a saturated liquid water. The pump feeds back the water into the boiler. Assume ideal processes. Find per kg of steam the net work and the cycle efficiency.

Or

4. (a) Explain briefly the principles of operation of steam engine condensing.

   (b) Explain various operations of a Carnot cycle and find efficiency with the help of P-V and T-S diaglans.

UNIT – III

5. (a) Dry saturated steam enters to a steam nozzle at a pressure of 15 bar and is discharged at a pressure of 2.0 bar if the dryness fraction of discharge steam is 0.96, what will be the final velocity of steam? Neglect initial velocity of steam. If 10% of heat drop is lost in friction find percentage reduction in final velocity.

   (b) State the relation between the velocity of steam and heat during any part of a steam nozzle.

Or

6. (a) Explain briefly about surface condensers.

   (b) The pressure under the air baffle of a surface condenser is 52 mm of Hg. temperature of the mixture learning the cooler section is 25° C. Assuming available water at 15.5° C and external water might lower the temperature further to 20° C. Explain the effect of this on the quantity of vapour accompanying the air to air pump suction.

UNIT – IV

7. Explain briefly with neat sketches what are the methods of reducing wheet or rotor speed.

Or

8. (a) The velocity of steam existing the nozzle of impulse stage of a turbine is 400 m/s. The blades operate close to the maximum blade efficiency. The nozzle angle is 20° considering equiangular blades and neglecting blade friction. Calculate for a steam flow of 0.6 kg/s, the diagram power, diagram efficiency.

   (b) Describe briefly the various methods of 'steam turbine governing'.

UNIT – V

9. (a) Classification and operation of tidal power plant.

   (b) Explain briefly about wind power plants.

Or

10. (a) Explain about flat plate collectors and focusing collectors.

    (b) Explain about Magneto hydro dynamics.

(10 EC 07)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR — SECOND SEMESTER

Branch – EEE, ECE and EICE

LOGIC CIRCUITS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. Write notes on different types of codes with examples.

Or

2. Write notes on error correction and detection codes.

UNIT – II

3. What are limitations of k-map? What are prime, essential and redundant prime implicants? Give example.

Or

4. Draw multiplexer and demultiplexer diagrams and explain them.

UNIT – III

5. What is race around condition? How it can be eleminated?

Or

6. Draw mod 10 counter and explain its working.

UNIT – IV

7. Draw serial binary adder and explain its working.

Or

8. Explain applications of parallel adder.

[P.T.O]

UNIT – V

9. Give memory hierarchy and explain their properties.

Or

10. Explain architecture of semiconductor RAM.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch - EEE, ECE & EICE

ELECTRONIC CIRCUITS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. Draw circuit diagram of full wave rectifier and explain its working. Derive expression for its efficiency.

Or

2. Explain frequency response of CE amplifier and derive expression for its band width.

UNIT – II

3. Explain the effect of coupling and by pass capacities on low frequency response.

Or

4. Draw hybrid Pi model at high frequencies and explain it.

UNIT – III

5. Explain different FET biasing schemes.

Or

6. Explain small signal model analysis of CS amplifier.

UNIT – IV

7. Explain small signal analysis of class A amplifier.

Or

8. Explain the frequency response of transformer coupled amplifier.

UNIT – V

9. Explain the effect of negative feedback on gain, stability, noise etc.

Or

10. Explain the Barkhausen criteria. Draw RC phase shift oscillator circuit and explain.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR — SECOND SEMESTER

Branch – Civil Engineering

MECHANICS OF SOLIDS

Time : 3 Hours *Max. Marks : 60*

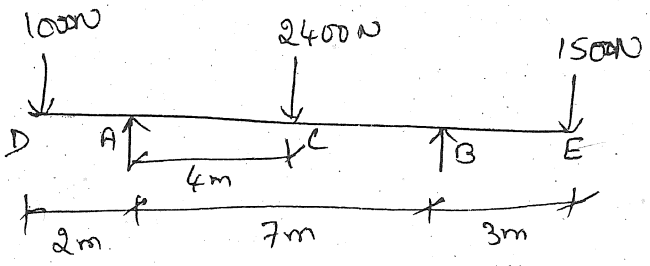
Answer ONE question from each Unit.

UNIT – I

1. A beam AB 10 m long has supports at its ends A and B. It carries a point load of 5 kN at 3 m from A and a point load of 5 kN at 7 m from A and a uniformly distributed load of 1 kN per metre between the point loads. Draw SF abd BM diagrams for the beam.

Or

2. Calculate the reactions at the supports A and B of the beam shown in figure-1. Draw bending movement and shearing force diagrams. Determine also the points of contraflaxure within the span AB and show their positions on the BM diagrams.



UNIT – II

3. A beam is triangular in section having a base b and an altitude h. It is placed with its base horizontal. If at a certain section of the beam the shear force is S. Find the maximum shear stress and shear stress at the neutral axis.

Or

4. Define pure bending. Explain the theory of simple bending.

UNIT – III

5. (a) What are the limitations of Euler's formula?

   (b) Derive an expression when one end of the column is fixed and other end is pinned.

Or

6. A masonry pier 6 m high is a hallow rectangle in section. The external dimensions are 5m × 2m while the internal diversions are 4m × 1m. If the pier is subjected to a horizontal thrust of 26 kN at its top in the vertical plane bisecting the length, find the extreme streses on the base section. Take the weight of masonry as 22 kN/m^3

[P.T.O]

UNIT – IV

7. A composite spring has two close-coiled helical steel springs in series. Each spring has a mean coil diameter of 8 times diameter of its wire. One spring has 20 coils and wire diameter of 2.5 mm. Find the diameter of the wire in the other spring if it has 15 coils and the stiffness of the composite spring is 1.25 N/mm. Find the greatest axial load that can be applied to the spring and the corresponding extension of a maximum shearing stress of 300 N/mm^2. Take $C = 789 \times 10^4 N/mm^2$

Or

8. A hollow shaft of diameter ratio 3/8 is to transmit 375 kw at 100 rpm, the maximum torque being 20% greater than the mean; the shear stress is not to exceed 60 N/mm^2 and the twist in a length of 4 m is not to exceed 2°. Calculate its external and internal diameters which would satisfy both the above conditions. take $C = 8.5 \times 10^4 N/mm^2$.

UNIT – V

9. Two planes AB and BC which are at right angles carry shear stresses of intensity 17.5 N/mm^2 while these planes also carry a tensile stress of 70 N/mm^2 and a compressive stress of 35 N/mm^2 respectively. Determine the principal stress and principal strains. Also determine the maximum shear stress and the plane on which it acts.

Or

10. A pipe of 500 mm internal diameter and 100 mm thickness contains a fluid at a pressure of $6 N/mm^2$. Find the maximum and minimum hoop stresses across the section. Also sketch the radial pressure distribution across this section.

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch - CSE

ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Explain Zener mechanism in zener diode.
   (b) Discuss LED and LASER characteristics.

Or

2. (a) What is early effect? Draw I/P and O/P characteristics of CB configuration.
   (b) Design a self bias circuit.

UNIT – II

3. (a) Explain CE amplifier.
   (b) Discuss multistate amplifiers.

Or

4. (a) Explain the principle and operation of RC phase shift oscillator.
   (b) Give the advantages of –ve feedback.

UNIT – III

5. (a) Explain inverting and non-inverting operations amplifiers.
   (b) Explain op-amp integrator in detail.

Or

6. (a) Explain astable multivibrator using 555 timer.
   (b) Discuss the principles of PLL in detail.

UNIT – IV

7. (a) Explain PCM with neat block diagram.
   (b) Briefly explain FM.

Or

8. (a) Explain delta modulation with neat block diagram.
   (b) Give the differences between TDM and FDM.

UNIT – V

9. (a) Explain weighted resistor DAC in detail.

   (b) Give the principles of CRO.

Or

10. (a) Explain successive approximation ADC.

    (b) Explain the principle and operation of digital multimeter.

(10 ME 08)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch – Mechanical Engineering

MACHINE TOOLS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. Explain with neat sketches types of lathe operations and work holding devices.

Or

2. Explain with neat sketch about capstan lathe.

UNIT – II

3. Explain with neat sketch about upright drilling machine and operations performed on it.

Or

4. Explain about surface grinding with neat sketch and also explain about Jig boring machines.

UNIT – III

5. Explain various types of indexings are used in milling machine.

Or

6. Explain with neat sketch about vertical broaching machine and also about Gear Finishing method.

UNIT – IV

7. Explain with sketch about CNC system and advantages of it.

Or

8. Explain about types of NC coordinate systems and also list the basic commands used in manual part program.

UNIT – V

9. Explain with sketch about USM and its advantages.

Or

10. Explain with neat sketch about LBM and its advantages.

(10 ME 08)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2015

SECOND YEAR/SECOND SEMESTER

Branch - CSE

BASICS OF ELECTRICAL ENGINEERING

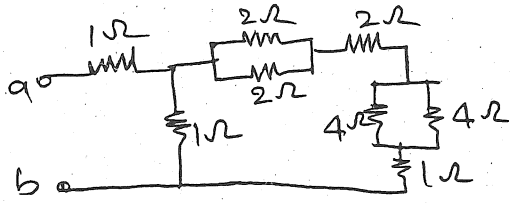
Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

(1 × 12= 12)

1. (a) By using series parallel combinations, find the equivalent resistance in fig below at the terminals a, b

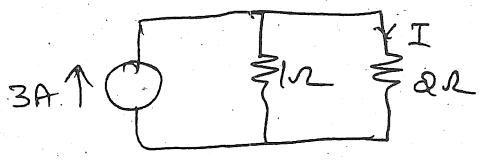


(b) Define and explain KVL and KCL with example.

Or

2. (a) Give the important points which have to be considered in calculating the parallel resistors current distribution.

(b) Find the current in the 2Ω resistor.



UNIT – II

(1 × 12= 12)

3. (a) Get the RMS, average and form factor of sine wave.

(b) Define phase difference and get the voltage, current power, impedance expressions for a pure inductor.

Or

4. (a) What is the importance of reactive power and explain about real power, reactive power and apparent power with the help of power triangle at L and C.

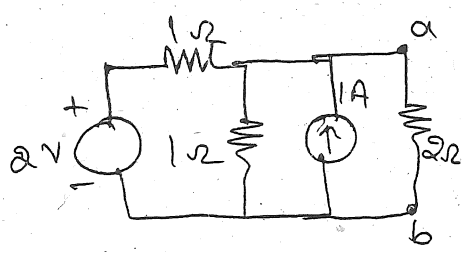
(b) Calculate the inductive reactance of a 100mH inductor connected to a 230V, 50 Hz sinusoidal supply. If the frequency is increased to 5 kHz what will be its reactance?

UNIT – III

(1 × 12= 12)

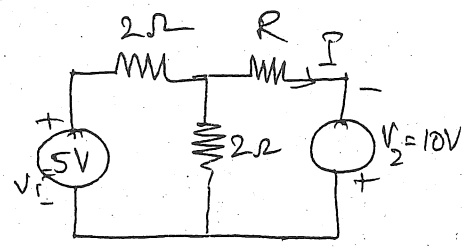
5. (a) State and explain superposition theorem with example.

   (b) Calculate the current in the 2Ω resistor in the given fig. using Thevenins theorem.



Or

6. (a) Using reciprocity theorem obtain the current I in the network given, if 5V source acting alone produces a current of 1A in the resistor R.



   (b) State and explain maximum power transfer theorem with example.

UNIT – IV

(1 × 12= 12)

7. (a) Give the principle of operation of DC generator.

   (b) Classify and get the voltage equations of various types of generators based on excitation.

Or

8. (a) Give the working principle of DC motors.

   (b) Derive the equation of Torque in DC motors.

UNIT – V

(1 × 12= 12)

9. (a) Classify various types of transformers based on construction, applications.

   (b) Derive emf equation of transformer.

Or

10. (a) What are various losses in transformers give methods to reduce the losses?

    (b) Explain the working of single phase inductor motor.

(10 EE 33)