Code :17CS1101

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

BASIC COMPUTER ENGINEERING

(Common to EEE, ECE ,CSE & IT)

Time : 3Hrs Max. Marks : 60

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

* * *

SECTION - I

1. (a) What is a computer? What is the most popular usages of home computers?
   (b) How are computer technologies being used to train surgeons?

2. (a) What are the four phases of information processing cycle?
   (b) Name and differentiate the two main categories of storage devices and computer software?

SECTION – II

3. (a) Explain how a bar code reader reads a bar code and what it does with the information from a bar code?
   (b) How does an OCR software translate scanned text into text that you can edit?

4. (a) What is the difference between L1 and L2 cache?
   (b) What is dot pitch? How does a color CRT monitor produce images on the screen?

SECTION – III

5. (a) What is the most effective way to measure the average access time of a hard disk?
   (b) List three tasks you can perform that can improve the performance of a computers hard disk?

6. (a) List four different types of magnetic storage media commonly used with PCs?
   (b) Why is a hard disk called a random access storage device?

SECTION – IV

7 (a) What are the four primary fucntions that an operating system perform?
   (b) What is the difference between object linking and object embedding?

8 (a) What is the function of windows in a GUI?

(b) When working with windows, what happens when you right click on most objects?

SECTION – V

9 (a) What is aclone? Explain its functionality?

(b) Explain why DOS is still use? What is a peer to peer network?

10 (a) What was the primary use of windows 2000 professional? Name four types of media used to link networks?

(b) What purpose would a shell serve in linux? List four types of network topologies used in wire based networks?

SECTION – VI

11 (a) Explain why data mining is often useful in making business decision?

(b) How to disconnected datasets help improve database performance?

12 (a) What is a spam blocker? When it is especially important to use a firewall?

(b) When is it especially important to use a firewall? How can you avoid spam by having two email addresses?

L3

Code : 17CS1102

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

INTRODUCTION TO COMPUTING

(Common to CE & ME)

Time : 3Hrs Max. Marks : 60

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

* * *

SECTION - I

1. (a) List out the uses of computers for individual users. Explain them briefly.
   (b) Why network servers are so important for the organizations? Explain it briefly.

2. (a) Differentiate between system software and application software.
   (b) Explain various applications of computers.

SECTION – II

3. (a) List out the various keys of a keyboard with its layout. Give its clear explanation.
   (b) Explain the various categories of storage devices with examples.

4. (a) Write how data is stored and organized on disk.
   (b) Distinguish CRT monitors and Flat panel Monitors.

SECTION – III

5. (a) Discuss about real time operating system.
   (b) Describe various user interfaces. Explain them briefly.

6. (a) Explain about Single user/Multitasking Operating System.
   (b) Write about Multi-user/Multitasking Operating System.

SECTION – IV

7 (a) Explain the structure of C program in detail.
   (b) Explain the following with an example.
   i) Character set ii) constants

8 (a) List and explain Data types in C language.
   (b) What is variable? Explain various rules for defining variables.

SECTION – V

9 (a) Explain about formatted functions with an example.

(b) Define user defined function? Write a c program to copy & reverse of a given string.

10 (a) Discuss various types of If statements.

(b) Explain switch statement. Write a c program to find whether a student secured distinction or first class or second class or third class or fail class using switch statement.

SECTION – VI

11 (a) Give the differences between while and do-while statements with an example.

(b) Write different types of for loop with an example.

12 (a) What are the Characteristics of an array? Write a C Program to find sum of elements in an array.

(b) List and explain Array Categories. Write a c program for addition of two dimensional matrices.

LB

Code :17CE1101

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

BUILDING MATERIALS

(Civil Engineering)

Time : 3Hrs Max. Marks : 60

Answer SIX Questions,Choosing ONE Question from each section

All Questions carry equal marks

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* * *

SECTION - I

1. (a) What are the uses of various types of bricks?
   (b) Describe the process of burning bricks in intermittent kilns.
2. (a) Describe the various constituents of good brick earth.
   (b) Give the sketch of the Hoffman's kiln.

SECTION – II

3. (a) Discuss physical and chemical classification of rocks.
   (b) What are the precautions to be taken in the process of blasting?
4. (a) Write a brief note on preservation of stones.
   (b) Briefly explain the properties and uses of common building stones.

SECTION – III

5. (a) Explain seasoning of timber, its necessity and methods of seasoning.
   (b) What are the various defects in timber? Why they are caused.
6. (a) Explain in what way steel can be alternate material for wood.
   (b) State and write briefly about various properties of glass.

SECTION – IV

7 (a) Describe the materials used in making concrete.
   (b) Define and explain workability of concrete.

8 (a) What are the precautions to be taken for the storage of cement
   (b) Briefly explain the procedure to find compressive strength of cement in the laboratory.

SECTION – V

9. (a) Differentiate between lime mortar and cement mortar.
   (b) Explain the characteristics of good mortar.

10 (a) Write briefly about procedure for selection of mortar.
(b) What is guniting? Explain about various applications of gunting.

SECTION – VI

11 (a) Discuss about the use of fly ash as a construction material.
(b) What are the uses of nano-materials as construction materials?
12 (a) Explain how fiber-reinforced plastics can be useful as building materials.
(b) Discuss about uses of carbon fibers.

Code :17ME1101

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

ELEMENTS OF MECHANICAL ENGINEERING

(Mechanical Engineering)

Time : 3Hrs Max. Marks : 60

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

* * *

SECTION - I

1. a) What are the advantages of casting process?
   b) Explain the working principle of arc welding with a neat sketch.

2. a) What are the differences between soldering and welding processes?
   b) What are the differences between hot working and cold working process?

SECTION – II

3. a) Classify the Engineering materials.
   b) What is alloy steel? Discuss the effect of any four important alloying elements on the properties of steel.

4. a) What are the functions performed by machine tools?
   b) Explain any one machine tool with neat sketch.

SECTION – III

5. Classify internal combustion engines and describe 4 stroke diesel engine with neat sketch.

6. a) Distinguish two stroke and four stroke engines.
   b) Explain IC engine performance characteristics.

SECTION – IV

7 a) Distinguish renewable and non-renewable energy sources.
   b) Explain how the power will be generated from wind energy?

8 Explain the important components of Steam power plant with a neat sketch.

SECTION – V

9 a) What is the unit of refrigeration? How it is defined?
   b) What are the applications of refrigeration system?

10 Explain about the working of air conditioning system with a neat sketch.

SECTION – VI

11 a) What do you mean by power transmission? How can you select a drive based on distance?

b) What are the applications of helical springs?

12 a) What is a cam? Classify them.

b) What are the applications of gear drive?

Code :17EE1101

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

BASIC ELECTRICAL SCIENCES

(Common to EEE, ECE, CSE & IT)

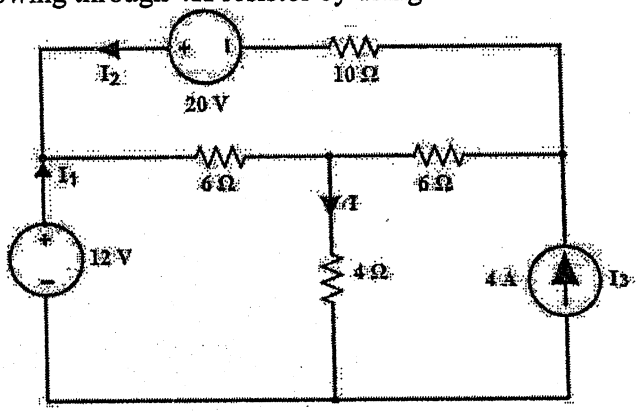
Time : 3Hrs Max. Marks : 60

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

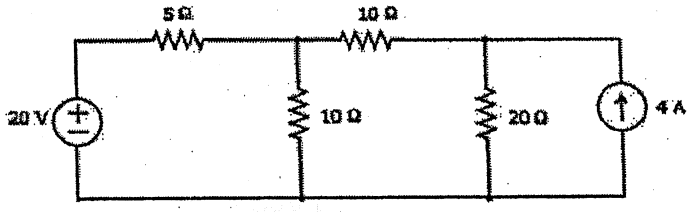
* * *

SECTION - I

1. (a) Derive the equivalent STAR expressions for given DELTA.
   (b) Find the current flowing through 4Ω resistor by using KVL and KCL?



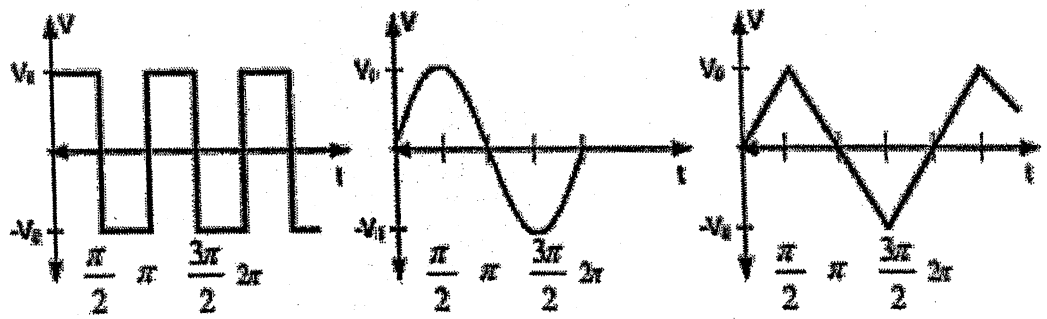
2. (a) Find the value of current flowing through 20Ω resistor by using source transformation and network reduction techniques?



   (b) Define & write the characteristics of R, L,C elements and also write the voltage and current equations

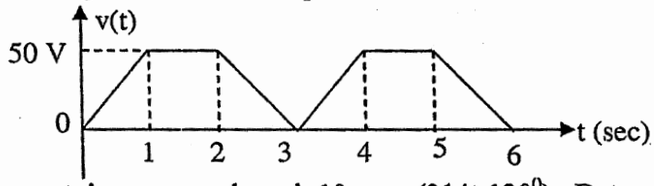
SECTION – II

3. (a) Find the RMS and Average value of the periodic waveforms shown in below fig.



   (b) Define & Write the difference between the terms phase and phase difference?

4. (a) Find the RMS and average values of the trapezoidal waveform shown in figure.



(b) An alternating current is expressed as $i=10 \cos (314t-120^0)$. Determine rms current, frequency and instantaneous current at t =5ms.

SECTION – III

5. (a) Explain the response of series RL circuit for a sinusoidal current source and also draw its complex impedance triangle?

(b) Explain the significance of real and reactive power and also complex power?

6. (a) Define power factor, and explain its significance?

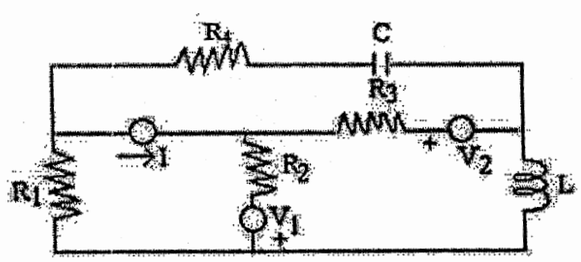
(b) Calculate current, real power, reactive power, apparent power and power factor (lagging/leading) for the circuit having impedances (5+j10)ohms and (6-j15) ohms connected in parallel fed from an AC supply of 200V

SECTION – IV

7 (a) Define the following terms with respect to Graph theory:
i) Branch,
ii) Tree,
iii) Node,
iv) Tree link,
v) Cut-set,
vi) Tie – set, and
vii) Incidence matrix?

(b) Write the steps involved in forming fundamental cut set matrix?

8 (a) What is duality. Explain the procedure for obtaining the dual of the given planar network shown below figure.



(b) Write the steps involved in forming fundamental tie set matrix?

SECTION – V

9 (a) The combined inductance of two coils connected in series is 0.6H and 0.1H in series aiding and series opposing connections. If the self-inductance of each coil is 0.2H, find the coefficient of coupling?

(b) Explain the concept of self and mutual inductance?

10 (a) Derive the expression for K, in two mutual inductive coils connected in series opposing manner?

(b) Write the significance of dot convention in the calculation of inductance of mutually coupled coils and how is it useful?

SECTION – VI

11 (a) A coil produces resonance at 20 KHz in series with a capacitor. Assuming the inductance and resistance of the coil be 10 H and 100Ω, find the Q factor of the coil?

(b) Explain the following terms: i) Resonance, ii) Selectivity, iii) Bandwidth, and iv) Q-factor.?

12 (a) An inductance of 0.5 H, a resistance of 5 ohms and a capacitance of 8μF are in series across a 220 V AC supply. Calculate the frequency at which the current flowing through the circuit becomes maximum. Also find bandwidth, half-power frequencies and voltage across the capacitance at resonance?

(b) Derive the expression for Q-factor of a RL series circuit?

Code : 17ME1102

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

ENGINEERING MECHANICS - I

(Mechanical Engineering)

Time : 3Hrs Max. Marks : 60

*Answer SIX Questions, Choosing **ONE** Question from each section*

All Questions carry equal marks

* * *

SECTION - I

1. a. State and prove parallelogram law of forces.
   b. Three forces of magnitude 30 kN, 10 kN and 15 kN are acting at a point 'O'. The angles made by 30 kN force, 10 kN force and 15 kN force with x-axis are 60^0, 120^0 and 240^0 respectively. Determine the magnitude and direction of the resultant force.

2. a. Differentiate between composition of forces and resolution of forces.
   b. Determine the resultant of the four forces acting on the body shown in **Fig.1.**

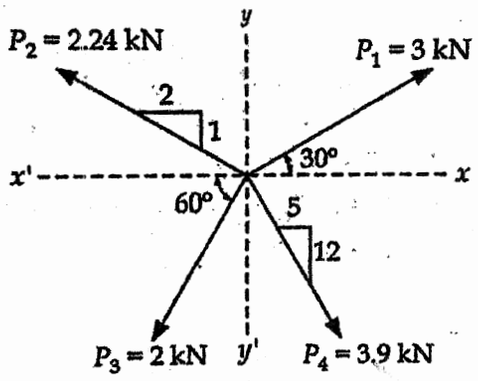


Fig.1.

SECTION – II

3. Two smooth circular cylinders, each of weight 1000 N and radius 15 cm are connected at their centers by a string AB of length 40 cm and rest upon a horizontal plane, supporting above them a third cylinder of weight 2000 N and radius 15 cm as shown in **Fig.2.** Find the force 'S' in the string AB and reaction produced on the floor at the points of contact D and E.

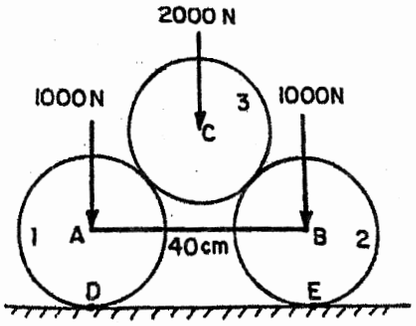


Fig.2.

4. Determine the reactions at A and B for the beam shown in **Fig.3.**

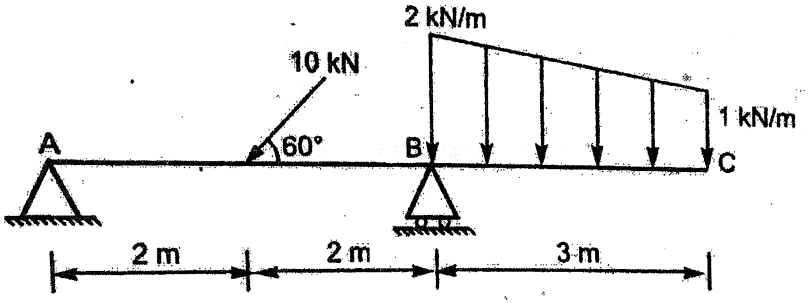


Fig.3.

SECTION – III

5. Determine the forces in the members of the truss shown in **Fig.4.**

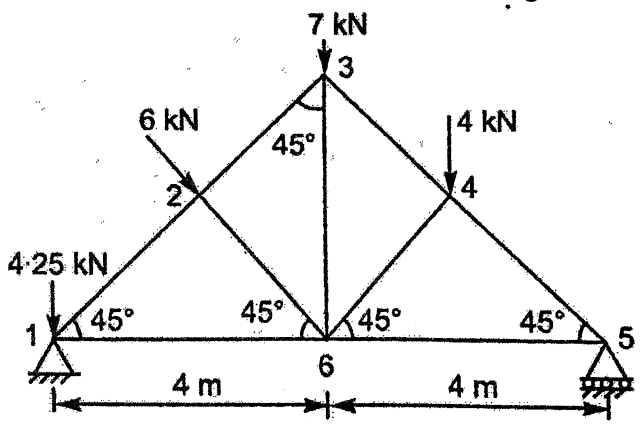


Fig.4.

6. Find the forces in the members of the truss shown in **Fig.5.** using method of sections.

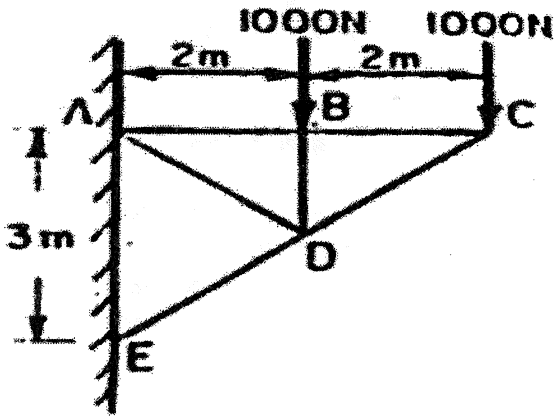


Fig.5.

SECTION – IV

7 a. State the laws of friction.

b. Two blocks A and B weighing 50 kg and 80kg respectively are in equilibrium in the position as shown in **Fig.6.** Calculate the force P required to move the lower block B and tension in the cable. Take co-efficient of friction at all contact surfaces as 0.30.

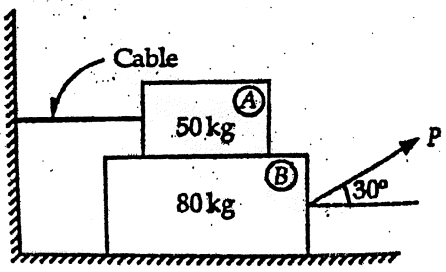


Fig.6.

8 a. Derive the expression for the reversibility/self locking of a machine.

b. The screw jack has threads of 60 mm diameter and 8 mm pitch. The jack supports a load of 500 N on its head and that revolves with the screw. If the co-efficient of friction at the screw thread is 0.10, determine

i) The effort to be applied at the end of a handle of 50 cm length to raise the load
ii) Work done in lifting the load through 10 mm.
iii) Efficiency of the screw and
iv) Ratio of effort required to raise and lower the load.

SECTION – V

9 Determine the centroid of the lamina shown in **Fig.7.**

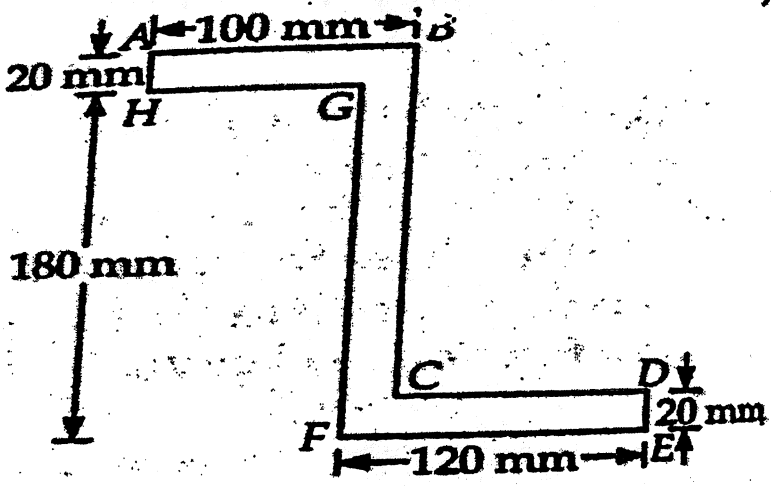


Fig.7.

10 a. Differentiate between centroid and center of gravity.

b. Locate the position of the centroid of the shaded area shown in **Fig.8.**

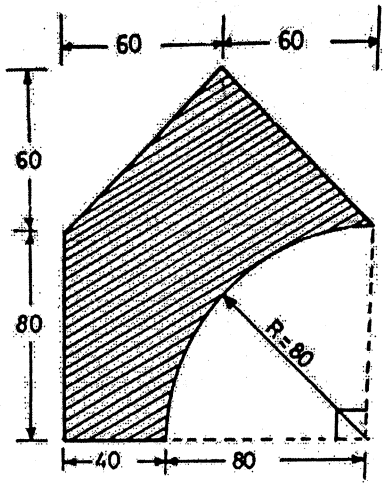


Fig.8.

SECTION – VI

11 An I-Section has the following dimensions in mm. Bottom flange 300 x 100, top flange 150 x 50 and web 450 x 40. Determine the moment of inertia of the section about the centroidal axis.

12 a. Determine the mass moment of inertia of the sphere.

b. Determine the mass moment of inertia of the hollow cylinder with respect to axis of rotation.

Code :17EE1102

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

BASIC ELECTRICAL ENGINEERING

(Civil Engineering)

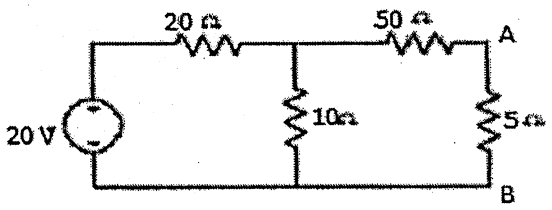
Time : 3Hrs Max. Marks : 60

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

* * *

SECTION - I

1. (a) State and explain Kirchhoff's laws using neat diagrams.
   (b) Find out the current passing through AB Terminals.



2. (a) Explain about classification of Circuit Elements and describe each of it.
   (b) Explain star-delta and delta –star transformation for resistive DC networks.

SECTION – II

3. (a) Derive the expression for average value and RMS value from the fundamentals of sin wave then derive form factor and peak factor of a sine wave.
   (b) A sinusoidal current wave is given by I= 50sin100πt.
   Determine:
   i) the greatest rate of change of current
   ii) Average and rms values of current
   iii)The time interval between a maximum value and next zero value of a current.

4. (a) Explain the concept of phasor representation and Analyze R-L-C circuit connections with phasor diagram.
   (b) Derive the relation between phase and line values in a 3-phase balanced delta connected system with neat circuit diagram.

SECTION – III

5. (a) Explain the working principle of operation of single-phase transformer.
   (b) Derive emf equation of a single phase transformer.

6. (a) Explain the constructional details and types of single-phase transformers.
   (b) Explain the working principle of operation of Auto- transformer.

SECTION – IV

7 (a) Classify electrical machines and explain working principle of alternator.
(b) Explain constructional details and applications of alternator.

8 (a) Explain principle of operation of split phase induction motor.
(b) Explain principle of operation of single phase capacitor start induction motor with diagram.

SECTION – V

9 (a) Write different types of safety measures in electrical systems.
(b) Briefly describe types of wiring methods and explain about stair case wiring with diagram.

10 (a) Explain plate earthing with diagram.
(b) Classify different types of conductors and cables used in electrical systems.

SECTION – VI

11 (a) Draw the layout of generation, transmission and distribution of electrical power system.
(b) Explain briefly how electrical power is generated and distributed to the consumers.

12 (a) Explain working principle of FUSE with neat diagram and differentiate rewirable fuse with HRC fuse.
(b) Explain different types of towers used for transmission of electrical power in power systems.

Code :17SH1104

B.TECH. DEGREE SUPPLEMENTARYEXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

NUMERICAL ANALYSIS

(Common to All Branches)

Time : 3Hrs Max. Marks : 60

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

* * *

SECTION - I

1. Find the real root of the equation $x^3 - x - 1 = 0$ correct to two decimal places by the Newton-Raphson Method.

2 (a) Fine by the iterative Method , a real root of $2x - log_{10}x = 7$.

(b) Find the real root of the equation $xe^x - 3 = 0$ by the regula falsi method correct to two decimal places.

SECTION – II

3. Solve the system of equations using Gauss-elimination Method.
$$3x + y - z = 3, 2x - 8y + z = -5, x - 2y + 9z = 8$$

4. Using the Gauss-Seidel iteration method,solve the system of equations
$$10x - 2y - z - w = 3; \quad -2x + 10y - z - w = 15;$$
$$-x - y + 10z - 2w = 27; -x - y - 2z + 10w = -9.$$

SECTION – III

5. From the following table estimate the number of students who obtained marks between 40 and 45.

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

6. Using Lagrange's formula find $f(3)$ to the following data

x	0	1	2	5
$f(x)$	2	3	12	147

SECTION – IV

7 Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find $\frac{dy}{dx}$ & $\frac{d^2y}{dx^2}$ at $x=1.0$ and $x=1.6$.

8 Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using

(i) Simpson's $\frac{1}{3}$ Rule taking h = $\frac{1}{4}$

(ii) Simpson's $\frac{3}{8}$ Rule taking h = $\frac{1}{6}$

SECTION – V

9 (a) Solve by Taylor's series method the equation $\frac{dy}{dx} = \log(xy)$ for $y(1.1)$ and $y(1.2)$ given that $y(1)=2$.

(b) Using Eulers Method ,solve for y at x= 0.1 from

$$\frac{dy}{dx} = x + y + xy\,; y(0) = 1, \textit{taking step size } h = 0.025$$

10 Using the Runge-Kutta method for fourth order solve for y(0.1),y(0.2) and y(0.3)given that $\frac{dy}{dx} = xy + y^2$, y(0)=1.

SECTION – VI

11 (a) Fit a second degree polynomial to the following data :

x	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	1.1	1.3	1.6	2.0	2.7	3.4	4.1

(b) The two regression equations of the variables x and y are $x=19.13-0.87y$ and $y=11.64-0.50x$. find (i) mean of $x's$ (ii) mean of $y's$ and (iii) correlation coefficient between x and y.

12 Obtain Rank correlation Coefficient for the following data.

Marks in Mathematics	68	64	75	50	64	80	75	40	55	64
Marks in Physics	62	58	68	45	81	60	68	48	50	70

Code : 17SH1101

B.TECH.DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

FUNCTIONAL ENGLISH

(Common to All Branches)

Time : 3Hrs Max. Marks: 60

Answer Six questions choosing ONE from each section
All questions carry equal marks.

* * *

SECTION - I

1. (a) Write a short paragraph on "Drug addiction".

   (b) Correct the errors in the given sentences by following the rules of subject- verb agreement
   1. Everyone have gone to the party.
   2. The new student as well as his parents are in the principal's office. .
   3. Neither Bill Gates nor Steve Jobs belong to India. .
   4. Ten Miles are a long distance to cover in an hour.

2. (a) Write a short paragraph on "Importance of girl education".

   (b) Name the part of speech of each underlined word in the following sentences
   1. She wanted to drive the car, <u>but</u> she had never received her license.
   2. She <u>completely</u> rejected his proposal.
   3. The young girl brought me a very <u>long</u> letter from the teacher.
   4. The man <u>*who*</u> is honest is trusted

SECTION – II

3. (a) Write a letter to your friend apologizing to him for your behavior the previous day.

   (b) Correct the errors in the given sentences following the rules of pronoun agreement.
   1. One must love his country.
   2. Ravi swims better than me.
   3. Every teacher and every boy was busy with their work.
   4. The Secretary and correspondent is negligent of their duty.

4. (a) Write a letter to the sub-inspector of police of your area reporting the theft of your motorcycle..

   (b) Fill up the blanks with suitable articles.
   1. -----rich must help the poor.
   2. he is not ----- honourable man.
   3. English is not ------ easy language.
   4. Which is ------- longest river in India?

SECTION – III

5. (a) Write a short dialogue between a teacher and a student who is preparing for GATE Examination

   (b) Fill up the blanks with suitable verb forms
   1. The gardener --------- (cut) the grass for two hours.
   2. The patient ----- (die) before the doctor arrived.
   3. Look, it ------- (rain) outside.
   4. If they had invited me, I ---------- (attend) the party.

6. (a) You go to a bank to open an account. You don't know the procedure to open a saving account and so ask the manager. Write a conversation taking place between you and the manager.

(b) Identify the following underlined words as (gerund, participle, infinitive and finite)

1. I saw the gardener watering plants.
2. There are many ways of breaking a heart.
3. I believe that laughing is the best calorie burner
4. He made them laugh

SECTION – IV

7 (a) You want a transfer to a new branch of the company. Write a telephonic conversation between H R Manager and you, requesting him to transfer you to the new branch.

(b) Fill up the blanks with suitable prepositions.

1. He prevented me ------- going to market.
2. They have been living in Visakhapatnam ------- seven years.
3. He quarreled -------- me.
4. We congratulated him ------ his success.

8. (a) You would like to take an admission in M.Tech under Management Quota (self-financing courses) in Andhra University. Write a telephonic conversation between the Admissions In charge and you.

(b) Write the following as directed

1. Shut the window. (Add question tag)
2. he is not here.. (Add question tag)
3. Sam is the most handsome boy in the class. (Change into comparative degree)
4. My house is bigger than yours. (Change into superlative degree)

SECTION – V

9 (a) Construct a story from the following outlines.

A slave escaped from bondage to the forest - soldiers came after him to catch - entered a cave - a lion was roaring with pain - its paw was swollen - the slave approached it and removed the thorn - they became friends - later the soldiers arrested the slave - took him to the king - the king ordered the solidiers to throw the slave to the hungry lion - the lion rushed at the slave - recognised the slave - remembered the kindness shown by the slave - then licked the feet of the slave - the spectators amazed - the slave explained the situation to them - the king set him free.

(b) Rewrite the following as directed.

1. Rama said to Hari, "Mohan will go"
   (Change into Indirect speech)
2. He said to me, "will you go?!"
   (Change into Indirect speech)
3. Raju said to me, "you are a clever boy"
   (Change into Indirect speech)
4. The teacher said, "Submit the report today in my chamber"
   (Change into Indirect speech)

10. (a) Construct a story from the following outlines.

A fox fell into a well - a thirsty goat came to the well - fox invited the goat to have a drink of fresh water - the foolish goat jumped into the well - fox tried to step on the goat's back and jumped off - promised to draw out goat afterwards - the goat agreed - the fox went away - foolish goat stayed there.

(b) Rewrite the following as directed.

1. Somebody has broken his mobile. (Begin with 'His mobile')
2. I did not help him. (Begin with 'He')
3. Who opened the window? (Begin with 'By whom')
4. Can you eat a dozen bananas (Begin with 'Can a dozen bananas)

SECTION – VI

11. (a) You are elected as the secretary of a voluntary organization which campaigns the need of abolition of child labour,. Draft a speech to address a gathering in your village/town.

(b) Rewrite the following as directed.

1. You must run fast to catch the train.(Change it into compound sentence)
2. I saw a man who was deaf (Change it into simple sentence)
3. He is cunning like a fox. (Change it into complex sentence)
4. The boat sank in the deep water (Change it into complex sentence)

12. (a) You are invited as the chief guest to a college anniversary. Draft a speech to address the students.

(b) Rewrite the sentences with right parallelism.

1. The summer program includes courses in cooking, sewing, and paint.
2 The safest way to lose weight is by eat less and by exercising more.
3. The witness testified calmly and clear.
4. The price includes delivery and installing.

Code : 17SH1102

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

ENGINEERING PHYSICS

(Common to EEE, ECE , CSE & IT)

Time : 3Hrs Max. Marks : 60

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

* * *

SECTION - I

1. (a) Explain unit cell and lattice parameters. How does a primitive cell is different from unit cell?
   (b) What are Miller indices? Write the procedure for finding the Miller indices of the plane.

2. (a) Derive Bragg's law of crystal diffraction. What is the limiting condition for Bragg's law.
   (b) Describe powder method to determine the crystal structure.

SECTION – II

3. (a) Explain the different types of polarization mechanisms in dielectrics.
   (b) Derive Claussius –Mosotti equation in dielectrics.

4. (a) Explain the origin of magnetic moment.
   (b) Distinguish between soft and hard magnetic materials.

SECTION – III

5. (a) Derive the expression for Drift and Diffusion current.
   (b) Explain Hall effect and obtain an expression for Hall voltage.

6. (a) Discuss the formation of potential barrier in a P-N junction.
   (b) Explain the working of a Solar cell.

SECTION - IV

7 (a) What are the essential elements of communication system? Explain briefly with block diagram.
   (b) What is sampling theorem in communication and write its applications.

8 (a) What is modulation? Explain the need for modulation in communication system?
   (b) Distinguish between amplitude and frequency modulations.

SECTION – V

9 (a) State important characteristics of Laser beam.

(b) Describe the construction and working of He-Ne laser.

10 (a) Obtain the expression for Numerical Aperture of an Optical fiber.

(b) Discuss various applications of Optical fibers.

SECTION - VI

11 (a) Explain Meissner effect in Superconductors.

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12 (a) Explain general properties of nano materials.

(b) Describe the Chemical Vapour Deposition (CVD) method for the synthesis of nano particles.

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B.TECH DEGREE SUPPLEMENTARY EXAMINATION, NOVEMBER 2019

I B.Tech. I Semester

ENGINEERING CHEMISTRY

(Common to CE&ME)

Time : 3Hrs Max. Marks : 60

Answer Six Questions choosing ONE Question from each section

All Questions carry equal marks

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SECTION – I

1. (a) Explain the working of hydrogen gas electrode.

   (b) Explain the working principle of Li-ion batteries.

2. (a) What is meant by conductometric titrations? Explain the titration of strong acid and strong base.

   (b) What are the advantages of conductometric titrations?

SECTION – II

3. (a) Explain electrochemical theory of corrosion.

   (b) Write a note on electroplating.

4. Define corrosion. Discuss various factors influencing the rate of corrosion.

SECTION – III

5. What are electrical insulators? Describe the characteristics and engineering applications of these materials.

6. (a) What do you understand by refractoriness? Explain its measurement.

   (b) What are the characteristics of good refractory ?

SECTION – IV

7. (a) Explain the ultimate analysis of coal to ascertain its quality.

   (b) A Sample of coal was contain the following constituents: C=85%; O=3%; S=1%; H=12%; N=3% and ash=2%. Calculate the minimum amount of air required for the complete combustion of 1 Kg of coal (oxygen in air is 23% by weight).

8. (a) Explain Ion-exchange process for softening of water.

   (b) Discuss the carbonate and non-carbonate hardness of water.

SECTION – V

9. (a) How do estimate the hardness of water by EDTA method?

   (b) 0.28g of $CaCO_3$ was dissolved in dil. Hcl and diluted to 1000ml. 100ml of this solution required 28ml of EDTA solution for titration. 100ml of same water sample on boiling, filtering etc., required 10ml of EDTA solution. Calculate different kinds of hardness in PPm.

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SECTION – VI

11. (a) What are the drawbacks of raw rubber?

    (b) Write short notes on compounding of rubber.

12. Explain the preparation, properties and applications of PVC and nylons.