

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

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.

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SECTION - I

1. (a) Write a short paragraph on "Online Education".
- (b) Correct the errors in the given sentences by following the rules of subject- verb agreement.
 1. Neither John nor his friends is available in the chamber.
 2. The principal and the secretary was present.
 3. Mary, along with her parents, have attended the function.
 4. Each of the girls have been given project work.
2. (a) Write a short paragraph on "Child Trafficking".
- (b) Name the part of speech of each underlined word in the following sentences.
 1. Rahul sings a melodious song.
 2. Wisdom is better than strength.
 3. He finished the course easily.
 4. They wanted to hire him, but he didn't want to work with them.

SECTION - II

3. (a) Write a letter to your friend telling him that you have been placed in Infosys company in a placement drive held in your college recently.
- (b) Correct the errors in the given sentences following the rules of pronoun agreement.
 1. One must respect his elders.
 2. All the students must show his hall-tickets before entering the examination hall.
 3. Each of the students gave their own version on the issue.
 4. The secretary and treasurer is negligent of their duty.
4. (a) Write a letter to the Manager, Union Bank of India, informing him that you have received a text message from the bank that Rs.10000/- has been debited from your account. Make a complaint to him that you have not done the above transaction.
- (b) Fill up the blanks with suitable articles.
 1. You can catch _____ Howrah Mail, if you start now.
 2. I am going to _____ church to drop my father.
 3. I met _____ European and _____ Indonesian in Bangalore last week.
 4. We noticed _____ strong smell coming from kitchen.

SECTION – III

5. (a) Write a short dialogue for the following situation:
Write a short dialogue for the following situation: You meet your friend who was posted as the Bank Manager in your village/ town. Congratulate him and invite him to your home for lunch.
- (b) Fill up the blanks with suitable verb forms.
1. The boys _____ (practice) dancing since early morning.
 2. The workers _____ (complete) their work in the field last week.
 3. If she reaches the station early, she _____ (catch) the train.
 4. I met with an accident while I _____ (cross) the road.
6. (a) Write a short dialogue for the following situation:
You meet surprisingly your school teacher at Chennai Central Railway Station after a long time. How do you start your conversation with him in this situation?
- (b) Identify the following underlined words as (gerund, participle, infinitive and finite)
1. I watched a boy dancing on the stage.
 2. Misled by his relatives, he lost his money in business.
 3. Smoking cigarettes is injurious to health.
 4. I made her laugh.

SECTION – IV

7. (a) Write a telephonic conversation to the following situation: You failed in three subjects in I Semester of I B.Tech. Make a call to your brother and request him to give you some tips to clear your back logs in Supplementary Exams.
- (b) Fill up the blanks with suitable prepositions.
1. This book consists _____ five chapters.
 2. They have been living in the USA ----- ten years.
 3. I have a car _____ two bikes.
 4. We congratulated him ----- his success.
8. (a) Write a telephonic conversation to the following situation: You are planning to take an admission in MS course in Germany. Make a call to ABC Educational Consultancy, New Delhi, to get full details about admission procedure.
- (b) Write the following as directed.
1. He doesn't like playing cricket. (Add question tag)
 2. The Universe is expanding. (Add question tag)
 3. Mount Everest is the highest peak in the world. (Change into comparative degree)
 4. Pen is mightier than sword. (Change into positive degree)

SECTION – V

- 9 (a) Construct a story from the following outlines.
Heavy rain- a railway bridge damages - a train approaching – a shepherd boy sees - stands on the track - ignores the warning whistles - waves his shirt - prevents the accident - rewarded for his bravery.
- (b) Rewrite the following as directed.
1. He said to his sister, “When did you finish your project.” (Change into Indirect speech)
 2. They said to me, “We have visited your home.” (Change into Indirect speech)
 3. Teacher said to the boy, “Finish your work now.” (Change into Indirect speech)
 4. He said to my father, “What a beautiful house you have!”(Change into Indirect speech)
10. (a) Construct a story from the following outlines.
God promises an elderly lady that He visits her house - she cleans house and waits-. someone knocks at the door-she finds a poor beggar - lady closes door- the beggar leaves- later there is another knock- lady opens door-a poor old man-she slams the door on his face- later someone knocks the door- a ragged hungry beggar-she sends him off empty-handed-no sign of God- she goes to bed-she has dream that God has come to her and said, “I came to you three times today and every time you snubbed me and didn’t allow me to enter house.”
- (b) Rewrite the following as directed.
1. People speak English all over the world. (Begin with ‘English’)
 2. I presented him a watch. (Begin with ‘He’)
 3. Who wrote the Mahabharata? (Begin with ‘By whom’)
 4. Can you understand my problem? (Begin with ‘Can my problem’)

SECTION – VI

11. (a) You are elected as the secretary of a voluntary organization which campaigns the need of using carry bags made of cloth or jute in the place of plastic. Draft a speech to address a gathering in your village/town encouraging them to avoid usage of plastic for saving environment.
- (b) Rewrite the following as directed.
1. Owing to her negligence, she lost her child. (Change it into compound sentence)
 2. I saw a man who was blind (Change it into simple sentence)
 3. An industrious man is sure to succeed. (Change it into complex sentence)
 4. Work hard and you will pass the examination (Change it into complex sentence)
12. (a) You are newly appointed health officer of Primary Health Centre of a village. To provide awareness on seasonal diseases, you organized an awareness programme for the local people. Draft a speech to address them.
- (b) Rewrite the sentences with right parallelism.
1. Mary sings sweetly and slow.
 2. Robert likes playing cricket and to sing folk songs.
 3. Her main duties are answering phone calls, filing records, and conduct surveys.
 4. I like to jog, bake, paint, and watching movies.

R-17

Code :17CE1101

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

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

** * **

SECTION - I

1. (a) How bricks are classified based on physical & mechanical properties?
(b) What are the tests performed to check the quality of bricks? Explain.
2. (a) Describe the ingredients of good brick earth.
(b) What are the harmful substances in brick earth? Explain.

SECTION - II

3. (a) What do you understand dressing of a stone? Explain.
(b) Explain the classification of building stones with examples.
4. (a) Enumerate advantages of artificial stones.
(b) Discuss the applications of stones, in detail.

SECTION - III

5. (a) Discuss the methods adopted for the preservation of timber.
(b) Describe the qualities of good timber.
6. (a) Write the properties and uses of cast iron.
(b) Describe the process of manufacturing of glass.

SECTION - IV

- 7 (a) Describe the process of manufacturing of cement by wet process with neat diagram.
(b) What are the field tests of cement? Explain any two.
- 8 (a) Write the characteristics of aggregates used in cement concrete.
(b) Give detailed account on quality of mixing water.

SECTION - V

- 9 (a) Discuss the characteristics of good mortar.
(b) Describe the process of making lime mortar.
- 10 (a) Give detailed account on grouting.
(b) What are the criteria's for the selection of mortar? Explain.

SECTION - VI

- 11 (a) Write the uses of smart construction materials.
(b) Describe the properties of fibre reinforced plastics.
- 12 (a) What are self-healing materials? Explain.
(b) Write detailed note on carbon fibres.

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*

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SECTION - I

1. (a) What is casting? State applications.
(b) Explain the working principle of gas welding with neat sketch
2. (a) What are the differences between soldering and brazing?
(b) Describe any two hot working process with neat sketches.

SECTION - II

3. (a) Define a composite material. How are composite materials classified?
(b) What is non-ferrous alloy? State the applications.
4. (a) Describe any two operations that can be on lathe machine.
(b) What are the different methods of taper turning on lathe? Explain any one method.

SECTION - III

5. (a) Describe the important components of IC engine.
(b) What are the differences between SI and CI engines?
6. (a) Explain the working of two stroke diesel engine with neat sketch.
(b) What are the applications of IC engines?

SECTION - IV

7. How the energy sources are classified? Explain any two alternate sources of energy.
8. Explain the working principle of Hydraulic power plant with a neat sketch.

SECTION - V

9. (a) Write short notes on commonly used refrigerants.
(b) What are the applications of air conditioning system?
10. Explain about the working of domestic refrigeration systems with a neat sketch.

SECTION - VI

11. Classify the power transmission systems. Explain anyone system with applications.
12. (a) State the applications of cams.
(b) Explain helical springs with neat sketch.

R-17

Code :17EE1102

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

I B.Tech. I Semester

BASIC ELECTRICAL ENGINEERING

(Civil Engineering)

Time : 3Hrs

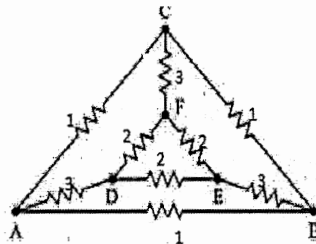
Max. Marks : 60

Answer *SIX* Questions choosing *ONE* Question from each section

All Questions carry equal marks

SECTION - I

1. (a) Explain about in detail about the active elements and passive elements..
(b) Two nos.100W,220V bulbs are required to be connected across a 400V supply. find the value of the resistance to be inserted in the line so that the voltage across the bulbs does not exceed 220V.
2. (a) Explain star-delta and delta –star transformation for resistive DC networks.
(b) Find out the equivalent Resistance between AB terminals for the following circuit and all Resistance values are in ohms.



SECTION - II

3. (a) Derive the expression for average value and RMS value from the fundamentals of sin wave.
(b) A pure inductive coil allows a current of 10A to flow from a 230V, 50 Hz supply. Find (i) inductance of the coil (ii) power absorbed and (iii) equations for voltage and current.
4. (a) Derive the relation between phase and line values in a 3-phase balanced star connected system with neat circuit diagram.
(b) Analyze R-L circuit and R-C series circuit connections and also draw its phasor diagrams.

SECTION - III

5. (a) Explain the working principle of operation of single-phase transformer.
(b) Explain the constructional details and types of single-phase transformers.
6. (a) A 100 kVA, 4000V/200V, 50 Hz single phase transformer has 100 secondary turns. Determine: (a) the primary and secondary current, (b) the number of primary turns.
(b) Explain the working principle of operation of Auto- transformer.

SECTION - IV

- 7 (a) Explain working principle of alternator.
(b) Explain constructional details and applications of alternator.
- 8 (a) Explain principle of operation of single phase induction motor.
(b) Explain principle of operation of single phase capacitor start and capacitor run induction motor with diagram.

SECTION - V

- 9 (a) Write different types of safety measures in electrical systems.
(b) Explain principle of operation of florescent lamp with diagram.
- 10 (a) Write the necessity for earthing and explain pipe earthing with diagram.
(b) Write 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 Relay and differentiate rewirable fuse with HRC fuse.
(b) Explain working principle of circuit breakers.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

I B.Tech. I Semester**BASIC ELECTRICAL SCIENCES**

(Common to EEE, ECE, CSE & IT)

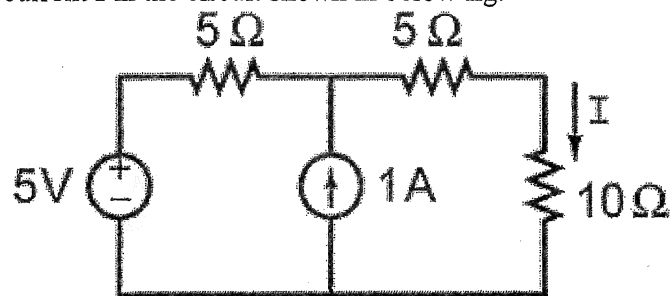
Time : 3Hrs

Max. Marks : 60

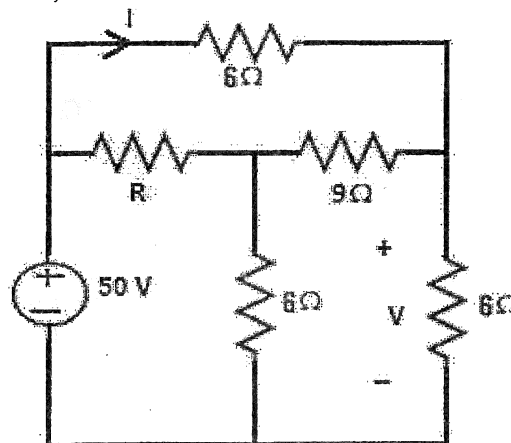
Answer *SIX* Questions, Choosing *ONE* Question from each section
All Questions carry equal marks

SECTION - I

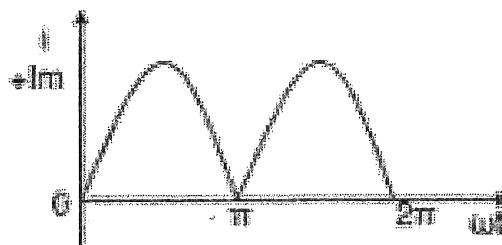
1. (a) Derive the equivalent DELTA expressions for given STAR. (5M)
(b) Find the value of current I in the circuit shown in below fig. (5M)



2. (a) Define what is an ideal and practical source? Explain the characteristics of practical voltage and current sources? (5M)
(b) In the circuit shown below, if $V = 20V$ then determine I and R? (5M)

**SECTION - II**

3. (a) Define the terms Impedance, Susceptance and Admittance and also write the difference between resistance and impedance? (5M)
(b) Find the RMS and average value of the waveform shown in below fig. (5M)



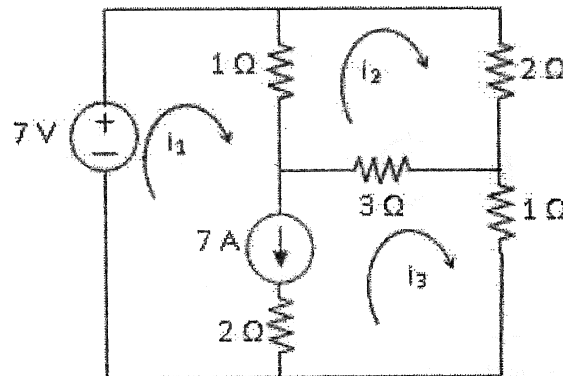
4. (a) Define the terms RMS, Average and form factor? (5M)
 (b) A wire carries a current of which is the combination of a direct current of 20 A and a sinusoidal current with a peak value of 20 A. Determine the RMS value of the resultant? (5M)

SECTION - III

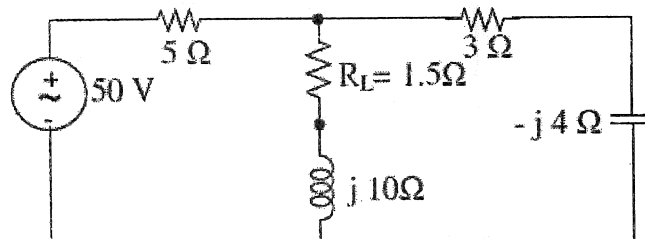
5. (a) Explain the response of series RC circuit for a sinusoidal voltage source and also draw its complex impedance triangle? (6M)
 (b) Prove that total active power consumed by pure inductor is zero? (4M)
 6. (a) A resistor (R) of 50 ohms in parallel with a capacitor (C) of 40 μ F, is connected in series with a pure inductor (L) of 30 mH to a 100 V, 50 Hz supply. Calculate the total current and also the current in the capacitor. (5M)
 (b) Explain the response of series RL circuit for a sinusoidal voltage source and also draw its complex impedance triangle? (5M)

SECTION - IV

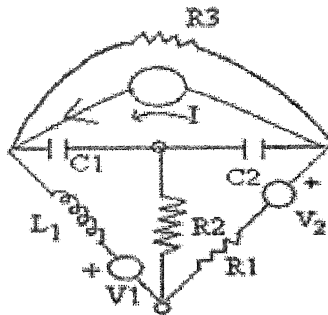
- 7 (a) For the given network shown in Figure, draw the oriented graph and choose one possible tree and construct the basic tie-set. (5M)



- (b) What is duality? Explain the procedure for obtaining the dual of the given network shown below figure. (5M)



- 8 (a) Write the steps involved in forming fundamental cut set matrix? (4M)
 (b) For the given network shown in Figure, draw the oriented graph and choose one possible tree and construct the basic cut-set. Write down the network Equations from the above matrix. (6M)



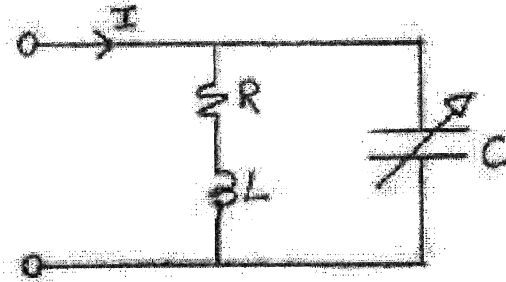
SECTION - V

- 9 (a) What is coefficient of coupling? What is the range of variation of this quantity? In which type of circuits is it minimum and in which type of circuits is it maximum? (5M)

- (b) Derive the expression for K , in two mutual inductive coils connected in parallel opposing manner? (5M)
- 10 (a) With necessary examples, define magnetic circuit, MMF, flux and reluctance? (5M)
- (b) 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? (5M)

SECTION - VI

- 11 (a) In a series RLC circuit if the applied voltage is 10V , and resonance frequency is 1KHz , and Q factor is 10 , what is the maximum voltage across the inductance. (5M)
- (b) Derive the equation for resonance frequency of a parallel RLC circuit? (5M)
- 12 (a) Explain the phenomenon of resonance and give its significance? (5M)
- (b) Explain how the current locus can be obtained for the following circuit shown with neat diagram. (5M)



B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

I B.Tech. I Semester

ENGINEERING MECHANICS - I
(Mechanical Engineering)

Time : 3 hours

Max Marks: 60

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

SECTION - I

- 1 A spherical ball of weight 75 N is attached to a string and is suspended from the ceiling as shown in Fig.1(a). Find the tension in the string, if the horizontal force F is applied to the ball as shown in Fig 1 (b). Determine the angle the string makes with the vertical and also the tension in the string if $F = 150$ kN.



Fig. 1 (a)

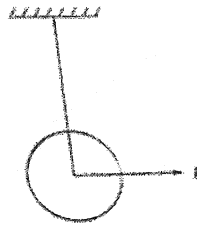


Fig.1(b)

2. State and prove the Varignon's theorem.

SECTION - II

3. A circular roller of radius 5 cm and of weight 100 N rests on a smooth horizontal surface and is held in position by a inclined bar of length 10 cm as shown in Fig.2 A horizontal force of 200 N is acting at B. Find the tension in the bar AB and the vertical reaction at C

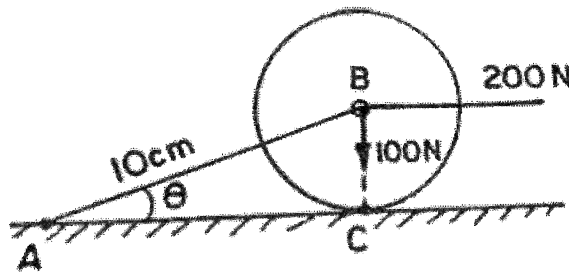


Fig.2

4. A beam AB of Span 6m is hinged at A, supported on roller at end B and carries loads as shown in fig.3. Determine the reactions at A and B

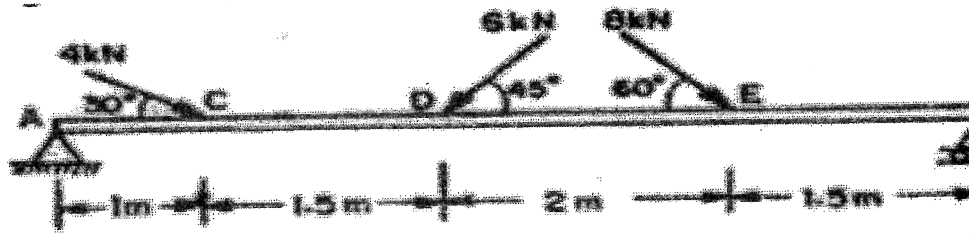


Fig.3

SECTION - III

5. What is a perfect truss? What are its mathematical conditions? What are the assumptions? Explain any one procedure for analyzing trusses.
6. Find the forces in the members BC, CD, and CE for the truss shown in Fig.4

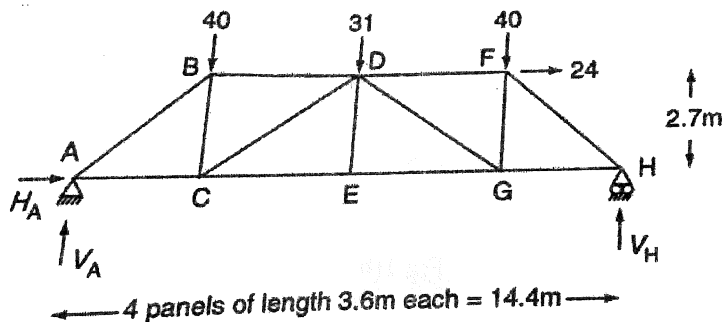


Fig.4

SECTION - IV

7. What is the least value of P required to cause the motion to impend. Assume the coefficient of friction on all contact surfaces as 0.2.

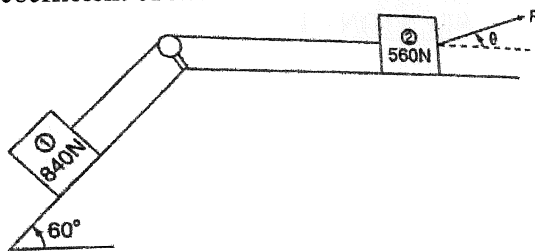


Fig.5

8. Obtain expression for effort required to raise and lower load in case of a simple screw Jack.

SECTION - V

- 9 Determine the Centre of gravity of the area shown in Fig.6 with respect to co-ordinate axis. All dimensions are in mm.

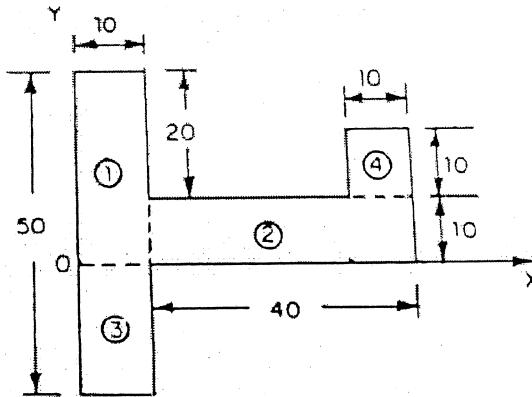


Fig.6

- 10 Locate the centroid of the shaded area as shown in Fig. 7

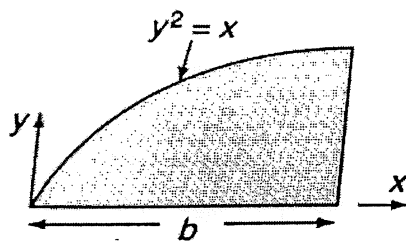


Fig.7

SECTION - VI

- 11 Find the moment of inertia of the section shown in Fig.8 about horizontal and vertical centroidal axes.

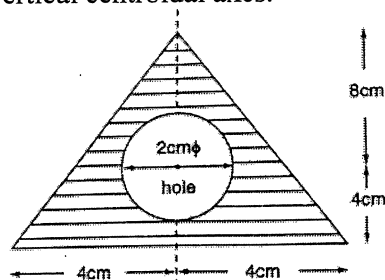


Fig.8

- 12 Determine the mass moment of inertia of a thin circular disc of radius R and thickness 't'.

R-17

Code :17CS1101

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

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

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SECTION - I

1. (a) Describe the two common designs for desktop computers.
(b) How the computer technologies are used by militray?
2. (a) List four units of measure for computer memory and storage.
(b) Identify and expalin four categories of computer hardware.

SECTION - II

3. (a) What the purpose is of START key which appers on IBM compatible keyboards?
(b) Describe how virtual memory works.
4. (a) How should you position your monitor, if you want to avoid eyestrain?
(b) How does digital light processing technology work?

SECTION - III

5. (a) What is the primary purpose of the file compression utilities such as winzip?
(b) What is data transfer rate? How can fragmentation harm a systems performance?
6. (a) How does a solid state disk store data?
(b) Describe the function of lands and pits on the surface of compact disk.

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) Describe the clipboard and its usage.
(b) Expalin the value of running a screen saver.

SECTION - V

- 9 (a) UNIX may be described as being difficult to use. Why? What distinguishes peer to peer network?
(b) How is windows NT workstation different from windows 95? What are packets and how they work?

- 10 (a) What is the primary usage of windows 2000 professional? Name three common LAN protocols?
- (b) What is a clone and explain its functionality? List four benefits that network provide to their users.

SECTION - VI

- 11 (a) What is the difference between MySQL and SQL server?
- (b) What is an EDM system?
- 12 (a) List four types of cookies that can be placed on your computer by a website.
- (b) What is the best way to deal with spyware and web bugs?

R-17

Code : 17CS1102

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

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 organizations. Explain them briefly.
(b) Why mainframes are so important for the organizations? Explain it briefly.
2. (a) Describe the various parts of computer with a neat diagram.
(b) Write and explain the various essential components of computer system.

SECTION - II

3. (a) Explain (i) Bar Code readers (ii) Image scanners (iii) OCR
(b) Differentiate between Optical Storage devices and Solid-state storage devices.
4. (a) How the operating system access the data form hard drive.
(b) Explain about various storage devices.

SECTION - III

5. (a) Discuss Single-user/Single-Tasking operating system.
(b) Explain about real time operating system.
6. (a) How the information is sharable? Explain it in detail.
(b) Give the differences between Single user and Multi user tasking systems.

SECTION - IV

- 7 (a) Explain C language keywords and delimiters.
(b) Write about declaration and initialization of variables.
- 8 (a) List out various operators. Explain each of them with an example.
(b) What is expression? Explain about operator precedence and its associativity.

SECTION - V

- 9 (a) Discuss commonly used library functions.
(b) Write a c program to find whether a student secured distinction or first class or second class or third class or fail class using if..else statement.
- 10 (a) What is decision making? Write about nested if statement.
(b) Give the differences between break and continue statement.

SECTION - VI

- 11 (a) Write the syntax of for loop. Write a C program to find the factorial of a given number.
(b) Explain exit controlled loop with an example.
- 12 (a) Define an Array with its initialization? Write various characteristics of an array.
(b) Write various categories of an array. Explain each of them with an example.

R-17

CODE : 17SH1103

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

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

SECTION - I

1. (a) Write short note on standing electrode potential and its significance.
(b) Describe the construction of glass electrode.
2. Explain the construction and working of H₂-O₂ fuel cell. What are the advantages of it?

SECTION - II

3. (a) Define corrosion and explain with suitable examples.
(b) Describe the mechanism of oxidation corrosion.
4. What is cathodic protection? Write short notes on Sacrificial anodic protection and Impressed current cathodic protection

SECTION - III

5. What are refractories? Explain thermal spalling, strength and porosity of refractories
6. Explain thick film, thin film and extreme pressure lubrication

SECTION - IV

- 7 (a) Distinguish between gross and net calorific value.
(b) On burning 0.73g of a solid fuel in a bomb calorimeter, the temperature of 1500g of water increased from 25^{oC} to 28^{oC}. Water equivalent of calorimeter and latent heat of steam are 470g and 587 cal/g respectively. If the fuel contains 2.5% of hydrogen, calculate the gross and net calorific value.
- 8 (a) What are the characteristics of good fuel?
(b) . Discuss the proximate analysis of coal with significance.

SECTION - V

- 9 (a) Calculate temporary and permanent hardness of a sample of water containing Mg(HCO₃)₂ = 14.6 mg/l ; Ca(HCO₃)₂ = 16.2mg/l ; MgCl₂=9.5 mg/l and CaSO₄=13.6 mg/l.
(b) Write a note on scales and sludges in boilers
- 10 (a) Explain zeolite process for the softening of water.
(b) Describe the method for the estimation of chlorides.

SECTION - VI

- 11 What is polymerization? Explain the preparation, properties and applications of Neoprene and silicon rubbers.
- 12 (a) What is natural rubber? Write brief notes on Vulcanization.
(b) Write the preparation, properties and uses of Bakelite

R-17

CODE : 17SH1102

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

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) Define (i) Crystal Structure (ii) Lattice Parameters (iii) Unit Cell (iv) Atomic radius.
(b) What is packing factor? Show that FCC crystals are closely packed than BCC crystals.
2. (a) Derive Bragg's law of X- ray diffraction.
(b) Describe Laue method to determine the crystal structure.

SECTION - II

3. (a) Derive the expression for internal field in solids using Lorentz method.
(b) Write any four applications of dielectric materials.
4. (a) Define magnetic susceptibility and permeability. Obtain the relation between them.
(b) Explain ferromagnetic hysteresis. What does its area represent?

SECTION - III

5. (a) Distinguish between intrinsic and extrinsic semiconductors.
(b) The Hall coefficient of a specimen of doped silicon is found to be $3.66 \times 10^{-4} \text{ m}^3/\text{c}$. The resistivity of specimen is $8.93 \times 10^{-3} \Omega \text{ m}$. Find the mobility and density of charge carriers.
6. (a) What is p-n junction diode? Explain it's characteristics under forward and reverse bias conditions.
(b) Describe the construction and working of a Photodiode

SECTION - IV

7. (a) Explain the principle of basic communication system.
(b) Describe basic steps for analog to digital conversion.
8. (a) What is signal impairment? Explain different types of modulation.
(b) Write a short on demodulation process.

SECTION - V

- 9 (a) Write the essential requirements to produce a Laser.
(b) Explain the construction and working of Ruby laser.
- 10 (a) With a neat diagram, explain the structure of an Optical fiber.
(b) Discuss various types of Optical fibers.

SECTION - VI

- 11 (a) Explain a Superconductor using critical parameters.
(b) Distinguish between Type-I and Type-II Superconductors.
- 12 (a) What are nano materials? Why surface to volume ratio is very large for nano particles compared to bulk materials?
(b) Write any five applications of nano materials.

- 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 Apply (i) the trapezoidal rule and (ii) Simpsons 1/3 Rule, to find an approximate value of $\int_{-3}^3 x^4 dx$, by taking six equal sub-intervals. Compare it with the exact value.

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 Modified Eulers Method, solve for y at $x=0.1$ from $\frac{dy}{dx} = 1 - y, y(0) = 0$ in the range $0 \leq x \leq 0.3, h = 0.1$

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

SECTION - VI

- 11 Find the most likely price in Mumbai corresponding to the price of rs.70 at Kolkata from the following :

| | | |
|--------------------|---------|--------|
| | Kolkata | Mumbai |
| Average Price | 65 | 67 |
| Standard Deviation | 2.5 | 3.5 |

Correlation coefficient between the prices of commodities in the two cities is 0.8.

- 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 |

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Code :17SH1104

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

I B.Tech. I Semester

NUMERICAL ANALYSIS

(Common to All Branches)

Time : 3 hours

Max. Marks :60

Answer Six questions, choosing One question from each section

All Questions carry equal Marks

SECTION - I

- 1 Find a root of the equation $x^3 - 4x - 9 = 0$, using correct to three decimal places using Newton Raphson Method.
- 2 (a) Find a root of the equation $x^3 - x - 11 = 0$, correct to four decimals using the bisection method.
- (b) Find the real root of the equation $xe^x - 3 = 0$ by the regula falsi method correct to two decimals places.

SECTION - II

- 3 Solve the system of equations using Gauss-elimination Method.
 $3x + 4y - z = 8, -2x + y + z = 3, x + 2y - z = 2$
- 4 Using the Gauss-Seidel iteration method, solve the system of equations
 $10x - 2y - z - w = 3; -2x + 10y - z - w = 15;$
 $-x - y + 10z - 2w = 27; -x - y - 2z + 10w = -9.$

SECTION - III

- 5 From the following table estimate the number of students who obtained marks between 40 and 45 using a suitable formula.

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

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Code : 19SH1104

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

I B.Tech. I Semester

ENGINEERING MATHEMATICS - I
(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. (a) Uranium disintegrates at a rate proportional to the amount present at any instant. If M_1 and M_2 are masses of uranium that are present at times T_1 and T_2 respectively, find half-life of uranium.
- (b) Solve the differential equation $(\cos x - x \cos y)dy - (\sin y + y \sin x)dx = 0$.
2. (a) Solve the differential equation $(1 + y^2)dx + (x - \tan^{-1} y)dy = 0$.
- (b) Solve the differential equation $(xy \cos y + \sin y)dx + x^2 \cos y dy = 0$.

SECTION - II

3. (a) Solve $(D^2 + 9)y = \cos^2 x$.
- (b) Solve $(D^2 - 2D + 1)y = (x^2 + 1)e^{3x}$.
4. (a) Solve $(D^2 + 4D + 20)y = 23 \sin t - 15 \cos t$.
- (b) Solve $(D^2 + 2)y = x^2 e^{3x}$.

SECTION - III

5. (a) Find $L \{t^2 \cos 5t\}$.
- (b) Show that $\int_0^{\infty} t e^{-2t} \cos t dt = \frac{3}{25}$.
6. (a) Find $L \left\{ \frac{e^{-at} - e^{-bt}}{t} \right\}$.
- (b) Find $L \{t^2 e^{3t} \sin 4t\}$.

SECTION - IV

7. (a) Using Laplace transform, solve $(D^2 + 5D + 6)y = \sin 2t$ with $y(0) = 0, y'(0) = 0$.
(b) Find $L^{-1} \left\{ \frac{1}{(s^2+4)(s^2+9)} \right\}$ by using Convolution Theorem.
8. (a) Find $L^{-1} \left\{ \frac{s e^{-s}}{(s^2+4s+13)} \right\}$.
(b) Find $L^{-1} \left\{ \frac{s+1}{(s^2+2s+26)} \right\}$

SECTION - V

9. (a) Solve the following system of equations,
 $2x_1 + 3x_2 - x_3 = 1; 3x_1 - 4x_2 + 3x_3 = -1; 2x_1 - x_2 + 2x_3 = -3;$
 $3x_1 + x_2 - 2x_3 = 4.$

- (b) Find rank of a matrix $\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$ by reducing it into Echelon form.

10. Find Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$.

SECTION - VI

11. (a) Obtain the Maclaurin's series expansion of $f(x) = \log(1+x)$.
(b) Find the maximum value of $x^m y^n z^p$, given that $x + y + z = a$.
12. (a) Find the maximum and minimum values of
 $f(x, y) = \sin x \sin y \sin(x+y)$, where $0 < x < \pi, 0 < y < \pi$.
(b) Obtain the Taylors series expansion of $f(x) = \sin x$ about $x = \frac{\pi}{4}$.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

**I B.Tech. I Semester
APPLIED 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) Distinguish between Interference and diffraction phenomenon of light.
(b) With necessary theory explain the fraunhofer diffraction due to single slit.
2. (a) Distinguish between Spontaneous and stimulated emission of radiation.
(b) Describe the construction and working principle of Ruby laser with neat diagrams.

SECTION - II

3. (a) Outline the importance of miller indices in identifying the crystal planes.
(b) Derive the expression for inter planar spacing in cubic crystal.
4. (a) Why X rays gets diffracted by the crystals.
(b) Discuss the crystal structure determination by powder method

SECTION - III

5. (a) What is Uncertainty principle?
(b) Describe the behavior of one dimensional motion of a particle in a box using Schrodinger's equation.
6. (a) State Bloch's theorem for a particle in a periodic potential.
(b) Describe the behavior of a particle in a periodic potential using Kronig-penny model.

SECTION - IV

7. (a) Explain the law of mass action in a semiconductor.
(b) Discuss drift and diffusion of charge carriers in a semiconductor.
8. (a) Distinguish between direct and indirect band gap semiconductors.
(b) Describe the construction and working principle of Light emitting diode.

SECTION – V

9. (a) What is ionic polarization of a dielectric?
(b) Derive the expression for internal field for a polarized dielectric.
10. (a) Describe the origin of magnetic moment in an atom.
(b) Distinguish between soft and hard magnetic materials.

SECTION – VI

11. (a) Explain the various types of superconductors.
(b) Mention the applications of superconductors.
12. (a) Mention the various types of nanomaterials.
(b) Describe the synthesis of nanomaterials by chemical vapour deposition method.

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CODE : 19SH1103

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

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

* * *

SECTION - I

1. (a) What is hardness of water?
(b) How is the hardness of water estimated by the E.D.T.A method?
2. (a) What is softening of water?
(b) Explain briefly the external treatment of hard water by ion-exchange process.

SECTION - II

3. (a) what is an electrochemical cell?
(b) Explain the functioning of Hydrogen-Oxygen fuel cell with a net diagram and equation.
4. (a) what is corrosion?
(b) Explain various factors influencing the rate of corrosion.

SECTION - III

5. Explain the preparation, properties and applications of PVC, Bakelite and nylons.
6. Explain the preparation, properties and applications of Buna-N and silicone rubber.

SECTION - IV

7. (a) what is calorific value?
(b) A sample of coal contains C=84%, S=1.5%, N₂=0.6%, H₂=5.5%, O₂=8.4%. Calculate the gross and net calorific values of coal.
8. (a) What is refining of petroleum?
(b) Briefly explain how the flue gas was analysed by ORSAT process.

SECTION - V

9. (a) what are refractory materials?
(b) Explain the properties of a good refractory materials.
10. (a) what are lubricants?
(b) Explain the properties of lubricating oils.

SECTION - VI

11. (a) Discuss some important methods for the preparation of colloids.
(b) What are colloids? Discuss their properties.
12. Explain the following.
(a) Adsorption Isotherm (b) BET equation.

I B.Tech. I Semester**PROGRAMMING FOR PROBLEM SOLVING**
(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. (a) Define an algorithm and the characteristics of a good algorithm. What are the steps to be followed to write an algorithm?
(b) Define variable. Explain the rules for constricting variables in C language.
2. (a) Write the general structure of C. Explain with an example.
(b) Draw a flow swapping two numbers using a temporary variable.

SECTION - II

3. (a) What is an operator? List and explain various types of operators.
(b) What are arithmetic expressions? Discuss the associativity and precedence of arithmetic operators.
4. (a) Write the guidelines to use scanf() and printf() functions in C language.
(b) Write a C program which takes as input p,t,r. Compute the simple interest and display the result.

SECTION - III

5. (a) List the differences between while loop and do-while loop. write a C program to find sum of Natural numbers from 1 to N using for loop.
(b) What is two way selection statements? Explain if, if else, and cascaded if-else with examples.
6. (a) Explain with syntax , the different loops used in „C“ program.
(b) Write a calculator program in C language to do simple operations like addition, subtraction, multiplication and division. Use switch statement in your program.

SECTION - IV

7. (a) How to declare and initialize a Two-dimensional array?. Discuss with examples.
(b) What is recursion? What are the advantages and Disadvantages of recursion?
8. (a) Define string. How string is declared and initialized ? Explain string input/output functions with an example.
(b) Write a C program to find the factorial of a given number using recursion.

SECTION - V

9. (a) What is function? Explain different classification of user defined functions based on parameter passing and return type with examples
(b) Write a c-program using function to check whether the given number is prime or not.
10. (a) Pointers and arrays are closely related in an aspect. How? Provide suitable example code and explain.
(b) What are actual parameters and formal parameters? Illustrate with example.

SECTION - VI

11. (a) How a user can define a data type of his own? Discuss one way of defining such data type.
(b) Explain the following file handling functions: a. fseek() b. ftell() c. rewind() d. feof()
12. (a) Explain array of structure and structure within a structure with an example.
(b) Write a C program using pointers to compute the Sum, Mean and Standard deviation of all elements stored in an array of "n" real numbers.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

I B.Tech. I Semester**BASIC ELECTRICAL SCIENCES**

(Common to EEE, CSE & IT)

Time : 3Hrs

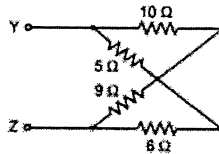
Max. Marks : 60

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

* * *

SECTION - I

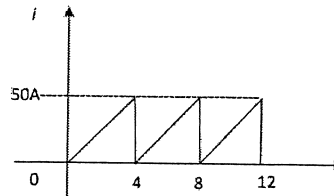
- Define the following : (i) Voltage (ii) Current (iii) Power (iv) Ohms Law
 - Find the equivalent resistance between the terminals Y and Z in Figure



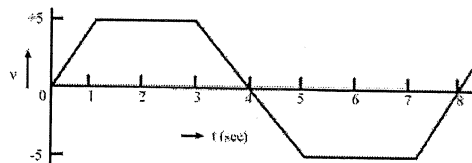
- Derive the equivalent STAR expressions for give DELTA.
 - Define Active and Passive elements and draw the V-I characteristics of Ideal and Practical voltage source?

SECTION - II

- Calculate the form factor for the saw-tooth wave form shown in figure



- Define form factor? For pure sinusoidal waveform, show that the form factor is 1.11?
- Define RMS value and find the RMS value of a pure sinusoidal waveform?
 - Calculate the Average value of the following waveform?

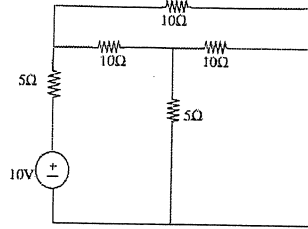
**SECTION - III**

- Define the following: (i) Amplitude (ii) Instantaneous value (iii) Frequency (iv) Phase (v) Phase difference
 - A resistance R, an inductance $L=0.01$ H, and a capacitance C are connected in series. When a voltage $v = 400 \cos(3000t-10^\circ)$ volts is applied to the series combination, a current flowing is $i = 10 \cos(3000t-55^\circ)$ amperes. Find R and C?
- Show that average power consumed by a pure inductor and a pure capacitor is zero?

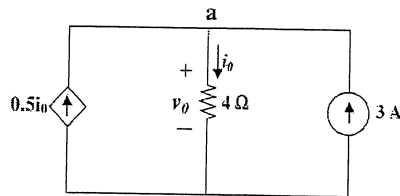
- (b) The resistance of a coil is 140Ω and its inductance 0.85 H . Determine the current, the P.F. and the circuit impedance when the coil is connected to 120 V , 60 Hz supply.

SECTION - IV

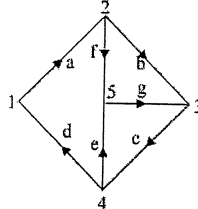
7. (a) For the network shown in figure, draw the graph, tree and obtain a cut-set matrix and solve for node equations and branch currents.



- (b) Find current i_0 and voltage V_0 in the circuit shown in Figure



8. (a) Find fundamental tie-set and cut-set matrix for the graph and its tree shown in figure



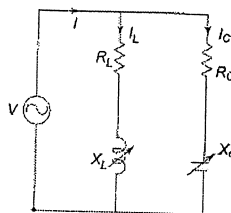
- (b) Write the differences between tie-set and cut-set?

SECTION - V

9. (a) Find the expression for total inductance of a two coupled inductors connected in parallel aiding?
 (b) Why Dot convention is required? How is it necessary for coupled circuits?
10. (a) Define self, mutual, total inductance and coefficient of coupling in magnetic circuits?
 (b) Find the expression for total inductance of a two coupled inductors connected in series aiding?

SECTION - VI

11. (a) Define resonance? Find the expression for half power frequencies for in case of series RLC circuit?
 (b) Prove that the locus of the current in an R-L circuit with R variable is a semicircle. Find the radius and the centre of the circle?
12. (a) Derive an expression for resonant frequency for parallel RLC Circuit. Also derive an expression for quality factor?
 (b) Draw the locus diagram of the following circuit for variation of X_L and X_C ?



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Code: 19EE1103

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

I B.Tech. I Semester

ELEMENTS OF ELECTRICAL & ELECTRONICS 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) Define the following :
(i). Voltage (ii). Current (iii). Energy (iv). Power (v). Ohm's Law
- (b) Prove that the energy stored in a capacitor is $\frac{1}{2} C V^2$
2. (a) Explain about in detail Kirchhoff's Voltage law with simple example.
- (b) Prove that in series combination of resistances the equivalent resistance in the d.c circuit is the simple sum of individual resistances.

SECTION - II

3. (a) Define RMS value, Average value, Peak factor & Form factors.
- (b) Determine the form factor value of a Full wave rectifier.
4. (a) Discuss the behavior of the inductive element connected to an AC source along with the waveform & phasor diagram.
- (b) Comparison between single phase and three phase systems.

SECTION - III

5. Explain the working of an alternator and describe its constructional details.
6. Discuss about the operation of capacitor start and capacitor run single phase induction motor.

SECTION – IV

7. (a) Derive the emf equation of a transformer.
(b) Explain the principle of operation of a transformer in detail.
8. (a) What are the losses that occur in a transformer and explain in detail?
(b) Define transformer efficiency and derive the condition under which it will have maximum efficiency.

SECTION – V

9. (a) Write a short note on Importance of electrical safety.
(b) Discuss different types of house wiring in detail.
10. Explain different types of conductors and their importance in detail.

SECTION – VI

11. Write a short note on Resistance temperature detector (RTD) and Thermocouple.
12. Describe with neat sketch various methods of Arc welding.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, AUGUST 2021

I B.Tech. I Semester**ENGINEERING MECHANICS - I**
(Mechanical Engineering)

Time : 3Hrs

Max. Marks : 60

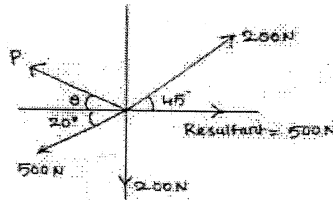
Answer **SIX** Questions, Choosing **ONE** Question from each section
All Questions carry equal marks

* * *

SECTION - I

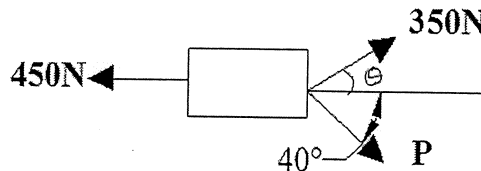
1. The four coplanar forces acting at a point are shown in Fig.1 and one of the forces is unknown and is represented as P. The resultant is having a magnitude of 500N and is acting along x-axis. Determine the unknown force P and its inclination with x-axis.

Fig.1



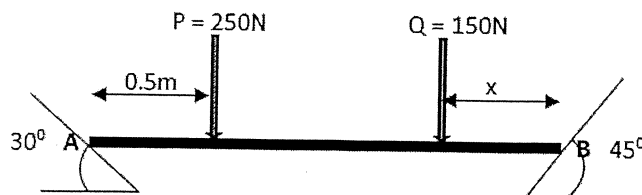
2. A Body is pulled by means of two ropes as shown in Fig.2. A force of 350N is applied at an angle θ with reference to X- axis. Determine the minimum magnitude of the force 'P' to be applied at angle of 40° with reference to X- axis, if the resultant pull is to be 450 N along X-axis

Fig2

**SECTION - II**

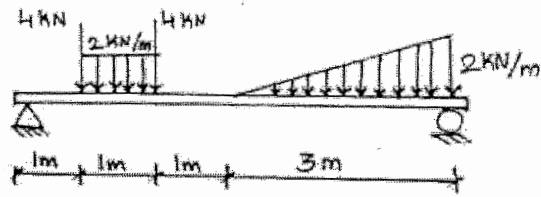
3. A bar of 2m long and of negligible weight rests in horizontal position on two smooth inclined planes. Determine the distance 'x' at which the load point Q = 150N should be placed from point B to keep the bar horizontal as shown in Fig.3.

Fig 3



4. Determine the reactions for a beam supported and loaded as shown in Fig. 4

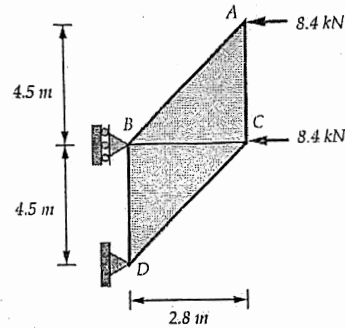
Fig. 4



SECTION - III

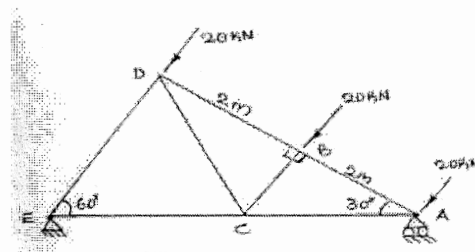
5. Analyze the forces in members of truss shown in Fig 5. and indicate the nature of force.

Fig 5



6. Determine the forces in the members BD, DC and EC of a truss loaded as shown in Fig. 6 using method of sections.

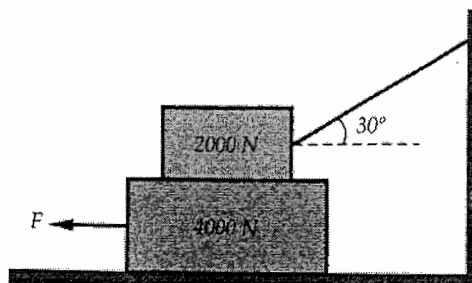
Fig. 6



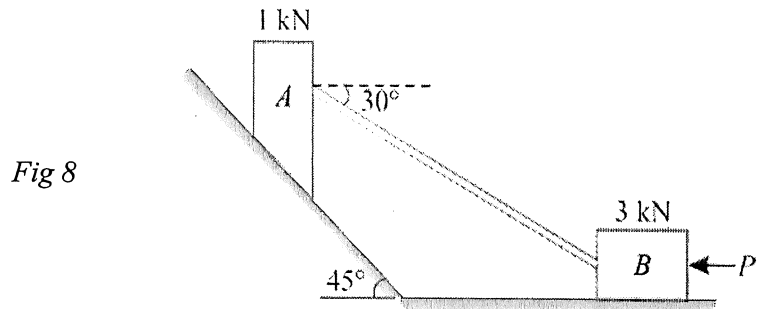
SECTION - IV

7. A block weighing 4000 N is resting on horizontal surface supports another block of 2000 N as shown in Figure 7. Find the horizontal force F just to move the block to the left. Take coefficient of friction for all contact surfaces as 0.2.

Fig.7

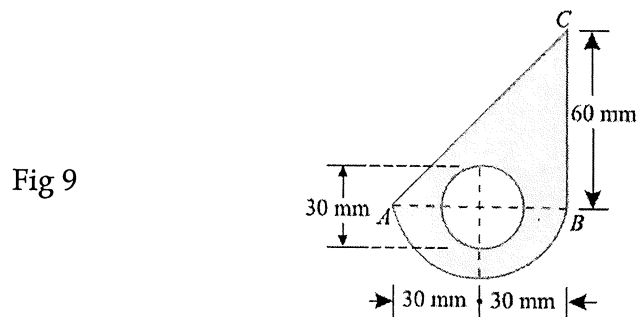


8. A block (A) weighing 1 kN rests on a rough inclined plane whose inclination to the horizontal is 45° . This block is connected to another block (B) weighing 3 kN rests on a rough horizontal plane by a weightless rigid bar inclined at an angle of 30° to the horizontal as shown in Fig 8. Find horizontal force (P) required to be applied to the block (B) just to move the block (A) in upward direction. Assume angle of limiting friction as 15° at all surface where there is sliding.

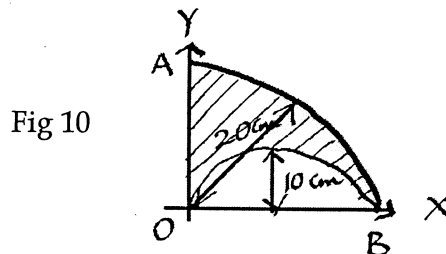


SECTION - V

9. Determine the coordinates of the centroid for a section as shown in Fig 9

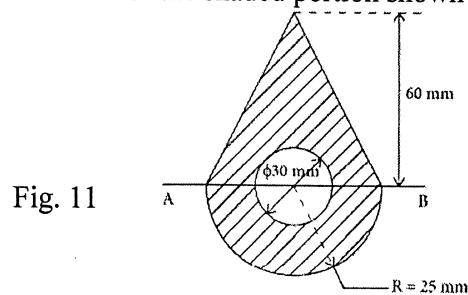


10. Determine the coordinates of the centroid for a section as shown in Fig 10



SECTION - VI

11. Find the moment of Inertia of the shaded portion shown in the Fig. 11



12. Find Mass Moment of Inertia of (a) cylinder (b) cone.

I B.Tech. I Semester**ELECTRICAL CIRCUITS**
(Electronics & Communication Engineering)

Time : 3Hrs

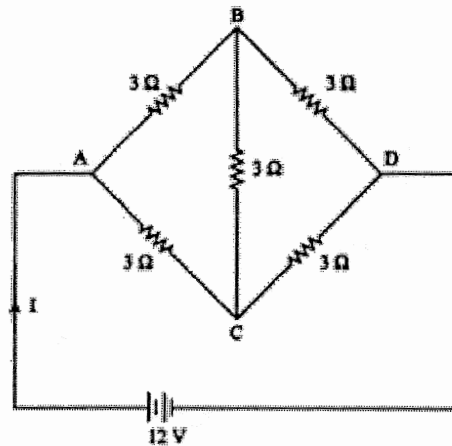
Max. Marks : 60

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

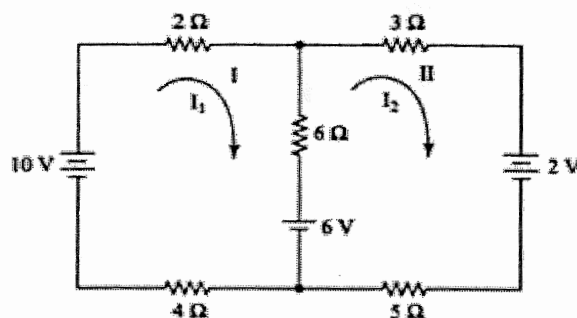
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SECTION - I

1. (a) Two resistances when they are in series have an equivalent resistance of 12 ohms and when connected in parallel have an equivalent resistance of 4 ohms. Find the two resistances?
- (b) Calculate the current I supplied by the battery in the circuit shown in fig.



2. (a) Distinguish between ideal and practical voltage source. Give examples.
- (b) Using the mesh analysis calculate the current flowing through the 6 ohms resistor in circuit shown in fig.

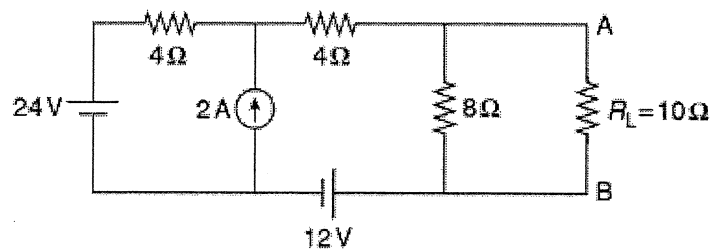
**SECTION - II**

3. (a) Define the Average value of sinusoidal varying voltage and find the relation with its maximum value.
- (b) Find the form factor of half wave rectified alternating current.

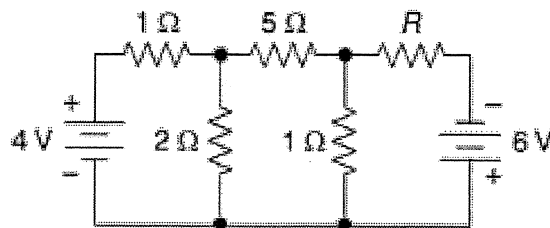
4. (a) Explain the concept of susceptance and Admittance in A.C. Circuits with example.
 (b) An alternating voltage varying sinusoidally with a frequency of 50Hz has an RMS value of 40V. Write down the equation for the instantaneous value and find this value (i) 0.0035 second (ii) 0.0135 seconds after passing through a positive maximum value.
5. (a) Find the impedance, current and the power factor of the RC Series circuit and draw the phasor diagram.
 (b) A coil of resistance of 10 ohms and inductance of 100mH in series with a 110 μ F is connected to a 200V, 50Hz supply. Calculate (i) Impedance (ii) the current flowing through the circuit.
6. (a) Discuss the various characteristics of a parallel RLC resonant circuit. Derive mathematical expression in support of discussion.
 (b) A variable inductor is connected in series with a resistor and a capacitor. The circuit is connected to a 200V 50Hz supply and the maximum current obtainable by varying inductance is 0.314A. The voltage across the capacitor then is 300V. Determine the R, L and C elements.

SECTION - IV

7. Applying Thevenin's theorem, calculate the current through the load resistance $R_L = 10$ ohms in the circuit shown in figure.

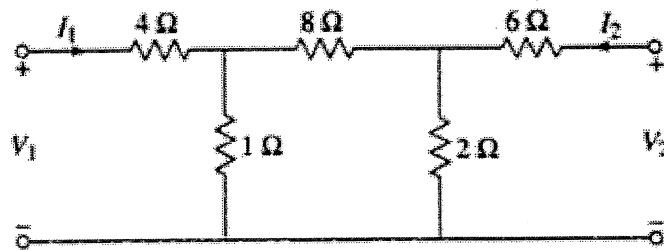


8. Find the value of R in the circuit of the figure such that maximum power takes place. What is the amount of this power?



SECTION - V

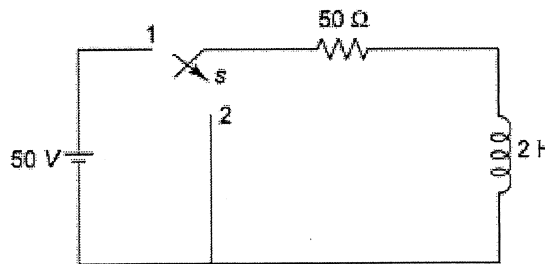
9. (a) Obtain the relationship between the admittance and hybrid parameters.
(b) Find ABCD parameters for the network shown in Figure.



10. (a) Prove that for a reciprocity two-port network, $AD - BC = 1$
(b) Currents $I_1 = 0.5V_1 - 0.2V_2$ and $I_2 = -0.2V_1 + V_2$ where V_1 and V_2 are the voltages at ports 1 and 2 respectively. Find the impedance and admittance parameters.

SECTION - VI

11. (a) Derive an expression for current response of RC series circuit transient.
(b) For the circuit shown in figure, determine the current $i(t)$ when the switch is at position 2. The switch S is moved from position 1 to position 2 at time $t=0$. The switch has been in position 1 for a long time.



12. A series RLC circuits with $R=300$ ohms, $L=1$ H and $C=100\mu\text{F}$ has a constant voltage of 50V applied to it at $t=0$. Find the maximum value of current. Assume zero initial conditions.

