

Code No: **R18A0012****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, October 2020****Applied Physics  
(EEE, ECE, CSE, IT)**

<b>Roll No</b>									
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**Time: 2 hours****Max. Marks: 70**Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1 a) Describe Debroglie's hypothesis in detail.  
b) Provide an experimental validity for Debroglie's hypothesis with the help of G. P. Thomson experiment.
- 2 a) Obtain the solution for particle enclosed in a one dimensional square well potential box.  
b) Explain Heisenberg's uncertainty principle in detail.
- 3 Explain the Kronig – Penny model in detail and explain how this model overcomes the drawbacks of Quantum free electron theory.
- 4 a) Explain the concept of effective mass and derive the expression for effective mass of an electron.  
b) Explain the origin of energy bands in solids.
- 5 a) Construct an expression for concentration of electrons in conduction band of an intrinsic semiconductor.  
b) What are direct and indirect band gap semiconductors?
- 6 a) Explain in detail about the construction, working and characteristics of LED.  
b) Explain in detail about the structure, working principle and characteristics of solar cell.
- 7 a) Classify Dia, Para and Ferromagnetic materials on the basis of magnetic moment.  
b) Explain the hysteresis phenomenon in ferromagnetic materials based on domain theory of ferromagnetism.
- 8 a) Define the terms population inversion and pumping in lasers?  
b) Explain the principle, construction and working of He-Ne Laser with energy level diagram.

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Code No: R18A0261

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, October 2020**

**Basic Electrical and Electronics Engineering**

(ME & AE)

<b>Roll No</b>									
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**Time: 2 hours**

**Max. Marks: 70**

Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1 (a) Differentiate Independent and Dependent sources, Ideal and Practical Sources.  
 (b) In the Fig. 1. shown, determine the current through the 2 ohm resistor and the total current delivered by the battery by using Kirchoff's laws.

OR

- 2 (a) What are the basic network elements? Write their volt-ampere relationship?  
 (b) What do you understand by source transformation? Find  $V_o$  using source transformation method shown in Fig. 2.

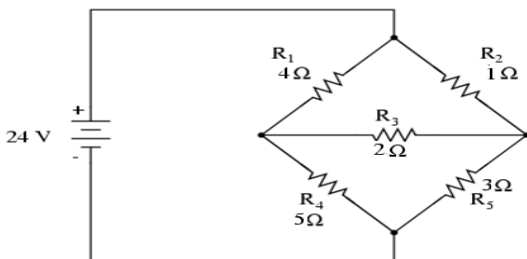


Fig. 1

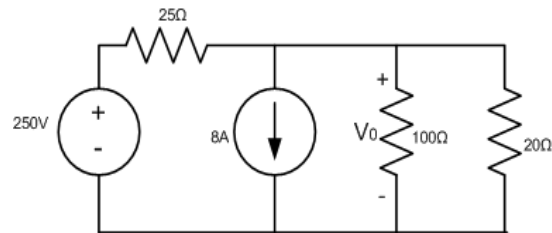


Fig. 2

- 3 (a) Explain the star-delta and delta-star transformation for a resistive network  
 (b) If  $R_{eq}=50\text{ ohm}$ , in the circuit shown in Fig. 3. Find the value of 'R'?

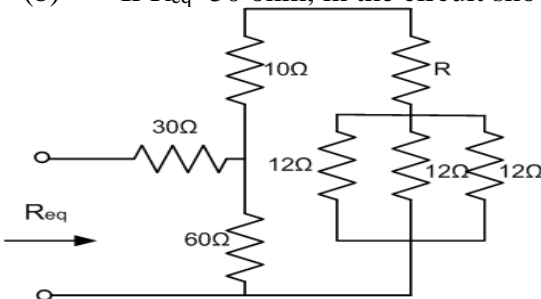


Fig. 3

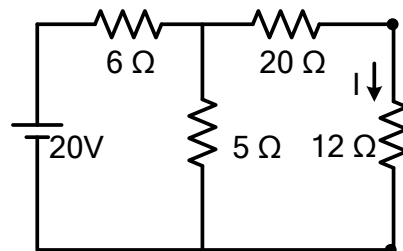


Fig. 4

- 4 (a) Apply the Norton's theorem to the circuit shown in Fig.4 determine the current through 12 Ω resistor  
 (b) State and explain superposition theorem. What are the limitations of Superposition theorem?  
 5 (a) Derive the fundamental emf equation of a single phase transformer.  
 (b) Explain the operation and principle of a DC motor.  
 6 (a) How transformers are classified according to their construction?  
 (b) Briefly explain the working and operating Principle of a DC Generator.

- 7 (a) Explain forward and reverse biased p-n diode with its Characteristics.  
(b) Discuss about the advantages and disadvantages of a half wave rectifier. Draw the output wave forms?
- 8 (a) What is a transistor? Draw the circuits of CB, CE and CC configurations.  
(b) Explain the operation of PNP transistor and draw its characteristics.

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Code No: R18A0013

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, October 2020****Engineering Chemistry****(ME & AE)**

<b>Roll No</b>									
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**Time: 2 hours****Max. Marks: 70**

Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1
  - a. Derive Nernst equation and explain its significance.
  - b. Explain the process of electroplating of Cu.
  
- 2
  - a. Mention the electrode reactions and cell reaction involved during charging and discharging process in lead-acid cell and describe its applications.
  - b. Describe the mechanism involved in rusting of iron in neutral or slightly alkaline medium.
  - c. How are the metals protected by impressed current method? Explain.
  
- 3
  - a. Write the molecular orbital electronic configuration of O<sub>2</sub> and N<sub>2</sub> molecules. Comment on their bond order and magnetic behavior.
  - b. Explain the salient features of molecular orbital theory?
  
- 4
  - a. What do you understand by LCAO method?
  - b. Describe the limitations of valence bond theory.
  - c. What are the salient features of crystal field theory?
  
- 5
  - a. Discuss the types of hardness of water. Also distinguish between them with examples.
  - b. Explain the disinfection of water by chlorination and mention its significance.
  
- 6
  - a. With the help of a neat diagram, explain the reverse osmosis method for desalination of brackish water.
  - b. Explain in detail a suitable softening method of water which removes all types of ions from water.
  
- 7
  - a. Explain S<sub>N</sub><sup>1</sup> mechanism for nucleophilic substitution reaction. Discuss its stereochemistry.
  - b. Explain Anti Markownikoff's rule with a suitable illustration.
  - c. Explain the mechanism involved in the oxidation of secondary alcohols using chromic acid.
  
- 8
  - a. Explain the significance of the constituents of proximate analysis of coal.
  - b. Differentiate between thermal and catalytic cracking.
  - c. What is petroleum? Give an account of refining of petroleum and list out various fractions obtained during refining of petroleum.

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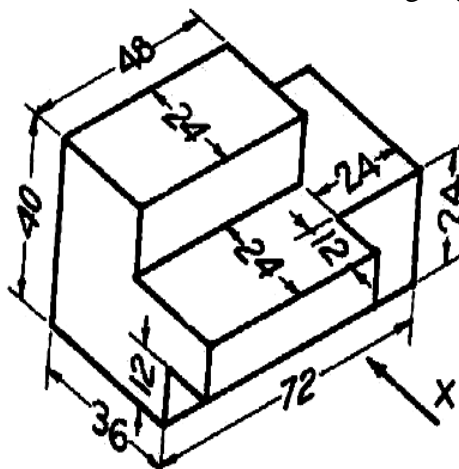
Time: 2 hours

Max. Marks: 70

Answer Any **Four** Questions  
All Questions carries equal marks.

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- 1 Draw a hypo cycloid of a circle of 30 mm diameter which rolls inside another circle of 160 mm diameter, for one revolution counter clock wise. Draw a tangent and a normal to it at a point 60 mm from the center of the directing circle.
- 2 a) Construct a diagonal scale of R.F=1:32,00,000 to show kilometers and long enough to measure up to 400km. show distances of 257 km and 333km on your scale.  
b) Construct a regular hexagon with a side 35mm long using general method
- 3 A line AB, 90 mm long, is inclined at  $45^{\circ}$  to the HP and its top view makes an angle of  $60^{\circ}$  with the VP. The end A is in the HP and 12 mm in front of the VP. Draw its front view and find its true inclination with the VP.
- 4 (a) A point A is 30mm above the H.P. and 40mm in front of the V.P. Draw its Projections.  
(b) A point A is 25mm below the H.P. and 35mm behind the V.P. Draw its Projections.
- 5 A plate of negligible thickness is made-up of a rectangle  $50 \times 45$  mm. Draw its projections when the longer side is parallel to H.P and inclined at  $45^{\circ}$  to V.P. The surface of the plate makes  $30^{\circ}$  with the H.P.
- 6 (a) A cube of 40 mm long edges lies with one of its square faces on H.P. Such that one of its vertical faces is inclined at  $40^{\circ}$  to V.P. Draw its projections.  
(b) Draw the projections of a pentagonal pyramid axis 50 mm long, base 40 mm side having base on the ground and one of edges of base inclined at  $45^{\circ}$  to V.P.
- 7 Draw the isometric view of a pentagonal pyramid with side of base 25mm and axis 60mm long. The pyramid is resting on its base on H.P. with an edge of the base (away from the observer) parallel to V.P. used the off-set method.
- 8 Draw the elevation, plan and side view for the following Figure



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Code No: R18A0001

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, October 2020****English****(EEE, ME, ECE, CSE, IT & AE)**

<b>Roll No</b>									
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**Time: 2 hours****Max. Marks: 70**

Answer Any **Four** Questions  
All Questions carries equal marks.

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1. a) "The Road Not Taken" by Robert Frost is a poem that has a deep inner meaning. Justify.  
b) In the poem "The Road Not Taken", what are the different symbols used by the poet to drive home the point he intends to make?
2. a) Use the following prefixes to form meaningful words.  
i. anti- ii. counter- iii. mal- iv. non- v. auto- vi. inter- vii. multi-  
b) Use appropriate punctuation marks in the following sentences.
  1. In the words of Murphys Law Anything that can go wrong will go wrong
  2. Some people work best in the mornings others do better in the evenings
  3. What are you doing next weekend
  4. The girls father sat in a corner
  5. Did you understand why I was upset
  6. It is a fine idea let us hope that it is going to work
  7. We will be arriving on Monday morning at least I think so
3. a). What, according to you, was the purpose of Lincoln's letter to his son's teacher?  
b). What tells you that Lincoln wanted his son to learn about nature too?
4. Write a synonym and an antonym each for the following words.  
i. query ii. commendable iii. stubborn iv. ridicule  
v. abrupt vi. vacillate vii. excite
5. Interpret the different themes and conflicts of the story "War" by Luigi Pirandello?

6. Choose the correct word that goes into each of the blanks.

Child workers, some as young as 10, have been found working in a textile 1) \_\_\_\_\_ in conditions described as close to slavery to produce clothes that appear destined for one the major high street 2) \_\_\_\_\_.

Speaking to a British newspaper, the children described long hours of 3) \_\_\_\_\_ work and threats and beatings. The company said it was unaware that clothing intended for its 4) \_\_\_\_\_ had been improperly 5) \_\_\_\_\_ to a 6) \_\_\_\_\_ that used child labour. It further announced it had withdrawn the garments involved until it had investigated the alleged 7) \_\_\_\_\_ of the 8) \_\_\_\_\_ code it imposed on manufacturers three years ago.

The discovery of these children working in appalling conditions in the Shahpur Jat area of Delhi has renewed concerns about the 9) \_\_\_\_\_ by some large retail chains of their 10) \_\_\_\_\_ production to India, recognised by the United Nations as one of the worlds's hotspots for child labour. According 11) \_\_\_\_\_ one 12) \_\_\_\_\_, over 20 per cent of India's economy is 13) \_\_\_\_\_ on children, which comes to a total of 55 million youngsters under 14 working.

14) \_\_\_\_\_ in the West should not only be demanding answers from retailers about how their 15) \_\_\_\_\_ are produced but also should be looking into their consciences at how they spend



their money and whether cheap prices in the West are worth the suffering caused to so many children.

1. a. facility b. factory c. office d. bureau
2. a. warehouse b. retailer c. warehouses d. retailers
3. a. inpaid b. unpaid c. without pay d. without payment
4. a. warehouses b. stores c. outlet d. branch
5. a. outsource b. outsourcing c. outsources d. outsourced
6. a. association b. sweatshop c. closed shop d. retailer
7. a. breaches b. errors c. mistakes d. wrongdoings
8. a. ethic b. ethnic c. ethical d. ethnical
9. a. outsource b. outsourcing c. outsources d. outsourced
10. a. garment b. raiment c. garments d. raiments
11. a. by b. to c. of d. from
12. a. estimate b. estimating c. estimates d. estimated
13. a. depends b. dependent c. dependant d. dependence
14. a. Consume b. Consumption c. Consumer d. Consumers
15. a. stuff b. warec. goods d. garment

7. J.K. Rowling, in her 'Harvard Address', talks about 'the fringe benefits of failure, and the importance of imagination'. It is powerful in so many ways as it tackles the subject of failure. What is the implicit message that you get?

8 a) Fill in the blanks with the right form of the verb agreeing with the subject.

- i. To take pay and then not to do work \_\_\_\_\_ dishonest.
- ii. The cost of all these articles \_\_\_\_\_ risen.
- iii. The jury \_\_\_\_\_ divided in their opinions
- iv. That night every one of the boat's crew \_\_\_\_\_ down with fever.
- v. One or the other of those fellows \_\_\_\_\_ stolen the watch.
- vi. The strain of all the difficulties and vexations and anxieties \_\_\_\_\_ more than he could bear.
- vii. No news \_\_\_\_\_ good news.

b) Fill in the blanks with the right form of the pronoun agreeing with the subject.

- i. During early rehearsals, an actor may forget \_\_\_\_\_ lines.
- ii. The Washington team was opportunistic; \_\_\_\_\_ took advantage of every break .
- iii. One needs to see \_\_\_\_\_ dentist twice per year.
- iv. The committee members put \_\_\_\_\_ signatures on the document.
- v. If any one of the sisters needs a ride, \_\_\_\_\_ can call me.
- vi. Automobiles won't work properly, unless \_\_\_\_\_ are regularly serviced.
- vii. If the board of directors controls the company, \_\_\_\_\_ may vote for a raise.

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Code No: R18A0021

## MALLA REDDY COLLEGE OF ENGINEERING &amp; TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

I B.Tech I Semester Supplementary Examinations, October 2020

## Mathematics-I

(EEE, ME, ECE, CSE, IT &amp; AE)

Roll No										
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Time: 2 hours

Max. Marks: 70

Answer Any Four Questions

All Questions carries equal marks.

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1

a) Find the rank of the following matrix by reducing it to Echelon form

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 15 \\ 0 & 6 & -3 & 9 & -6 \\ 0 & -8 & 4 & -12 & 8 \\ 0 & 6 & -3 & 10 & -4 \end{bmatrix}$$

b) Solve the system of equations

$$x_1 + x_2 + x_3 + x_4 = 0$$

$$x_1 + x_2 + x_3 - x_4 = 4$$

$$x_1 + x_2 - x_3 + x_4 = -4$$

$$x_1 - x_2 + x_3 + x_4 = 2$$

2 a) Verify Cayley-Hamilton Theorem and find  $A^{-1}$  if exists

$$A = \begin{bmatrix} 0 & c & -b \\ -c & 0 & a \\ b & -a & 0 \end{bmatrix}$$

b) Find the Eigen values and Eigen vectors of

$$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

3 a) If  $x = r \sin \theta \cos \phi$ ,  $y = r \sin \theta \sin \phi$ ,  $z = r \cos \theta$ , then find  $\frac{\partial(x,y,z)}{\partial(r,\theta,\phi)}$ 

b) Find the maximum and minimum values of the function

$$f(x, y) = 2(x^2 - y^2) - x^4 + y^4$$

4 a) Expand  $e^x \cos y$  at (0,0) up to three terms.

b) A rectangular box which is open at the top, has a capacity of 32 cubic feet. Determine the dimensions of the box such that the least material is required for the construction.

5 a) The rate at which bacteria multiply is proportional to the instantaneous number present. If the original number doubles in 2 hours, in how many hours will it be triple?

b) Solve  $xe^x(dx - dy) + e^x dx + ye^y dy = 0$

6 a) Solve  $(D^2 + 1)y = \csc x$  by using method of variation of parameters.

b) Solve  $(D^2 + 1)y = \sin x \sin 2x + e^x x^2$

7 a) Form partial differential equation by eliminating arbitrary constants  $h$  and  $k$  from:  $(x - h)^2 + (y - k)^2 + z^2 = c^2$

b) Solve  $px + py = pq$

8 a) Using Convolution theorem, find  $L^{-1} \left\{ \frac{s^2}{(s^2+a^2)^2} \right\}$

b) Using Laplace Transform, Solve  $\frac{d^2y}{dt^2} + y = \sin 2t$ , given that  $y(0) = 0, y'(0) = 0$

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Code No: **R18A0501****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech I Semester Supplementary Examinations, October 2020****Programming for Problem Solving**

(EEE, ME, ECE, CSE, IT &amp; AE)

<b>Roll No</b>									
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**Time: 2 hours****Max. Marks: 70**

Answer Any **Four** Questions  
All Questions carries equal marks.

- 1
  - a. Explain the block diagram of a computer? Also explain the difference between primary memory & secondary memory.
  - b. What is a flow chart? Draw flow chart to find the smallest of three numbers.
- 2
  - a. What is an operator? Explain different types of operators in C language.
  - b. What are different simple and derived Data Types used in C? Explain with example.
- 3
  - a. Write a program to find the greatest number among the three given numbers.
  - b. Discuss break, continue and goto statements.
- 4 List out various conditional, unconditional and nested control statements used in C with syntax and example.
- 5
  - a. Differentiate recursive and non-recursive functions with examples.
  - b. Explain about i) storage classes used in C and ii) Advantages of Functions
- 6
  - a. Illustrate Function Prototypes and scope rules for Functions.
  - b. Define Call by Value? Write a Program to demonstrate Call by Value.
- 7
  - a. Define an array. Explain different types of arrays with examples.
  - b. Demonstrate a C Program to read String using scanf & getchar.
- 8
  - a. What is a pointer? Why are they important? Why pointers should have data types when their size is always 4 bytes (in a 32-bit machine), irrespective of the variable they are pointing to?
  - b. Write a C program to maintain a book structure containing name, author and pages as structure members. Pass the address of structure variable to a user defined function and display the contents.

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