

Code No: R18A0201

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**  
(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Regular/Supplementary Examinations, Oct/Nov 2020**

**Basic Electrical Engineering**

**(EEE, ECE, CSE & IT)**

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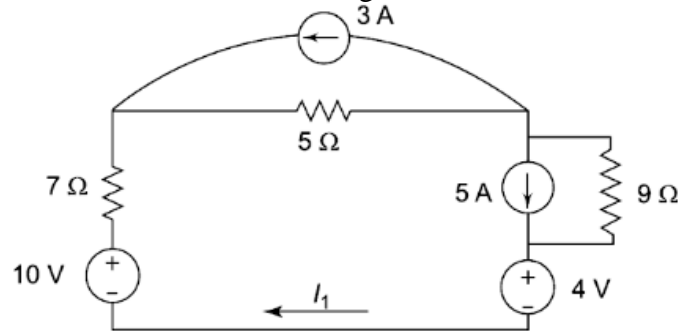
**Time: 2 hours**

**Max. Marks: 70**

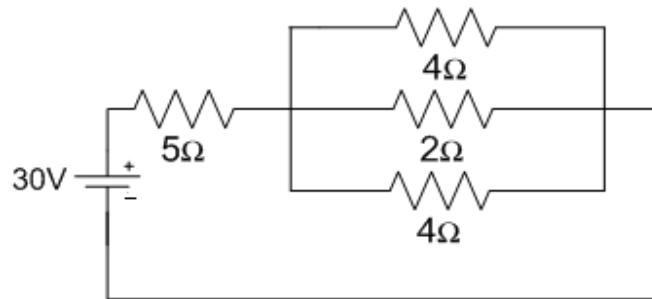
Answer Any **Four** Questions  
All Questions carries equal marks.

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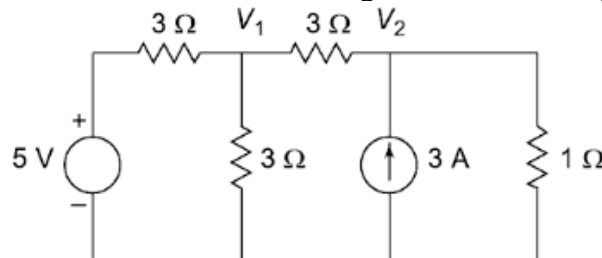
- 1(a)** Define  
i) Charge ii) Current iii) Voltage
- (b)** Determine the value of  $I_1$  in the circuit using source transformation technique.



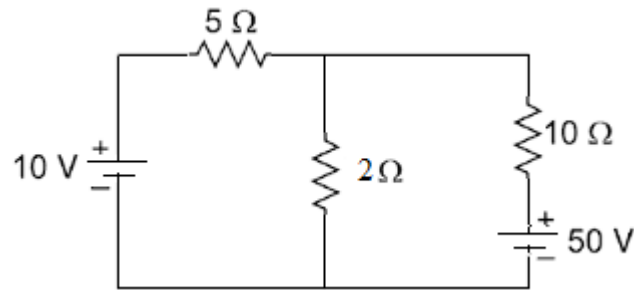
- 2(a)** Define Ohm's Law and List the applications of it.
- (b)** Determine the total current in the circuit



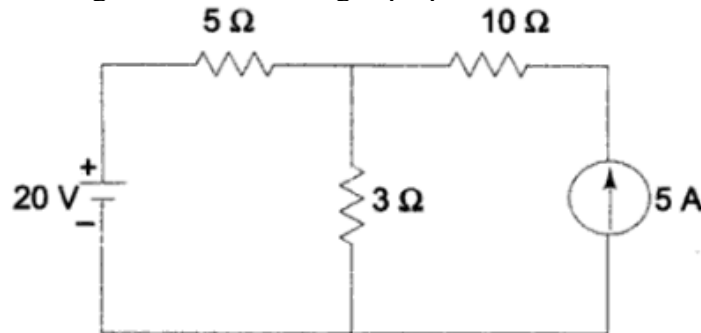
- 3(a)** Using nodal analysis, determine the node voltages in the following network



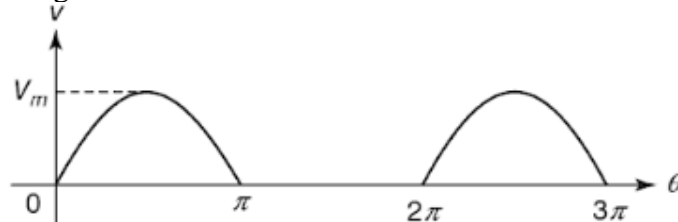
- (b)** Discuss the steps to determine the Thevenin's equivalent circuit.
- 4(a)** Write the mesh equations and determine the currents in the circuit shown in the fig.



- (b) Find the current through  $3\Omega$  resistor using superposition theorem in the circuit



- 5(a) Determine the average value and rms value of the waveform shown in the fig.



- (b) An inductive coil having negligible resistance and  $0.1\text{H}$  inductance is connected across an AC supply of  $220\text{V}$ ,  $50\text{Hz}$ . Calculate (i) Inductive reactance (ii) RMS value of Current (iii) Power factor (v) write down the equations for voltage and current.
- 6(a) An alternating current is given by  $i=14.14 \sin(377 t)$ .  
Find (i) rms value of the current (ii) frequency (iii) instantaneous value of the current at  $t=3 \text{ ms}$
- (b) Define resonant frequency and derive the equation of resonant frequency of parallel RLC circuit
- 7(a) Describe the principle of operation of a generator.  
(b) List the common features of rotating electrical machines.
- 8(a) Describe the characteristics of batteries.  
(b) Illustrate the operation of Miniature Circuit Breaker (MCB)

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Code No: R18A0013

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.Tech II Semester Regular/Supplementary Examinations, Oct/Nov 2020****Engineering Chemistry****(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) What is meant by battery? Explain the construction and working of lead acid cell with cell reactions.
  - b) What is electrochemical corrosion? Explain the mechanism of evaluation of hydrogen with suitable example.
- 2
  - a) Write a short note on Galvanic cell.
  - b) What is tinning process? Explain.
- 3
  - a) List out the Salient features of Crystal field theory.
  - b) Show through a diagram and explain the splitting of d-orbital in octahedral complexes.
- 4
  - a) Explain the Salient features of Molecular orbital theory.
  - b) Draw and explain the MOT diagram for O<sub>2</sub> Molecule.
- 5
  - a) How is hard water softened by ion exchange process?
  - b) Give the principle of reverse osmosis. Give the main advantage of reverse osmosis over ion-exchange process.
- 6
  - a) Define hardness of water. How hardness of water is classified? Express the units of hardness of water. What is the relationship between them?
  - b) Give the chemical reactions involved in the determination of hardness of water by EDTA method. What is the function of alkaline buffer in the determination of hardness of water by EDTA Method?
  - c) Explain briefly about disinfection of water by chlorination.
- 7
  - a) What is Markownikoff's addition? Explain briefly with suitable examples.
  - b) What are reduction reactions? Explain briefly reduction of carbonyl compounds using LiAlH<sub>4</sub>.
  - c) What is substitution reaction?
- 8
  - a) Discuss the term calorific value. Give its unit. Justify the statement "Petroleum is a better fuel than coal". What are characteristics of a good fuel?
  - b) Explain proximate analysis of coal and give its significance?

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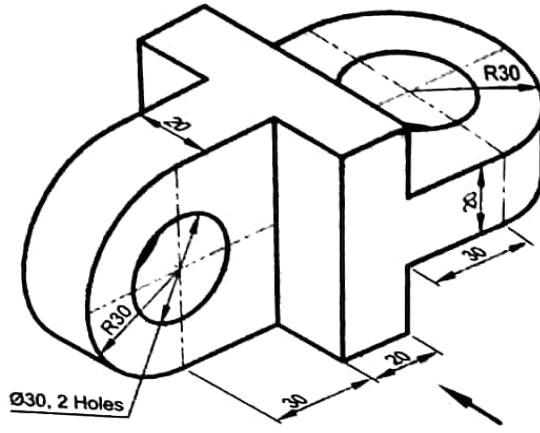
**Code No: R18A0301****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.TechII Semester Regular/Supplementary Examinations, Oct/Nov 2020****Engineering Graphics****(ME & AE)**

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

All Questions carries equal marks.

- 1 Draw an ellipse when the distance of its focus from its directrix is 50mm and eccentricity is  $\frac{2}{3}$ . Also draw a normal and tangent to the ellipse at a point 70mm from the directrix
- 2 A line of 1 centimeter represents an actual length of 4 dm. Draw a plain scale and mark a distance of 6.7 m on it.
- 3 Draw the all possible projections of point N, equal distance 60mm from both the reference planes.
- 4 A 70 mm long line PQ, has its end P 20 mm above the H.P. and 30 mm in front of the V.P. The line is inclined at  $45^\circ$  to the H.P. and  $30^\circ$  to the V.P. Draw its projections
- 5 A hexagonal plane of side 30mm has an edge on the H.P. Its surface is inclined at  $45^\circ$  to the H.P. and the edge on which the plane rests is inclined at  $30^\circ$  to the V.P. Draw its projections.
- 6 A cylinder of base diameter 50 mm and axis 70 mm has a generator in the V.P. and inclined at  $45^\circ$  to the H.P. Draw its projections
- 7 Draw the isometric view of a hexagonal prism of base side 30 mm and axis 70mm. The prism is resting on its base on the H.P. with an edge of the base parallel to the V.P.
- 8 Draw three views of the object shown in fig. All dimensions are in mm



**Code No: R18A0002****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.TechII Semester Regular/Supplementary Examinations, October/November****Professional English****(Common to all branches)**

<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 Describe your favorite place in 200 words.
- 2.a Highlight various components of an effective paragraph.
  - b Write a paragraph on the topic “Health is Wealth” following all the conventions of writing a paragraph.
- 3 Write short notes on the following with regard to effective oral presentation.
  - a. Selection of topic
  - b. Preparation of slides
  - c. Language ability
  - d. Body language/gestures
  - e. Interaction with the audience
  - f. Eye contact
  - g. Facial expressions
- 4.a Change the following complex sentences into simple sentences.
  - a. After she had learned her lessons, she went out to play.
  - b. While he was walking along the street, he saw a dead cobra.
  - c. Although she was wealthy and educated, she never made a name.
  - d. If he follows my advice, he will win his object.
  - e. As she was driven out of her country, she sought shelter in a foreign land.
  - f. He wore a new shirt yesterday that he had bought at the airport.
  - g. He confessed that he was guilty.
- 4.b Rewrite the following sentences after making necessary corrections.
  - a. They have watched that movie last Monday.
  - b. Where he can find a restaurant?
  - c. He lives in United States.
  - d. One of my teacher is from London.
  - e. Let’s go by walk.
  - f. Can I have a question?
  - g. This is the worse day of his life.

- 5 Elaborate on the things to do and not to do to be successful in the job interviews.
- 6.a Change the following sentences from direct to indirect speech.
- Anitha said to Naveen, "Practice meditation."
  - My mother said to me, "How intelligent you are!"
  - The commentator said, "What a beautiful bowling!"
  - He said to her, "I took her permission."
  - She said to me, "I am waiting for you."
  - Doctor said to her, "She is doing well."
  - He said to her father, "She has posted the letter."
- b What is a cover letter? Write a cover letter to the HCL company as if your sending resume.
- 7.a What are the challenges commonly faced by candidates in telephonic interviews and how one can overcome them?
- b Complete the following sentences using an appropriate auxiliary verb.
- Tell me, \_\_\_\_\_ (be) you coming to the party?
  - What \_\_\_\_\_ (do) you do every Sunday?
  - I \_\_\_\_\_ (model) like to watch TV. There is a good film on.
  - She \_\_\_\_\_ (do) not want to stay at home. She wants to go out with her friends.
  - He \_\_\_\_\_ (have) called me twice this morning.
  - What \_\_\_\_\_ (do) she do in her free time?
  - Where \_\_\_\_\_ (do) they go yesterday?
8. **Prepare an eye-catching resume for the following notification assuming that you meet the qualifications skills and experience.**

**NOTIFICATION**

*Date of notification* \_\_\_\_\_ (your choice)

*Name of the newspaper* \_\_\_\_\_ (your choice)

*Name of the company* \_\_\_\_\_ (your choice)

*For the position of* \_\_\_\_\_ (your choice)

With/without experience.

Qualification: B.Tech with excellent academic record

Send your latest resume to **The HR Manager, Name of the company,**

**Mumbai, India,** within 15days from the date of advertisement.

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Code No: **R18A0015****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**  
(Autonomous Institution – UGC, Govt. of India)**I B.Tech II Semester Regular/Supplementary Examinations, Oct/Nov 2020****Engineering Physics****(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 What is simple harmonic motion? Derive an expression for motion of a simple harmonic oscillator.
- 2 Derive an equation to describe the position of a damped harmonic oscillator at instant of time.
- 3 a) What are Newton's rings? Describe and explain formation of Newton's rings in reflected monochromatic light.  
b) Newton's rings are observed between a convex lens and a plane glass plate. The diameter of  $n^{\text{th}}$  and  $(n+5)^{\text{th}}$  rings are 11.37 and 14.28 units, respectively. Find the diameter of  $(n+14)^{\text{th}}$  ring.
- 4 a) Define resolving power of a microscope. Derive an expression for it.  
b) Calculate the resolving power of a telescope whose lens is of diameter 200 in. Where wavelength is  $5.5 \times 10^{-5}$  cm.
- 5 a) Obtain an expression for density of states  
b) Distinguish between semiconductors and insulators
- 6 a) With a neat diagram discuss Kronig-Penny model  
b) What is the concept of effective mass of an electron?
- 7 a) Derive an equation for Calusius-Mosotti relation.  
b) What is Bohr Magneton? How it is related to magnetic moment of an electron?
- 8 a) Explain population inversion.  
b) With a neat diagram explain construction and working principle of He-Ne laser system.

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Code No: R18A0022

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**I B.TechII Semester Regular/Supplementary Examinations, October/November****Mathematics-II****(Common to all branches)**

<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**
- Find a real root of  $x^3 + x^2 + x - 7 = 0$  correct to two decimal places by using Bisection method
  - The population of a town in the decadal census was given below

Year $x$	1891	1901	1911	1921	1931
Population $y$	46	66	81	93	101

Estimate the population for the year 1895

- 2**
- Using Newton- Raphson method to find the root of the equation  $e^x - 3x = 0$  that lies between 0 and 1
  - Apply Lagrange's interpolation formula find  $f(36)$ , given that  $f(30) = -30$ ,  $f(34) = -13$ ,  $f(38) = 3$  and  $f(42) = 18$

- 3**
- Evaluate  $\int_0^{\frac{\pi}{2}} \sqrt{\sin x} \, dx$  by using simpson's  $\frac{1}{3}$  rule

- Using Taylor series, find  $y(0.1)$ , Given that  $\frac{dy}{dx} = 1 + xy$  and  $y(0) = 1$

- 4**
- Find  $y(0.1)$  using Modified Euler's method given that  $\frac{dy}{dx} = xy^2 + 1$  and  $y(0) = 1$

- Obtain a relation of the form  $y = ab^x$  for the following data by the method of least squares

$x$	2	3	4	5	6
$y$	8.3	15.4	33.1	65.2	127.4

5

a) Show that  $\beta(m, n) = \int_0^{\infty} \frac{x^{n-1}}{(1+x)^{m+n}} dx$

b) Show that  $\int_{\theta=0}^{\frac{\pi}{2}} \sin^n x dx = \frac{\Gamma\left(\frac{n+1}{2}\right)}{\Gamma\left(\frac{n+2}{2}\right)} \cdot \frac{\sqrt{\pi}}{2}$

6

a) Prove that  $\int_0^1 \frac{x^2 dx}{\sqrt{1-x^4}} \times \int_0^1 \frac{dx}{\sqrt{1+x^4}} = \frac{\pi}{4\sqrt{2}}$

b) Prove that  $\Gamma(n) = \int_0^1 \log(1/x)^{n-1} dx$  where  $n > 0$

7

a) Evaluate  $\int_0^{\frac{\pi}{4}} \int_0^{a \sin \theta} \frac{r dr d\theta}{\sqrt{a^2 - r^2}}$

b) Find the volume of the sphere  $x^2 + y^2 + z^2 = a^2$

8

Verify divergence theorem for  $\vec{F} = (2x - z)\hat{i} + x^2 y \hat{j} - xz^2 \hat{k}$  taken over the region bounded by  $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$

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**Code No: R18A0502****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****I B.Tech II Semester Regular/Supplementary Examinations, Oct/Nov 2020****Object Oriented Programming****(Common to all branches)**

<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) What do you mean by object oriented programming? Explain how it is different from procedural concepts.  
b) List out and elaborate various data types and tokens in C++?
- 2 a) What are the features of OOP? Explain.  
b) List and discuss variables, constants and operators in C++?
- 3 a) Illustrate the purpose of static members in C++ with an example?  
b) Demonstrate objects as function arguments in C++ with suitable example?
- 4 a) Discuss about memory allocation for objects in C++ and list its significance?  
b) Define a class? How do you access members on that and list the merits and scope of classes in C++.
- 5 Explain the scope of default constructor, parameterized constructor and copy constructor in C++ with an example.
- 6 What do you mean by inheritance? Explain about hierarchical inheritance and hybrid inheritance in object oriented design process.
- 7 Describe about memory management process in C++ with example? List its scope in real time environment.
- 8 Define exception handling? Explain throwing and catching mechanisms in C++ and list out the scope of exception handling in real time application development.

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