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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
Analog and Digital Electronics
(EEE & ECE)

Roll No										

Time: 3 hours   **Max. Marks: 70**

Answer Any **Five** Questions
All Questions carries equal marks.
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1   Explain the temperature dependence of VI characteristics of pn junction diode and also plot the characteristics of PN junction diode in forward and reverse bias conditions.   **[14M]**

2   a. Explain practical versus ideal diode and draw its equivalent circuits**.**   **[7M]**
     b. Compare zener diode and pn junction diode and mention its applications.   **[7M]**

3   Describe the input and output characteristics of a transistor in CC configuration and plot them.   **[14M]**

4   a. What is Early effect?   **[4M]**
     b. Explain the operation of a pnp transistor and also mention how it acts as an amplifier.   **[10M]**

5   Explain the principle of operation of n channel JFET and draw its small signal model   **[14M]**

6   Explain the principle of operation of depletion mode n channel MOSFET and plot its drain and transfer characteristics   **[14M]**

7   a. What is the specialty of unit-distance code? State where they are used.   **[7M]**
     b) Give the Boolean expressions used for following gates   **[7M]**
     i) AND ii) NOR iii) EX-OR iv) OR

8   Reduce the following functions using K-map techniques.
     a) $f(A, B, C, D, E) = \sum m(1, 4, 8, 10, 11, 20, 22, 24, 25, 26) + d(0, 12, 16, 17)$ **[7M]**
     b) $f(A, B, C, D) = \pi M(4, 5, 6, 7, 8, 12, 13) + d(1, 15)$.   **[7M]**
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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
Applied Physics
(EEE & ECE)

Roll No									

Time: 3 hours   **Max. Marks: 70**

Answer Any **Five** Questions
All Questions carries equal marks.
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1	a.	Discuss mode propagation through step and graded index optical fibers	**[10M]**
	b.	Write any four applications of optical fibers.	**[4M]**
2		With neat diagram explain working mechanism of He-Ne gas laser.	**[14M]**
3	a.	Calculate energy of a particle in one dimensional square well potential.	**[10M]**
	b.	Calculate the energy of an electron in third excited state which is confined in I-D potential well of width 0.1nm	**[4M]**
4	a.	What is dual nature of the light? Explain the dual nature of the light using de-Broglie's hypothesis.	**[10M]**
	b.	Calculate the Debrogile wavelength of an electron accelerated by potential difference of 169 Volts	**[4M]**
5		Derive the expression for Density of states	**[14M]**
6	a.	Draw and explain E – K diagram.	**[7M]**
	b.	Derive an expression for Effective mass electron.	**[7M]**
7	a.	With neat diagram explain LED construction and characteristics.	**[8M]**
	b.	Distinguish between Direct and Indirect bang gap semiconductors	**[6M]**
8	a.	Distinguish between properties of anti-ferro and ferri magnetic materials.	**[4M]**
	b.	Derive an equation for Bohr magneton.	**[10M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
Basic Electrical Engineering
(CSE, IT, CSE-CS, CSE-AI&ML, CSE-DS & CSE-IOT, AIDS, AIML)

Roll No
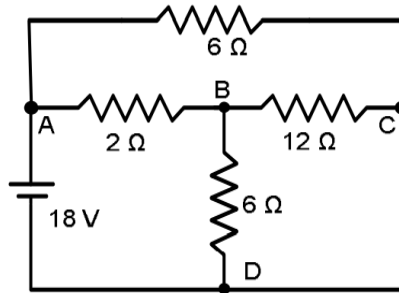
Time: 3 hours   **Max. Marks: 70**

Answer Any **Five** Questions
All Questions carries equal marks.
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1   For the circuit shown below, calculate the current in each resistance using KVL as   **[14M]**
well as KCL and comment on the solution methods.

2   Discuss the following with respect to electrical circuit.
    (i) Independent sources   **[5M]**
    (ii) Dependent sources   **[5M]**
    (iii) Passive Elements   **[4M]**

3   (a) Find the voltages V_1, and V_2 in the circuit shown in figure below using nodal   **[7M]**
analysis.
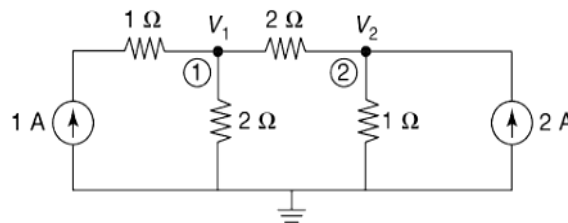
    (b) Determine the current delivered by the source in the circuit as shown in figure.   **[7M]**
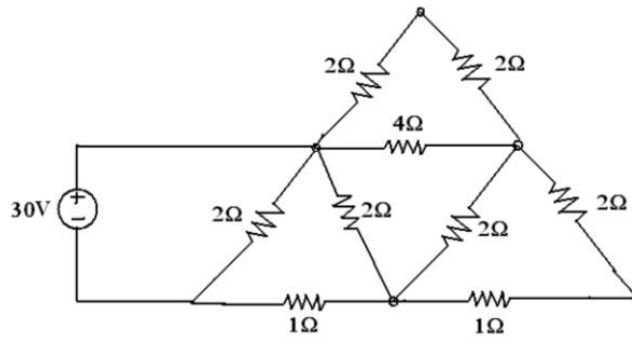
4   (a) State and explain the superposition theorem with suitable example.   **[7M]**

     (b) Define Norton's Theorem and discuss the various steps involved with suitable circuits?   **[7M]**

5   (a) Define RMS value, Average value, form factor and peak factor.   **[7M]**

     (b) A 230 V, 50 Hz ac supply is applied to a coil of 0.06 H inductance and 2.5Ω resistance connected in series with a 6.8 µF capacitor. Calculate (i) Impedance (ii) Current (iii) Phase angle between current and voltage (iv) power factor (v) power consumed.   **[7M]**

6   (a) An alternating current varying sinusoidally, with a frequency of 50Hz, has an rms value of 20A. Write down the equation for the instantaneous value and find this value at (i) 0.0025s, (ii) 0.0125s after passing through a positive maximum value. At what time, measured from a positive maximum value, will instantaneous current be 14.14A?   **[7M]**

     (b) Derive the expression for impedance, power factor and phase angel of R-L series.   **[7M]**

7   (a) Explain the construction and working principle of single phase transformer.   **[7M]**

     (b) Starting from fundamentals, derive the emf equation of the single phase transformer.   **[7M]**

8   Write short notes on the following.

     (a) MCB   **[7M]**

     (b) ELCB   **[7M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
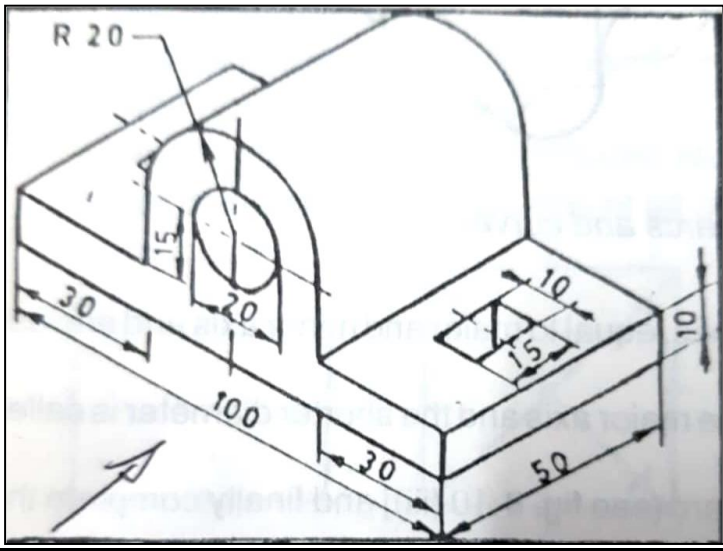### Computer Aided Engineering Graphics
(CSE, IT, CSE-AIML,CSE-CS,CSE-DS,CSE-IOT & AIML)

Roll No										

Time: 3 hours   **Max. Marks: 70**

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

1	**a**	Divide a 100 mm long straight line into eight equal parts.	**[7M]**
	b	Inscribe a hexagon in a circle of 60 mm diameter.	**[7M]**
2	**a**	Draw a circle of 100 mm diameter and divide eight equal parts.	**[7M]**
	b	Construct a regular pentagon of side 60 mm with general method.	**[7M]**

3   Draw the projections of the following points on a common reference line keeping   **[14M]**
the distance between their projectors 30 mm apart.
a)   Point A is 20 mm below the H.P and 50 mm in front of the V.P
b)   Point B is in the H.P and 40 mm behind the V.P.
c)   Point C is 30 mm in front of the V.P and in the H.P
d)   Point D is 50 mm above the H.P and 30 mm behind the V.P
e)   Point E is 20 mm below the H.P and 50 mm behind the V.P
f)   Point F on both the H.P and V.P.

4   A straight line AB 80 mm long has its end A in both H.P and V.P. The straight   **[14M]**
line is inclined at 30° to V.P and 45° to H.P. Draw its projections.

5   A Pentagonal plane with a 30 mm side has an edge on the H.P The surface of   **[14M]**
the plane is inclined at 45° to the H.P. and Perpendicular to the V.P. The
surface of the planes is inclined at 30° to the V.P. Draw its projections.

6   A cone of base 50 mm diameter and axis 65 mm long lies with one of its   **[14M]**
generators on the H.P and its axis is parallel to the V.P. Draw its projection.

7   Draw the isometric projection of a pentagonal prism of base side 40 mm and   **[14M]**
height 65 mm when it rests with its base on the H.P the axis is inclined at 30°
to the H.P

8   Draw the (i) Front view (ii) Top View (iii) Side view of the Following Isometric   **[14M]**
view shown below

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R20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
Engineering Chemistry
(ME)

Roll No										

Time: 3 hours   Max. Marks: 70

Answer Any Five Questions
All Questions carries equal marks.
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1		Define Galvanic cell? Explain the construction and working of Galvanic cell.	[14M]
2	a.	Define electrode potential. Write the Nernst equation for the Hydrogen electrode.	[7M]
	b.	What are fuel cells? Write the redox reactions involved in producing the cell emf. Briefly discuss the applications and advantages of fuel cells.	[7M]
3	**a.**	What is the Pilling -Bedworth Rule? Discuss the role of oxide film formed in oxidation corrosion.	[7M]
	b.	Explain the process of Tinning? What are advantages of this process.	[7M]
4	a.	Write a note on dry corrosion.	[7M]
	b.	What is electro less plating ? Discuss the electro less plating of Ni in detail.	[7M]
5	**a.**	Distinguish between thermoplastic polymers from thermosetting polymers with suitable examples.	[7M]
	b.	Write the synthesis, properties and Engineering applications of Polycarbonate.	[7M]
6	a.	Explain the mechanism of conduction of electricity in polyacetylene and write its applications.	[7M]
	b.	What are Fiber reinforced plastics. Discuss the advantages of FRP's with examples.	[7M]
7	a.	What are smart materials? Write the different types of smart materials with examples.	[7M]
	b.	Explain the detailed applications of shape memory alloys.	[7M]
8	a.	What is meant by photosensitization? Give one example.	[7M]
	b.	Explain Florescence and Phosphorescence in detail.	[7M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
English
(EEE, ME, ECE, CSE, CSE-AIML, IT & AE)

Roll No										

Time: 3 hours   **Max. Marks: 70**

Answer Any **Five** Questions
All Questions carries equal marks.
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1	**A**	What is the moral presented by the poet in the poem 'The Road Not Taken'?	**[7M]**
	B	Write a paragraph about the career you are considering. Explain why you are choosing that career path, and how you plan to accomplish your goals.	**[7M]**
2	**A**	*Correct the following sentences:*	**[7M]**
		i) Vijay took a first taxi that came his way.	
		ii) I hate a telephone for is constant ringing.	
		iii) He is cleverer of two.	
		iv) The Economics is a very interesting subject.	
		iv) He was ready with the cup and saucer.	
		vi) A MLA visited my house yesterday.	
		vii) The man is the greatest of god's creations.	
	B	Write seven words with possible prefixes and suffixes	**[7M]**
3	**A**	How does Abraham Lincoln want his son's teacher to treat him?	**[7M]**
	B	Write an essay on – Does technology make us lazy.	**[7M]**
4	**A**	Write the Synonyms for the following words	**[7M]**
		i. Rude	
		ii. Intelligibility	
		iii. Tiny	
		iv. Polity	
		v. Childish	
		vi. Amicable	
		vii. Difficulty	
	B	Write any seven sentences of direct speech and change them into Indirect speech.	**[7M]**
5	**A**	What road will you choose if you are in poet's place and why?.	**[7M]**
	B	Write a letter to the Mayor of your city seeking a solution to the problem of water logging in your area.	**[7M]**
6		What is Nadella's vision for the future of Technology?	**[14M]**
7	**A**	Describe the central idea of the JK Rowling speech on the fringe benefits of failure and importance of imagination?	**[7M]**

B *Summarize the text given below in 70-80 words.*   **[7M]**

Water contamination is a serious form of pollution, and one that can be challenging to rectify. There seem to be two main causes involved, and a variety of damaging effects on people and the biosphere, which we will discuss here.

Probably the main factor is the issue of emissions from cars, factories and other human activities. These emissions contain damaging pollutant particles which can contaminate rainwater run-off and thus enter the water cycle, by transferring through the water table into aquifers, streams and rivers. Filtration and processing are not really viable options for such large volumes of water, and so the water table remains tainted with these elements over long periods, as we see in Eastern Europe today. In situations where soil erosion and logging have already damaged the local environment, the accumulation can be very serious. The other major cause is accidental or deliberate dumping of waste products in places outside of controlled landfills or waste processing centres. Even small amounts of abandoned waste can enter water supplies through the ground, often undetected.

The effects on animal life can be severe, especially for species which are already endangered by such threats as poaching, habitat loss and food chain disruption. Contaminated water can lead to dwindling numbers or even potential extinction, as may indeed happen to the Asian tiger populations. The impact on human society can also be distressing, including the poisoning of drinking water, famine or drought due to lack of safe irrigation, and long-term loss of land as we see, for example, after the Bhopal poisoning catastrophe in India. Such effects tend to have an especially grave impact on the very poorest in society, with the least resources to counter the environmental effects.

Overall, we see that emissions and dumping are the main origins of the problem, and that the effects on both humans and animals are exacerbated by the existing environmental, criminal or social problems. (316 words)

8 **A** Summarize the India's achievements in the last 75 years since independence?   **[7M]**

B *Select the correct word to complete the sentence.*   **[1X7= 7M]**

i) She came to the college *later/latter* than I.

ii) Can you *ensure / insure* the package for the value of the contents?

iii) Adhvaith *ensured / assured* me that my presentation was appropriate.

iv) Delhi is *farther/ further* than Mumbai .

v) This tree is *elder/older* than that.

vi) I *hardly/scarcely* see how I can finish this work.

vii) Rahul and Renu love *one another/ each other.*

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R20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
Engineering Physics
(ME & AE)

Roll No										

Time: 3 hours   **Max. Marks: 70**

Answer Any **Five** Questions
All Questions carries equal marks.
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1	a)	Define simple harmonic motion. Explain the characteristics of simple harmonic motion.	**[7M]**
	b)	Derive an equation of motion of forced damped Harmoinc oscillator.	**[7M]**
2	a)	Derive an equation for energy decay in damped Harmoinc oscillator.	**[8M]**
	b)	Explain about Quality factor in damped harmonic oscillator.	**[6M]**
3	a)	Define coherence. What are the preliminary conditions to get interference	**[6M]**
	b)	With the help of a ray diagram, explain the interference phenomenon in thin films in reflected light.	**[8M]**
4	a)	Explain about resolving power of grating.	**[6M]**
	b)	What is diffraction grating? Explain the diffraction phenomenon of grating and explain the different intensity conditions	**[8M]**
5	a)	Define the terms i) Effective mass ii) density of energy states iii) Fermi level.	**[6M]**
	b)	Derive an equation for effective mass of electron.	**[8M]**
6	a)	Explain Bloch's theorem.	**[7M]**
	b)	Draw and Explain the E-k curve	**[7M]**
7	a)	Derive an expression for Bohr Magneton.	**[7M]**
	b)	Explain the classification of antiferro and ferri magnetic materials.	**[7M]**
8	a)	Explain the terms i) population inversion ii) meta stable states iii) pumping	**[6M]**
	b)	Explain the construction and working of Helium-Neon laser.	**[8M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
Mathematics-I
(EEE,ME,ECE,CSE, IT, CSE-AIML,CSE-CS,CSE-DS,CSE-IOT,AIDS & AE)

Roll No

Time: 3 hours   **Max. Marks: 70**

Answer Any **Five** Questions
All Questions carries equal marks.
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1   (a) Define rank of a matrix and reduce the matrix A into Normal form and   **[8M]**
hence find its rank

$$A = \begin{bmatrix} 0 & 1 & 2 & -2 \\ 4 & 0 & 2 & 6 \\ 2 & 1 & 3 & 1 \end{bmatrix}$$

(b) Solve the system of equations   **[6M]**
$2x + y + z = 10; 3x + 2y + 3z = 18; x + 4y + 9z = 16.$

2   **[14M]**
If $A = \begin{bmatrix} 2 & 1 & 2 \\ 5 & 3 & 3 \\ -1 & 0 & -2 \end{bmatrix}$, State and verify Cayley Hamilton theorem and hence find

$A^4 \,\& \, A^{-1}$.

3   If $u = \dfrac{x+y}{1-xy}$, $v = \tan^{-1} x + \tan^{-1} y$. Find $\dfrac{\partial(u,v)}{\partial(x,y)}$. Hence prove that u and v are   **[14M]**

Functionally dependent.

4   (a) Find the minimum value of $x^2 + y^2 + z^2$ given that $x + y + z = 3a$.   **[7M]**

(b) Expand the function $f(x, y) = e^x \log(1+y)$ in terms of x and y up to the   **[7M]**
terms of 3rd degree using Taylors theorem.

5   (a) Solve the following differential equations   **[7M]**
(*i*) $y = (x-a)p - p^2$ (*ii*) $y = px + p^n$.

(b) A body is originally at $80^0 C$ and cools down to $60^0 C$ in 20 minutes. If the   **[7M]**
temperature of the air is $40^0 C$, find the temperature of the body after 40
minutes .

6 (a) Solve the differential equation $(x^2 y - 2xy^2)dx = (x^3 - 3x^2 y)dy$. **[7M]**

(b) Solve $y(2x^2 y + e^x)dx = (e^x + y^3)dy$. **[7M]**

7 (a) Solve $(D^2 + a^2)y = \tan ax$ by method of variation of parameters. **[7M]**

(b) Solve $(D^2 - 4D + 4)y = 8x^2 + e^{2x}$. **[7M]**

8 (a) Find the Laplace transform of $(i)\dfrac{\cos 2t - \cos 3t}{t}$ (ii) $te^{3t}\sin 2t$. **[7M]**

(b) Apply convolution theorem to evaluate $L^{-1}\{\dfrac{1}{(s-2)(s+2)^2}\}$. **[7M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
I B.Tech I Semester Supplementary Examinations, October 2022
Programming for Problem Solving
(Common to ALL)

Roll No										

Time: 3 hours   **Max. Marks: 70**

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

1	a) Demonstrate a general structure of C program with an example.	**[8M]**
	b) Draw a flowchart to find the maximum number of a given series of data	**[6M]**

2	a) Develop a C program to find the largest of three numbers using ternary operator.	**[8M]**
	b) Explain different looping statements in C	**[6M]**

3	a) Construct a C program to find the greatest number from two dimensional array.	**[7M]**
	b) Discuss the following with suitable examples: i. Array of Pointers ii. Pointer to pointer	**[7M]**

4	Build a program to replace each constant in a string with the text one except letter „z" „Z" and „a" „A" . Thus the string "Programming in C is fun" should be modified as "Qsphsannjoh jo D jt gvo".	**[14M]**

5	a) Classify the types of storage classes they do C supports? What is the necessity of each?	**[7M]**
	b) With suitable example illustrate "call by value and call by reference" techniques of passing parameters in.	**[7M]**

6	a) Describe about dynamic memory management functions.	**[6M]**
	b) What is Structure in C? Demonstrate how to declare, initialize and access a Structure to store DATE (Day, Month,Year)	**[8M]**

7	a) Discuss, how a file can be opened in different modes.	**[6M]**
	b) Write a C program to copy the contents from one file to another file.	**[8M]**

8	Build a C program to implement the stack and perform push and pop operation. Also write a function to display the content of stack after each operation.	**[14M]**

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