

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlupochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad.

I B.Tech I Sem Regular End Examinations, DECEMBER-2017SUBJECT: Engineering Mathematics

Branch: Common to CE, EEE, ME, ECE, CSE, IT & MINING

Time: 3 hours

Max. Marks: 60

PART – A

Answer All Questions

5x2Mark=10 Marks

1. Solve the system $2x+y+3z=0$, $2y=0$, $3z=0$ by matrix method.2. If $A = \begin{bmatrix} 1 & 5 \\ 2 & 4 \end{bmatrix}$, then find the eigen values of $A^3 - A^2 + I$ 3. Solve the differential equation $(x^2 - y^2)dx = 2xy dy$ 4. Solve $\frac{d^3y}{dx^3} + \frac{d^2y}{dx^2} - \frac{dy}{dx} - y = 0$ 5. Find $L\left(\int_0^t e^{u-t} \cos(u) du\right)$.**PART-B**

Answer Any 5 Questions

5x10 Marks= 50 Marks

1. (a) Find the rank of $\begin{pmatrix} 1 & 4 & 3 & -2 & 1 \\ -2 & -3 & -1 & 4 & 3 \\ -1 & 6 & 7 & 2 & 9 \\ -3 & 3 & 6 & 6 & 12 \end{pmatrix}$

(b) Explain the procedure to solve non-homogeneous system of linear equations using LU decomposition method.

OR2. a) Reduce the matrix $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 3 \\ 3 & 0 & 5 & -10 \end{bmatrix}$ into the normal form and hence find its rank.b) Find inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ by elementary transformations.

3. (a) Find the eigen values and the corresponding eigen vectors of the matrix.

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

[6+4](b) If $\lambda_1, \lambda_2, \dots, \lambda_n$ are the Eigen values of A, then prove that the Eigen values of $(A - kI)$ are $\lambda_1 - k, \lambda_2 - k, \lambda_3 - k, \dots, \lambda_n - k$.**OR**

4. a) Using Cayley-Hamilton theorem, find A^{-1} where $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ also find the matrix

represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$

- b) Let $v_1 = (1, -1, 0)$; $v_2 = (0, 1, -1)$ and $v_3 = (0, 0, 1)$ be the elements of R^3 . Show that set of vectors $\{v_1, v_2, v_3\}$ is linearly independent.

5. a) Form the differential equation by eliminating the arbitrary constant

$$x \tan(y/x) = c$$

- b) Solve the differential equation: $\frac{dy}{dx} + y \cos x = y^3 \sin 2x$ [3+3+4]

- c) Find the orthogonal trajectories of the family of circles $x^2 + y^2 = ax$.

OR

- 6.a) Solve $x \frac{dy}{dx} + y = x^3 y^6$

- b) If 30% of a radioactive substance disappeared in 10 days, how long will it take for 90% of it to disappear?

7. (a) Solve $(D^2+4)y = e^x + \sin 2x + \cos 2x$

- b) Solve $\frac{d^2 y}{dx^2} + y = x \cos x$ by the method of variation of parameters.

OR

8. a) Solve the differential equation $\frac{d^2 y}{dx^2} + 5 \frac{dy}{dx} + 6y = e^{-2x} \sin 2x$

- b) Solve $(1+x)^2 \frac{d^2 y}{dx^2} + (1+x) \frac{dy}{dx} + y = 2 \sin\{\log(1+x)\}$

9. Solve $\frac{d^3 y}{dt^3} - 3 \frac{d^2 y}{dt^2} + 3 \frac{dy}{dt} - y = t^2 e^{2t}$ where $y = 1$; $\frac{dy}{dt} = 0$; $\frac{d^2 y}{dt^2} = -2$ at $t = 0$ using Laplace transform method.

OR

10. Using Convolution Theorem, find the inverse Laplace transform of $\frac{s}{(s^2 + 4)(s^2 + 9)}$

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I B.Tech I Sem Regular End Examinations, DECEMBER-2017SUBJECT: Engineering Physics

Branch: Common to CE, EEE, ME, ECE, CSE, IT & MINING

Time: 3 hours

Max. Marks: 60

PART – A

Answer All Questions

5x2Mark=10 Marks

1. Define principle of super position?
2. What are forced vibrations?
3. Draw crystal planes having miller indices (111) and (101).
4. State Heisenberg's Uncertainty principle
5. What is nano material

PART-B

Answer Any 5 Questions

5x10 Marks= 50 Marks

1. a) What is a thin film? Discuss the theory of interference in thin films due to reflected light and obtain the conditions for maxima and minima. (7+3)
b) What is the thickness of the thinnest film of 1.33 refractive index in which destructive interference of the Yellow light (6000\AA) of a normally incident beam in air can take place by reflection?
- OR
2. a) Obtain the expressions for bright and dark fringes when a monochromatic light beam reflected from a thin parallel film of transparent material. (7+3)
b). Two slits are separated by a distance of 0.2mm are illuminated by a monochromatic light of wavelength of 550nm. Calculate the fringe width on the screen at a distance of 1meter from the slits.
3. a) Solve the equation of motion of body executing simple harmonic motion.
b). derive the expression for the total energy of the body executing simple harmonic motion.
- OR
4. a) Draw neat sketch of Lissajous figures with same frequency of SHM (7+3)
b) What is resonance? explain resonance frequency
5. a) What are miller indices?
b) Find the miller indices for a crystal plane
c) Derive the expression for interplanar spacing between consecutive planes described by miller indices. (2+2+6)
- OR
6. a) Derive the Bragg's of X-ray diffraction and obtain the relation between the Inter planar distance 'd' In orthogonal system with lattice parameters a, b, c.
b) The Bragg angle corresponding to the first order reflection from plane (111) in a crystal is 30 degrees when X-rays of wave length 1.75A are used. Calculate inter atomic spacing.

7. a) What is a wave function?
b) Explain the properties and physical significance of wave function.
c) Calculate the de-Broglie wavelength of an electron moving with a velocity of 10^7 m/s. (2+6+2)

OR

8. a) Show that the solution of Schrodinger's equation for a particle in an infinite potential well leads to the concept of quantization of energy.
b) An electron is confined to move in a one dimensional potential well of length 5Å. Find the quantized energy values for the three lowest energy states. ($h = 6.63 \times 10^{-34}$ J.s, and $m = 9.11 \times 10^{-31}$ Kg).

9. a) What are the induced effects due to increase in surface area of nanoparticles? (7+3)
b) Define top down and bottom up methods.

OR

10. a) Explain any technique for the synthesis of nanomaterial (7+3).
b) Describe CVD (Chemical vapor deposition) technique for the synthesis of nanomaterials

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I B.Tech I Sem Regular End Examinations, DECEMBER-2017SUBJECT: Applied Chemistry

Branch: Common to CE, ME & MINING

Time: 3 hours

Max. Marks: 60

PART – A**Answer All Questions****5x2Mark=10 Marks**

1. Write chemical formulas for temporary and permanent hardness.
2. Impure metal corrodes faster than pure metal under identical conditions. Give reason.
3. What are elastomer? Give examples
4. Why tetra ethyl lead is mixed with gasoline.
5. What are the biomedical applications of carbon nano tubes?

PART-B**Answer all Questions****5x10 Marks= 50 Marks**

1. a) explain the alkalinity of water.
b) What are the causes of hardness of water? Give the disadvantages of hard water.
- OR
2. a) explain hot lime-soda process for softening of water with neat labeled diagram.
b) Discuss advantages and disadvantages of hot lime-soda process.
3. a) Explain the mechanism of hydrogen evolution and oxygen absorption in electrochemical corrosion.
b) What is cementation? How is it done?
- OR
4. Explain Dry (chemical) theory of corrosion in detail.
5. a) Bring out the differences between thermoplastics and thermosetting plastics.
b) Write the preparation, properties and engineering applications of Bakelite.
- OR
6. Give the preparation, properties and engineering applications of (a) PVC b) Teflon (c) Nylon 6,6.
7. a) Define the terms i) HCV ii) LCV
b) Calculate the gross & net calorific values of coal having the following composition.
Carbon = 85 %, Hydrogen= 8%, sulphur= 1%, Nitrogen=2%, ash= 4%. (Latent of heat is 587 cal/gm)
- OR
8. a) A sample of coal was found to have the following composition C=75%, H= 5.2%, O= 12.8%, S=1.2%, N=3.7% and ash=2.1%. Calculate the minimum amount of air required for complete combustion of 1 kg of coal.
b) Write advantages and disadvantages of hydro power and biomass energy.
9. Write a short note on Bio-fuels, Bio-sensors and Bio-Surfactants.
- OR
10. a) write a note on importance of green chemistry.
b) Write a short note on i) fullerenes ii) Nano wires.

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
5408 S. UNIVERSITY AVE.
CHICAGO, ILL. 60637

RECEIVED: 10/10/77
10/10/77

TO: DR. J. H. GOLDSTEIN
FROM: DR. J. H. GOLDSTEIN
SUBJECT: 13C NMR SPECTROSCOPY
OF POLYMERIZATION OF VINYL
MONOMERS

10/10/77

Enclosed for you are two copies of a letterhead memorandum
dated 10/10/77, which contains a summary of the results of
the 13C NMR spectroscopy of the polymerization of vinyl
monomers. The results are summarized in the attached
letterhead memorandum. The results are summarized in the
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I B.Tech I Sem*Regular***Examinations, DECEMBER-2017****SUBJECT: English****Branch: Common to EEE, ECE, CSE & IT****Time: 3 hours****Max. Marks: 60****PART – A****Answer All Questions****5x2Mark=10 Marks**

1. a) I _____ (understood) his words.. (write appropriate **prefix** to form the antonym of the word given)
b) The _____ (exam) is scheduled at 10 AM
(write appropriate **suffix** to form the noun form of the word))
2. a. The master punished the servant. (Change into Passive Voice)
b. My dog enjoys being bathed but hates getting his nails trimmed. (Change into Complex Sentence)
3. a. Joseph ----- (complete) the work just now. (Fill with appropriate verb form)
b. Give meaning to the following idiom and use in your own sentence: *Cold Shoulder*
4. a. My sister goes to the school every day. She is studying class 3. (Correct the sentence)
b. Give synonym for *DILIGENT* and use in your own sentence.
5. a. Give antonym for *PRISTINE* and use in your own sentence.
b. Dad said, I was at my friend's place last night." (Change into Indirect Speech)

PART-B**Answer All Questions****5x10 Marks= 50 Marks**

1. Do you think one need to discard certain things from life to lead a happy life? Support your answer.

OR

2. Growth and contribution ,those are bedrocks of happiness-comment, according to the lesson "Minimalism "
3. Describe how changes in the society through technology can lead to wealth generation in a country like India.

OR

4. (a) Draft paragraph on causes and effects of pollution in Delhi ?
(b)Write a short paragraph on 'my favourite subject.'

5. Describe how Subbaiah's greed led to his tragic death in the story *Half a Rupee Worth*.

OR

6. Write an essay on "Education – Importance in development of a country".
7. Write a letter to the Commissioner of your city requesting to provide street lights and children's park for your colony.

OR

8. a) Does the poem "I Too" talk about discrimination? Support your answer.
b) What lesson can we draw from the life of Jesse Owens .
9. Summarize the following passage:-

While oil supplies are going down international demand is going up... and so is the competition. Already pipelines are being taken to ever-increasing lengths to get at the oil on which industrialized economies and societies so heavily rely. As supplies start to dwindle, and the price of oil starts to rise, companies will find profit in places previously considered - because of their geography or political situations - impenetrable. US professor of peace and security studies Michael Klare predicts the emergence of a new geography. 'Attracting the greatest interest,' he says, 'will be places that harbour particularly abundant supplies of vital materials.' Possessing two-thirds of known future oil reserves, the Persian Gulf region (which includes Iraq, Iran, Saudi Arabia, and Kuwait) is most likely to experience the interest of oil competitors. The Caspian Sea Basin (which includes the Central Asian states of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan) is next; with a fifth of the world's total reserves. There is now an extensive US military build-up in both regions. US companies and those of its allies are now being given the rights to extract the oil and lease the land over which their pipelines can run. These pipelines will map out strategic allegiances. For countries not playing on the US team the consequences will be significant.

OR

10. Does the poem *I, Too* by Langston Hughes talk about racial discrimination? Give your views.

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I B.Tech I Sem Regular End Examinations, DECEMBER-2017**SUBJECT: Computer Programming****Branch: Common to CE, ME, Mining, EEE, ECE, CSE & IT****Time: 3 hours****Max. Marks: 60****PART – A****Answer All Questions****5x2Mark=10 Marks**

1. Write an algorithm to find roots of quadratic equation
2. What are the differences between break and continue statements?
3. Write the syntax of malloc ().
4. Define the syntax of structure declaration?
5. Differentiate the file opening “r” and “a” modes

PART-B**Answer All Questions****5x10 Marks= 50 Marks**

1. Explain following concepts
 - i) Explain Bit-wise operators in C Language.
 - ii) What is an Identifier and list the rules for constructing an Identifier

OR

2. a) What is an algorithm? Write an algorithm for printing Fibonacci series.
b) Write about different data types in C.
3. a) Write a C program to multiply given two matrices.
b) What are different conditional statements in C?

OR

4. (a) Discuss about continue statement with an example.
(b) What are the advantages of using arrays? Give the syntax for declaration, accessing and printing one dimensional array.
5. What is a string? Write a c program to reverse a string using pointer.

OR

6. a) Write a c program to find GCD of tow numbers using functions
b) Explain gets() and puts()with an example.

7. Write a program to demonstrate Call-by-reference

OR

8. a) What is a structure? How is a structure different from an array? [4M]
b) Write a program using structures to store and display student information. [6M]

9. Write a c program to copy contents of one file to another file using command line arguments?

OR

10. Sort the following 10 elements using bubble sort technique and compare it with Insertion sort technique. How many passes for each technique?

87 54 98 34 27 88 36 12 90 23

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad.**I B.Tech I Sem Regular End Examinations, DECEMBER-2017****SUBJECT: Basic Electrical and Electronics Engg.****Branch: Common to CE, ME & Mining****Time: 3 hours****Max. Marks: 60****PART – A****Answer All Questions****5x2Mark=10 Marks**

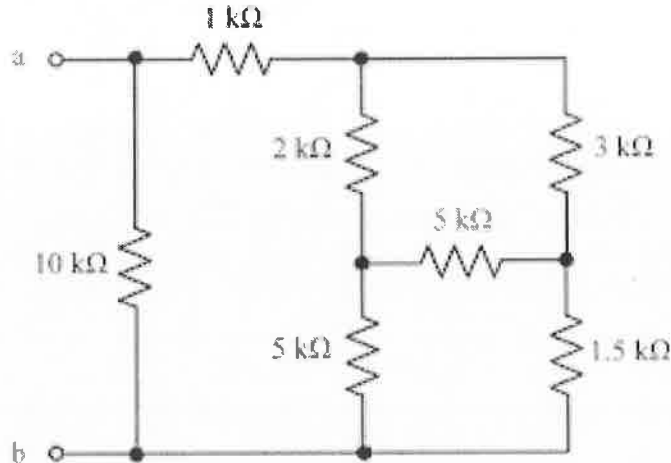
1. Define R-L-C parameters.
2. Explain Flemings right hand rule
3. Define phase and phase difference
4. Draw the V-I Characteristics of Zenor Diode
5. What is filter

PART-B**Answer All Questions****5x10 Marks= 50 Marks**

1. Derive the expression for star to delta and delta to star transformation.

OR

2. Find Equivalent resistance as shown in figure.



3. a) State the Faraday's laws of Electromagnetism.
b) Explain the factors on which self inductances depends.

OR

4. Two coils of number of turns $N_1 = 1000$, $N_2 = 400$ respectively are placed near each other. They are magnetically coupled in such a way that 75 % of flux produced by one of 1000 turns links other. A current of 6 ampere produce a flux of 0.8 mWb in N_1 and same amount of current produces a flux of 0.5 mWb in the coil of N_2 turns. Determine L_1, L_2, M, K for coils.

5. a) Explain steady state analysis of pure inductance with sinusoidal excitation
b) A pure inductive coil allows a current of 10A to flow from a 230V , 50hz supply.
Find i) inductive reactance ii) inductance iii) power

OR

6. a) Define impedance , admittance , reactance , susceptance
b) A 230V 50hz Ac supply is applied to a coil of 0.06H inductance and 2.5Ω resistance connected in series with $6.8\mu\text{F}$ capacitance . calculate: i) impedance ii) current

7. a) Explain band structure of open circuit PN junction diode
b) Explain current components of PN junction diode.

OR

8. a) Can any ordinary rectifier diode be used as a zener diode , explain
b) A silicon diode has a reverse saturation current of 7.12 nanoA at room temperature of 27°C calculate its forward current if it is forward biased with a voltage of 0.7V.

9. a) Discuss about load line analysis of diode
b) Explain Zener diode as voltage regulator

OR

10. Discuss series diode configuration and parallel diode configuration

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I B.Tech I Sem Regular End Examinations, DECEMBER-2017**SUBJECT: Engineering Graphics****Branch: Common to EEE & ECE****Time: 3 hours****Max. Marks: 60****Answer All Questions****5x12 Marks= 60 Marks**

1. Draw the involute of a circle of 40 mm diameter and also draw a tangent and a normal at a point of 95mm from the center of the circle.

OR

2. The distance between two stations is 210 km. A passenger train covers this distance in 7 hours. Construct a plain scale to measure time up to a single minute. RF is 1/200,000 Indicate the distance traveled by train in 29 minutes.
3. The front view and top view of a straight line PQ measures 50mm and 65mm respectively. The point P is in the HP and 20 mm in front of the VP and the front view of the line is inclined at 45° to the reference line. Determine the true length of PQ, true angles of inclination with the reference planes.

OR

4. Draw the projections of the following points on the same ground line keeping the projectors 25mm apart
A. in the H.P. and 20mm behind V.P.
B. 40mm above H.P. and 25mm in front of V.P.
C. in the V.P. and 40 mm above the H.P.
D. 25mm below H.P. and 25mm Behind V.P.
E. 15mm above H.P. and 50mm behind V.P.
F. 40mm below H.P. and 25mm in front of V.P.
G. in both H.P. and V.P.

5. A cylinder of base diameter 50mm and height 65mm rests on its base on HP. It is cut by a plane perpendicular to VP and inclined at 30° to HP and meets the axis at a distance 30mm from the base. Draw the front view, sectional top view and true shape of the section.

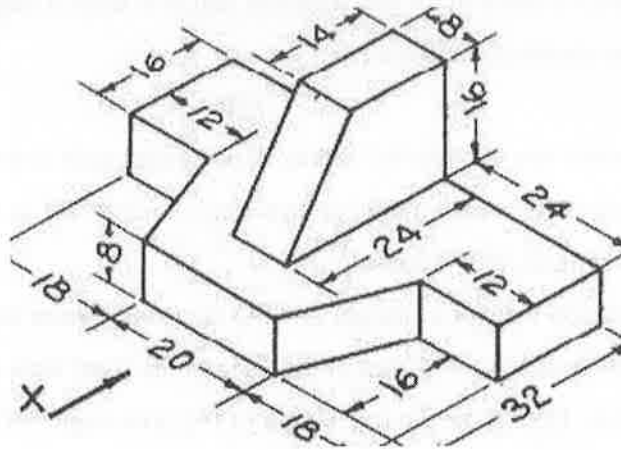
OR

6. Draw the projections of a cone, base 45 mm diameter and axis 50 mm long, when it is resting on the ground on a point on its base circle with (a) the axis making an angle of 30° with the HP and 45° with the VP.

7. A cone of base diameter 40mm and altitude 60mm rests on its base on the HP. It is cut by a plane inclined at 40° to HP and passes through a point on axis which is 40mm above HP. Draw the development of the lateral surface of the lower portion of the cone.

OR

8. Draw the isometric view of the pentagonal pyramid of side of base 30mm and axis 70mm long is resting on its base on H.P.
9. Draw the orthographic views of the following figure



OR

10. Explain the following Editing entities with figures

(i) FILLET (ii) ROTATE (iii) ARC (iv) OFFSET (v) ELLIPSE (vi) LINE

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I B.Tech I Sem Regular End Examinations, DECEMBER-2017**SUBJECT: Engineering Graphics****Branch: Common to CSE & IT****Time: 3 hours****Max. Marks: 60****Answer All Questions****5x12 Marks= 60 Marks**

1. Construct a scale of 1:4, to show centimeters and long enough to measure up to 5 decimeters.

OR

2. Construct a conic when the distance of its focus from its directrix is 50 mm and its eccentricity is $\frac{2}{3}$ also draw a normal and tangent at any point on the curve.

3. A pentagonal lamina of side 30mm rests on the ground with one of its sides inclined at 30° to VP while the surface of the lamina is inclined at 45° to HP. Draw the projections of the lamina.

OR

4. One end of the line AB is in first quadrant, 20 mm above HP and 30 mm in front of VP. The other end is 40 mm behind VP and 50 mm below HP. The distance between the projectors of the line is 60 mm. Draw the projections.

5. A square pyramid, base 40 mm side and axis 65 mm long, has its base on the HP and all the edges of the base equally inclined to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 45° to the HP and bisecting the axis. Draw its sectional top view, sectional side view and true shape of the section.

OR

6. Draw the projections of a right cylinder of diameter 45mm and axis 60mm when its axis makes an angle of 30° with the HP and 45° with VP.

7. A pentagonal pyramid has a base side of 30mm and axis height of 70mm. It rests with its base on HP such that one of the base edges perpendicular to VP. The pyramid is cut by a plane which bisects the axis and is inclined at 30° to HP. Draw the development of the remaining portion of the pyramid.

OR

8. Draw the isometric view of a pentagonal prism, with side of base 25mm and axis 60mm long. The prism is resting on its base on H.P with an edge of the base parallel to VP.

9. Explain the following Editing entities with figures

(i) ERASE (ii) CHAMFER (iii) MIRROR (iv) SPLINE (v) COPY (vi) POLYGON

OR

10. Draw the orthographic views of the following figure

