H.T No: | | | | | | | | | | | **R18** **Course Code: A30004**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations July/August-2024

Course Name: Linear Algebra and Calculus

(Common for all Branches)

Date: 16.07.2024 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. Write the matrix A=$\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ as the sum of symmetric and skew symmetric matrices. 2 M
2. Find the value of λ suchthat the rank of A=$\begin{bmatrix}1 & 2 & 4\\ 2 & \lambda & 5\\ 4 & 8 & \lambda\end{bmatrix}$ is 2. 2 M
3. If 1,-1,2 are the eigenvalues of a 3X3 matrix A, then find the eigen values of the matrix B=$A^2 - 2A^{-1} + I$ 2 M
4. Define the nature of quadratic forms(Positive definite, Semi Positive definite, Negative definite and Semi negative definite). 2 M
5. Test the convergence of the sequence $a_n = \frac{n^2-3n}{3n^2+n}$. 2 M
6. Test the convergence of the series $\sum_{n=1}^{\infty} \frac{4n^3+2}{7n^3+5}$ 2 M
7. Discuss the applicability of Rolle's theorem for $f(x) = |x|$ in [-2,2]. 2 M
8. Find the Taylor series of f(x) = $\sin x$ about $x = \pi/4$. 2 M
9. Find $\frac{\partial z}{\partial x}$, $\frac{\partial z}{\partial y}$. for Z=$\tan^{-1}(x/y)$, (x,y)≠(0,0). 2 M
10. If $z = log(x^2 + y^2 + xy)$ then find $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y}$. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) Find the rank of the matrix A=$\begin{bmatrix}2 & 3 & 1 & 0 & 4\\ 3 & 1 & 2 & -1 & 1\\ 5 & 4 & 3 & -1 & 5\end{bmatrix}$ by using echelon form. 5M

ii) Test for consistency and hence solve the following system of equations 5M

$x + 2y + z = 2, 3x + y - 2z = 1, 4x - 3y - z = 3, 2x + 4y + 2z = 4$

OR

11. B). i) Apply Gauss elimination method to solve the equations $x + 4y - z = -5$, 5M

$x + y - 6z = -12, 3x - y - z = 4.$ 5M

ii) Apply Gauss seidel iteration method to solve the equations $20x + y - 2z = 17$,

$3x + 20y - z = -18, 2x - 3y + 20z = 25$

12. A). Verify Cayley-Hamilton theorem for the matrix A=$\begin{bmatrix}-1 & 2 & -2\\ -6 & -1 & 2\\ 6 & 2 & -1\end{bmatrix}$ and find the inverse of the matrix. 10M

(P.T.O..)

OR

12. B). Show that the matrix $A=\begin{bmatrix} 3 & 1 & -1 \\ -2 & 1 & 2 \\ 0 & 1 & 2 \end{bmatrix}$ is diagonalizable. Hence find P such that $P^{-1}AP$ is a diagonal matrix. 10M

13. A). i) Test the convergence of the series $\sum_{n=1}^{\infty} \frac{1}{n} tan \frac{1}{n}$ 5M

ii) Test the convergence of the series $\sum_{n=1}^{\infty} \frac{4.7.10...(3n+1)}{1.2.3...n} x^n$ 5M

OR

13. B). i) Test the convergence of the series $\sum_{n=1}^{\infty} \frac{n^n x^n}{n!}$ 5M

ii) Test the convergence of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{2n-1}$ 5M

14. A). i) Verify Lagrange's Mean value theorem for $f(x) = (x-1)(x-2)(x-3)$ in [2,5]. 5M

ii) Find the volume of solid generated by revolving the plane area bounded by $y^2 = 4x$ and $x = 4$ about the line x-axis 5M

OR

14. B). Find the relation between Beta and Gamma functions. 10M

15. A). i) Show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 2u log u$ where $log u = \frac{x^3+y^3}{3x+4y}$. 5M

ii) Show that the functions $u = x\sqrt{1-y^2} + y\sqrt{1-x^2}, v = sin^{-1}x + sin^{-1}y$ are functionally related and find the relation ship. 5M

OR

15. B). Examine $f(x,y)=x^4+2x^2y-x^2+3y^2$ for maximum and minimum values. 10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A30008

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations July/August-2024
Course Name: Engineering Physics
(Common for CE & ME)

Date: 19.07.2024 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1.	What are forced vibrations? Give two examples.	2 M
2.	Mention any two applications of acoustic waves.	2 M
3.	Define interference. What do you mean by coherent sources?	2 M
4.	State the Rayleigh criterion of resolution.	2 M
5.	How will you differentiate laser light from ordinary light?	2 M
6.	An optical fiber refractive indices of core and cladding are 1.53 and 1.42 respectively. Calculate acceptance angle of optical fiber?	2 M
7.	What is meant by piezoelectric effect?	2 M
8.	Classify the magnetic materials on the basis of magnetic moment	2 M
9.	Differentiate Top-down and Bottom-up approaches	2 M
10.	Write a short note on quantum confinement.	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	What are transverse waves? Derive the expression for frequency of transverse wave in a string.	10M
	OR	
11. B).	Derive an expression for damped harmonic oscillator and discuss conditions for heavy, critical and light damped oscillations.	10M
12. A).	Explain the formation of Newton's rings and how does the wave length of source of light canbe calculated by using Newton's rings.	10M
	OR	
12. B).	Explain the Fraurnhofer diffraction due to single slit for principal maxima and secondary maxima.	10M
13. A).	Describe the construction and working of Ruby laser. With neat diagrams. Write any four applications.	10M
	OR	
13. B).	Distinguish between step index and graded index optical fibers	10M
14. A).	Derive an expression for Internal field in dielectric materials using Lorentz method.	10M
	OR	
14. B).	What is Hysteresis curve? Explain Hysteresis behavior of Ferro magnetic materials	10M
15. A).	With neat diagram explain the synthesis of the nanoparticles using top-down technique.	10M
	OR	
15. B).	Sketch the neat block diagram of TEM and explain in detail.	10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A30009

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations July/August-2024

Course Name: Applied Physics

(Common for EEE, CSC, CSM, AID & AIM)

Date: 19.07.2024 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)
Each question carries TWO marks. **10x2=20M**

1.	Write a short note on electron gas.	2 M
2.	State Heisenberg's uncertainty principle.	2 M
3.	Write the expression for Hall coefficient.	2 M
4.	How can you distinguish insulators and conductors?	2 M
5.	Mention the characteristics of Zener diode.	2 M
6.	What is non-radiative recombination?	2 M
7.	Differentiate spontaneous and simulated emission.	2 M
8.	List the types of power losses in optical fibres.	2 M
9.	Define magnetic field induction (B) and magnetization (M).	2 M
10.	What is Meissner effect?	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	i) What are matter waves? Write the expression for de-Broglie wavelength of matter waves. ii) Describe the principle of Davison-Germer experiment of electron diffraction.	3M 7M
	OR	
11. B).	i) What is the importance of Schrodinger wave function? ii) Obtain the time independent Schrodinger wave equation for a particle in one dimensional box.	3M 7M
12. A).	What are p-type semiconductors? Obtain an expression for carrier concentration in p-type semiconductors.	10M
	OR	
12. B).	Show that Fermi level is nearer to the conduction band in an n-type semiconductor and nearer to the valence band in an p-type semiconductor	10M
13. A).	Differentiate LED and photodiode. Explain the working principle of LED.	10M
	OR	
13. B).	Explain forward and reverse bias effects in I-V curves of a P-N junction diode.	10M
14. A).	i) Derive an expression for acceptance angle of an optical fibre. ii) Draw the block diagram of fibre optic communication system.	8M 2M

(P.T.O..)

OR

14. B).	i) Explain the working principle of He-Ne laser with the help of energy level diagram.	6M
	ii) Discuss the characteristics of a laser.	4M
15. A).	i) Discuss hysteresis curve based on domain theory of ferromagnetism.	6M
	ii) Distinguish piezo-electric and pyro-electric materials	4M

OR

15. B).	i) Derive the expression for electronic polarizability.	6M
	ii) Explain the effect of magnetic field in superconductors with the help of suitable diagram	4M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30001**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations July/August-2024

Course Name: English

(Computer Science & Engineering)

Date: 19.07.2024 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. **Fill in the blanks with appropriate prepositions.** 2 M
   a). The farmer wakes up _____ sunrise.
   i. of ii. at iii. on iv. in
   b). The River Thames flows _____ London.
   i. over ii. through iii. on iv. at
2. What is Blending and Borrowing in word formation? 2 M
3. **Fill in the blanks with articles (a, an or the)** 2 M
   a). ____Moon is treated as goddess in Greek mythology.
   b). There are 365 days in _____ year
4. **Punctuate the following sentences.** 2 M
   a) whos the indian teams captain
   b) id forgotten that hed mentioned that its there
5. How does time management help us overcome our weakness according to Seneca? 2 M
6. **Correct the following sentences:** 2 M
   a) The committee members_____ (leads, lead) very different lives in private.
   b) Eight dollars _____(is, are) the price of a movie these days.
7. **Write synonyms for the following words.** 2 M
   a). clandestine b). dormant
8. What has *Time* Magazine to say about Yunus? 2 M
9. **Avoid redundancy in the following sentences.** 2 M
   a) Please don't repeat the mistake again.
   b) Seshu couldn't study why because he was too poor.
10. **Identify the following abbreviations and give their full forms** 2 M
    a). PAN b). VAT

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). What does William Hazlitt say about despising people? What justification does he provide for his advice? 10M

OR

11. B). **i) Fill in the blanks with appropriate prepositions.** 5M
   a) We waited ages for a taxi. We gave up ..... the end and walked home.
   b) I am moving to a new address ..... the end of September.
   c) You will find the sports results ..... the back page of the newspaper.
   d) I wouldn't like an office job. I couldn't spend the whole day sitting ..... a desk.
   e) If you walk to the end of the street, you'll see a small shop ..... the corner

(P.T.O.)

ii) Change the sentences as directed. 5M

a) If you don't start now, you'll miss the bus. (change it into compound sentence)
b) I completed my assignment and then went to play. (change it into complex sentence)
c) In order to stay healthy, you need to exercise regularly. (change it into compound sentence)
d) It was freezing, so I wore a jacket. (change it into complex sentence)
e) She's a nurse, and her duty is to take care of patients. (Change into a simple sentence)

12. A). Illustrate the technique of personification applied by Alfred Tennyson in the poem "The Brook". 10M

OR

12. B). Shaw overcame his nervousness by regular practice on public speaking in a gradual manner. Justify. 10M

13. A). **Fill in the blanks with appropriate verbs (singular or plural-Ex.is, are.. etc).** 10M

1. Plenty of mangoes and bananas ..... available in this season.
2. A dictionary and an atlas ..... missing from the library.
3. The brothers as well as their sister ..... good at their studies.
4. The students accompanied by their teacher ..... gone on a picnic.
5. The children as well as their mother ..... missing.
6. To take pay and then not to do work ..... dishonest.
7. The jury ..... divided in their opinions
8. That night every one of the boat's crew ..... down with a fever.
9. One or the other of those fellows ..... stolen the watch.
10. The strain of all the difficulties and vexations and anxieties ..... more than he could bear.

OR

13. B). Write a paragraph on 'Television journalism today is little more than entertainment.' Follow the Principles of Good Writing. 10M

14. A). Establishment of Village Bank is not a cake walk for Yunus. Briefly describe the various struggles that Yunus went through to establish and run Grameen Bank. 10M

OR

14. B). Write a short essay on the topic 'Is social media good for society?' Substantiate your arguments with facts, reasons and examples. 10M

15. A). What do you think of the rules the author has given to improve language? Would these help in making language simpler and easier to understand? If so, then how? 10M

OR

15. B). **Read the following passage and write a precis of one-third of the original in length.** 10M

South Korea is planning to move its capital from Seoul to a new site in the middle of the country. Although Seoul has been the capital since the fourteenth century, the city of over 20 million is now very crowded, and close to the hostile armies of North Korea. The new capital is planned to cost $45 billion.

There is, however, strong opposition to the project, since similar schemes in other countries have taken far longer and cost much more than originally planned. Australia, for example, took over 70 years to finish building Canberra, while Nigeria has never completed its planned new capital, Abuja. Both Brazil and Malaysia have found that the building of new capitals (Brasilia and Putrajaya) can sharply increase the national burden of debt. Even if the government does eventually move to the new capital, it is unlikely that South Korea's main businesses will follow it, so Seoul will probably continue to be the country's principal city.

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30011**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations July/August-2024

Course Name: Engineering Chemistry

(Common for ECE, CSE, IT & CSD)

Date: 24.07.2024 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. What are atomic and molecular orbitals? 2 M
2. What are low spin complexes in CFT? 2 M
3. Give examples of anodic inhibitors. 2 M
4. Differentiate primary cells and secondary cells. 2 M
5. ^{13}C is NMR active while ^{12}C is not, Justify? 2 M
6. What is meant by magnetic resonance imaging? 2 M
7. How potable water is treated by chlorination? 2 M
8. Calculate the Total hardness of a given hard water sample containing 16.2mg/l of Ca $(HCO_3)_2$, 7.3mg/l of Mg $(HCO_3)_2$, 9.5mg/l of $MgCl_2$ and 13.6mg/l of $CaSO_4$. 2 M
9. What is a Drug? Give two examples? 2 M
10. What are stereoisomers? 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) Discuss the salient features of Molecular Orbital Theory. 5M

ii) Explain the bonding and anti-bonding interactions in 1,3-butadiene molecule, with the help of MOED. 5M

OR

11. B). Expand CFST. Mention the magnetic properties and crystal field stabilization energy for $[Fe(H_2O)_6]^{2+}$ and $[Fe(CN)_6]^{4-}$ complexes. 10M

12. A). i) Explain the construction and working of calomel electrode with neat diagram. 5M

ii) Write a short note on electrochemical series by discussing the characteristics. 5M

OR

12. B). i) What is meant by cathodic protection method? 5M

ii) Give an account of the method used in electroless plating? 5M

13. A). i) What is meant by spin-spin coupling? Explain how spin-spin multiplicity is calculated? 5M

ii) What is vibration-rotation spectrum? What are its selection rules? 5M

OR

13. B). i) Explain the principle underlying nuclear magnetic resonance spectroscopy. 5M

ii) What are the selection rules for electronic spectra? Explain with examples. 5M

(P.T.O..)

14. A). i) What is brackish water? Explain the desalination of brackish water by electrodialysis method. 5M

ii) Explain scales in the boiler. Explain the causes and control measures. 5M

OR

14. B). Elaborate the terms: 10M
i) Sterilization
ii) Coagulation
iii) Sedimentation

15. A). i) Explain the types of Elimination reactions with suitable examples. 4M

ii) Explain why anti-Markownikoff rule is shown by HBr but not HCl and HI. 6M

OR

15. B). i) How will you differentiate between SN^1 and SN^2 mechanism? Explain with examples. 6M

ii) Define Chirality with examples. 4M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30312**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations July/August-2024

Course Name: Engineering Graphics

(Common for CE & ME)

Date: 22.07.2024 FN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1.	Define the conic sections and explain with neat sketches.	1 M
2.	Define the term eccentricity and mention its value for various curves.	1 M
3.	Draw the projections of point A, situated in the HP and 20mm behind VP.	1 M
4.	Define the term orthographic projection.	1 M
5.	Explain the solids of revolution with examples.	1 M
6.	Define the term prism.	1 M
7.	Explain about development of surface.	1 M
8.	Name the methods of determining the curves of intersection.	1 M
9.	Differentiate between isometric view and isometric projection.	1 M
10.	Explain Isometric scale with neat a sketch.	1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	The vertex of a hyperbola is 65mm from its focus. Draw the curve if the Eccentricity is 3/2. Draw a normal and tangent at a point on the curve 75mm from the directrix.	10M
	OR	
11. B).	A circle of 50mm Diameter rolls along a straight line without slipping. Draw the curve traced out by a point 'P' on the circumference, for one complete revolution of the circle. Name the curve. Draw a normal and tangent to the curve at a point 40mm from the line.	10M
12. A).	A point P is 15mm above HP and 20mm Infront of VP. Another point Q is 25mm behind the VP and 40mm below the HP. Draw the projections of P & Q keeping the distance between their projectors equal to 90mm. Draw the straight lines joining their top views and their front views.	10M
	OR	
12. B).	Draw the projections of the regular pentagon of 40mm side, having its surface inclined at 30° to the HP and a side parallel to the HP and inclined at an angle of 60° to the VP.	10M
13. A).	A pentagonal prism of base side 30mm and height 60mm rests on one of its base on the H.P. inclined at 30^0 to the V.P. Its axis is inclined at 45^0 to the H.P .Draw its projections.	10M
	OR	
13. B).	A Hexagonal prism base edge 30 mm axis height 60 mm long is resting on its base on the ground with one edge parallel to VP It is cut by a section plane perpendicular to VP and bisect the axis of prism at an angle 45 ° to the HP. Draw sectional top view, true shape of the section.	10M

(P.T.O.)

14. A). A cone of base diameter 50mm and 60mm is resting on its base on the H.P. Draw the development of its lateral surface when it is cut by an auxiliary inclined plane inclined at 60^0 to the H.P and bisecting the axis. 10M

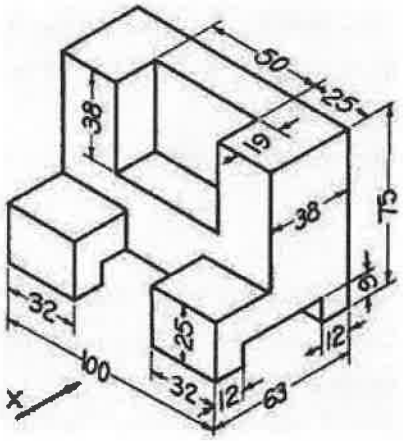
OR

14. B). A cylinder of base diameter 70mm is resting on its base on the H.P. It is penetrated by another cylinder of base diameter 50mm, such that their axes intersect each other at right angles. Draw the projections of the combination and show the curves of intersection. 10M

15. A). A frustum of square pyramid base edge 50 mm axis height 60 mm long top edge 30 mm, a sphere having radius 20 mm located centrally one and the above. Draw isometric view of given solids. 10M

OR

15. B). Draw the Front view, Top view and side view for the figure shown below. 10M



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H.T No: | | | | | | | | | | | R18 | Course Code: A30501

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations July/August-2024

Course Name: Programming for Problem Solving

(Common for EEE, ECE, CSE, IT, CSC, CSM, CSD, AID & AIM)

Date: 22.07.2024 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)
Each question carries TWO marks. **10x2=20M**

1. Define flowchart. List any four symbols and specify its purpose. 2 M
2. What are the rules for declaring a variable? 2 M
3. Compare and contrast break and continue. 2 M
4. What are the applications of arrays? 2 M
5. What are actual and formal arguments? 2 M
6. Define recursion. 2 M
7. What is a pointer? 2 M
8. Define typedef. 2 M
9. What are command line arguments? 2 M
10. Discuss about the different modes available for opening a file. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) Explain Flowchart and Pseudo code with neat diagram. 5M
ii) Differentiate precedence and associativity with suitable example. 5M

OR

11. B). i) Write an algorithm to find the greatest among three numbers. 4M
ii) Explain about printf() and scanf()with examples. 6M

12. A). Describe various loops in C with examples. 10M

OR

12. B). i) Develop a C program to print sum of a digit 5M
ii) What is an array? Explain how elements can be accessed in an array with example. 5M

13. A). Discuss about passing arguments to function with examples. 10M

OR

13. B). i) Explain about storage class in C. 5M
ii) Define string. What are different way of declaring and initialization a string with examples? 5M

14. A). i) Explain how a structure is different from Union. 5M
ii) Describe Array of structures with examples. 5M

OR

14. B). i) Write in detail about dynamic memory allocation with examples. 5M
ii) Write a short notes on bitfields. 5M

15. A). Write a program to implement Binary search. 10M

OR

15. B). Discuss in detail about opening and closing files with examples. 10M

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H.T No: | | | | | | | | | | | **R18** | **Course Code: A30313**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations July/August-2024

Course Name: Engineering Drawing

(Common for EEE, CSC, CSM, AID & AIM)

Date: 24.07.2024 FN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1. What are the different types of Lines used in engineering drawing? 1 M
2. What is the difference between cycloid and epicycloid? 1 M
3. What is a point? 1 M
4. Define line. 1 M
5. What is a solid? 1 M
6. What is the difference between prism and pyramid? 1 M
7. What are iso-metric planes? 1 M
8. What is isometric line? 1 M
9. What is the difference between Isometric view and Orthographic projection? 1 M
10. Define Eccentricity. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Draw an ellipse with the distance of the focus from the directrix at 50mm and eccentricity = 2/3 (Eccentricity method). 10M

OR

11. B). Draw a parabola when the distance between its focus and directrix is 50 mm. Also, draw a tangent and a normal at a point 70 mm from the directrix. 10M

12. A). Draw the projections of the following points on the same ground line, keepingthe projectors 25 mm apart. 10M
i) in the HP, 20 behind VP.
ii) 40 above HP, 25 in front of VP.
iii) in the VP, 40 above HP.
iv) 25 below HP, 25 behind VP.
v) 15 above HP, 50 behind VP.

OR

12. B). A 70 mm long line MN is inclined at 30° to the H.P. The end M is 15 mm in front of the V.P. and 25 mm above the H.P. The front view of the line measures 45 mm. Draw the projections of the line MN and determine its true angle of inclination with the V.P. 10M

13. A). A square pyramid of base side 30 mm and axis 60 mm has one of its triangular faces on the ground and its axis parallel to V.P. Draw its projections. 10M

OR

13. B). A cone of base diameter 50 mm and height 60 mm is resting on a point of its base circle on the H.P. with its axis parallel to the V.P. and inclined at 45° to the H.P. Draw its projections. 10M

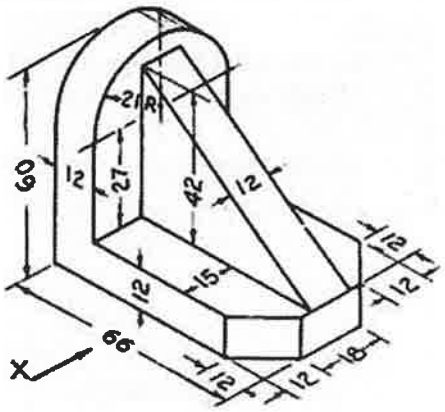
(P.T.O..)

14. A). Draw the isometric view of a square prism of base side 40 mm and axis 60 mm resting on the H.P. on the(a) base with axis perpendicular to the H.P., (b) rectangular face with axis perpendicular to the V.P. 10M

OR

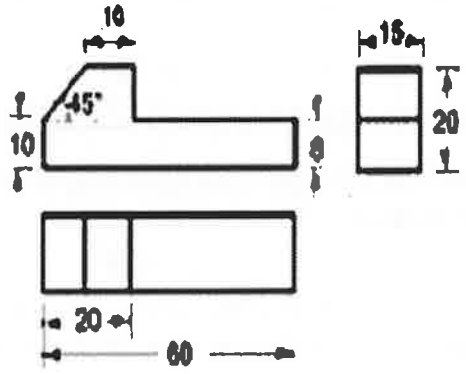
14. B). Draw an isometric projection of a pentagonal prism of base side 35 mm and axis 60 mm. The prism rests on its base on the H.P. with an edge of the base parallel to the V.P. 10M

15. A). Draw the front view, top view and side view for the following fig. 10M



OR

15. B). The front top and side views of an angle plate are shown in Fig. Draw its isometric view. 10M



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H.T No: | | | | | | | | | | | **R18** | **Course Code: A30311**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations July/August-2024

Course Name: Engineering Mechanics

(Common for CE & ME)

Date: 24.07.2024 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

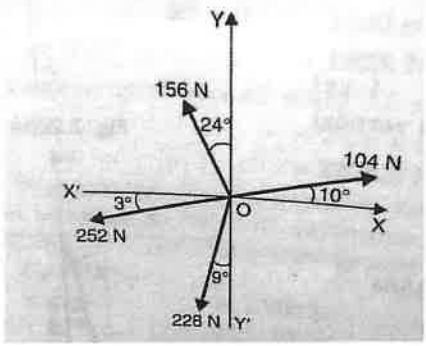
Each question carries TWO marks. **10x2=20M**

1. What is concurrent force system? 2 M
2. What are conditions for equilibrium? 2 M
3. Differentiate between Centroid & Center of gravity. 2 M
4. State the Pappus theorem. 2 M
5. Define the second Moment of inertia. 2 M
6. State the parallel axis theorem. 2 M
7. What is mean by relative motion? 2 M
8. Differentiate between Kinematics & Kinetics. 2 M
9. State the principle of Work & Energy. 2 M
10. What is Dynamic Equilibrium? 2 M

PART-B

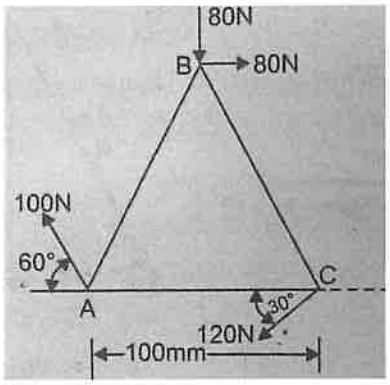
Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Find the resultant for concurrent force system as shown in fig. 10M



OR

11. B). An equilateral triangle subjected to system of forces as shown in figure. Find the resultant and its location. 10M

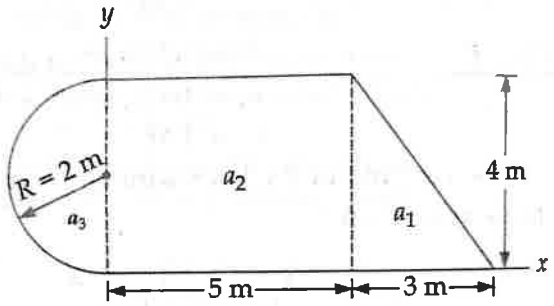


(P.T.O.)

12. A). Determine centre of gravity of a solid hemisphere of radius r from its diametrical axis. (From the first principles). 10M

OR

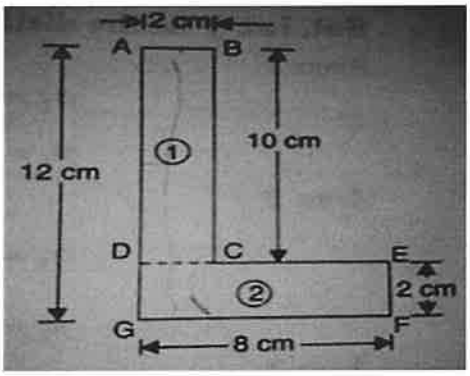
12. B). Determine the centoid for following figure. 10M



13. A). Derive the mass moment of inertia for rectangular plate (width B, depth D, thickness T). 10M

OR

13. B). Determine the area moment of inertia of the given figure about the base 10M



14. A). A stone is thrown from the top of a building upward at an angle of 40^0 to the horizontal with an initial speed of 30 m/sec. The height of the building is 30 m. Determine: (i) The horizontal distance from the point of projection to the point where the stone strikes the ground. (ii) The greatest elevation reached by the stone (iii) Velocity, when it strikes the ground and (iv) Time of flight. 10M

OR

14. B). The acceleration of a particle is expressed as $a = 10 - x$. The particle starts with no initial velocity at the position $x = 0$. Determine (i) the velocity of the particle when $x = 8$ m, (ii) the position of the particle where the velocity is again zero, and (iii) the velocity of the particle when acceleration becomes zero 10M

15. A). A 750 kW power engine, working at full power propells a 2500 kN train up an incline of 1 in 100 at a speed of 60 km/hr. If the track resistance is 5 N per kN weight of train, determine the acceleration with which the train is moving. 10M

OR

15. B). A block of weight 2000N rests on a rough horizontal surface (μ=0.2) and is pulled by a force of 800N applied at an angle of 30° to the horizontal. Determine the velocity attained by the block after it has moved 20m starting from the rest. Proceed to calculate the further distance moved by the body if the pull is removed. Use work-energy relation. 10M

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