DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular Winter Examination – 2024

Course: B. Tech. **Branch: Common to all branches** **Semester: I**

Subject Code & Name: (24AFI000BS101) Engineering Mathematics - I

Max Marks: 60 **Date: 06/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(CO)	Marks
Q.1	**Objective type questions. (Compulsory Question)**					**12**
1	Homogeneous system of linear equations is/has				(CO1)	1
	a. always consistent	b. always inconsistent	c. no solution	d. None		
2	The rank of matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 2 & 2 \\ 3 & 3 & 3 \end{bmatrix}$ is equal to				(CO1)	1
	a. 1	b. 2	c. 3	d. None		
3	If $A = [a_{ij}]$ is a square matrix of order n, then trace of matrix A is				(CO1)	1
	a. product of diagonal elements	b. sum of diagonal elements	c. sum of row elements	d. None		
4	If $u = f\left(\frac{y}{x}\right)$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is equal to				(CO2)	1
	a. 2u	b. u	c. 0	d. None		
5	If $u = x^y$ then $\frac{\partial u}{\partial y}$ is equal to				(CO2)	1
	a. $x^y \log x$	b. 0	c. yx^{y-1}	d. None		
6	If $u = f(y-z, z-x, x-y)$ show that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z}$				(CO3)	1
	a. 1	b. **0**	c. -1	d. None		
7	The condition for the function $f(x, y)$ to have maximum value at (a, b) is				(CO3)	1
	a. $rt - s^2 > 0$ and $r < 0$	b. $rt - s^2 > 0$ and $r > 0$	c. $rt - s^2 < 0$ and $r < 0$	d. None		
8	If $x = uv, y = \frac{u}{v}$ then $\frac{\partial(x,y)}{\partial(u,v)}$ is				(CO3)	1
	a. $\frac{-2u}{v}$	b. $\frac{-2v}{u}$	c. 0	d. None		
9	The formula for $\int_0^{\frac{\pi}{2}} \sin^n\theta d\theta$ is equal to				(CO4)	1
	a. $\frac{n(n-1)(n-3)\ldots}{n(n-2)(n-4)\ldots} \times \frac{\pi}{2}$	b. $\frac{n(n-1)(n-3)\ldots}{n(n-2)(n-4)\ldots} \times 1$	c. $\frac{n(n-1)(n-3)\ldots}{n(n-2)(n-4)\ldots} \times 1$ or $\frac{\pi}{2}$	d. None		

10	The number of loops in the polar curve $r = a\sin 2\theta$ are				(CO4)	1
	a. 4	b. 2	c. 6	d. None		
11	The value of $\int_0^2 \int_1^y xy\, dxdy$ is equal to				(CO5)	1
	a. 0	b. 1	c. -1	d. None		
12	In polar co-ordinate system (r, θ) , value of $dy\, dx$ is equal to				(CO5)	1
	a. $dr\, d\theta$	b. $r dr\, d\theta$	c. $r^2 dr\, d\theta$	d. None		
Q.2	**Solve the following.**					12
A)	Solve the equations: $x + 3y + 2z = 0;\ 2x - y + 3z = 0;\ 3x - 5y + 4z = 0.$				(CO1)	6
B)	Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 1 & 0 & -4 \\ 0 & 5 & 4 \\ -4 & 4 & 3 \end{bmatrix}$				(CO1)	6
Q.3	**Solve the following.**					12
A)	If $x^x y^y z^z = c$, show that at $x = y = z$, $\frac{\partial^2 z}{\partial x \partial y} = -(x \log ex)^{-1}$.				(CO2)	6
B)	If z is a homogeneous function of degree n in x, y, then prove that $x^2 \frac{\partial^2 z}{\partial x^2} + 2xy \frac{\partial^2 z}{\partial x \partial y} + y^2 \frac{\partial^2 z}{\partial y^2} = n(n-1)z.$				(CO2)	6
Q.4	**Solve any TWO of the following.**					12
A)	Expand $f(x, y) = e^x \sin y$ in the powers of x and y as far as the terms of third degree.				(CO3)	6
B)	Test the function $f(x, y) = x^4 + y^4 - x^2 - y^2 + 1$ for maxima, minima and saddle point				(CO3)	6
C)	Find the maximum value of $x^m y^n z^p$ when $x + y + z = a$.				(CO3)	6
Q.5	**Solve any TWO of the following.**					12
A)	Evaluate $\int_0^\infty \frac{dx}{(1+x^2)^n}$.				(CO4)	6
B)	Trace the curve $x = a(\theta - \sin\theta),\ y = a(1 - \cos\theta)$ (Cycloid).				(CO4)	6
C)	Trace the curve $r = a \sin 3\theta$ (3 Leaved Rose).				(CO4)	6
Q.6	**Solve any TWO of the following.**					12
A)	Evaluate $\int_0^1 \int_0^x e^{x+y}\, dy\, dx$.				(CO5)	6
B)	Find the area of the circle $x^2 + y^2 = a^2$.				(CO5)	6
C)	Define and verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 2 & 1 & -1 \end{bmatrix}$				(CO2)	6
	*** End ***					

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular, Winter Examination – 2024

Course: F.Y. B.Tech Branch : All Branches Semester : I

Subject Code & Name: 24AF1CHEBS102 (Engineering Chemistry)

Max Marks: 60 Date: 08/02/2025 Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**					**12**
1	---------- Indicator is used in Winkler's method of DO determination.				1	1
	a. Methanol	b. Starch	c. Cathol	d. Naphthol		
2	EBT makes ---------- dentate complex with Ca metal				1	1
	a. Bi	b. mono	c. tri	d. tetra		
3	Calorific value measured in -------				2	1
	a. ppm	b. ppb	c. mg/l	d. kcal/kg		
4	Boys Calorimeter is used to determine calorific value of ------- fuel.				2	1
	a. Gas	b. solid	c. wood	d. liquid		
5	Which of the following is an example of semi-solid lubricant?				2	1
	a. paint	b. alcohol	c. grease	d. diesel		
6	Cell constant is measured in ---------				3	1
	a. DO	b. MO	c. CO	d. none		
7	Specific conductance of KCl at 25 °C is ------				3	1
	a.0.033	b. 0.0288	c. 0.273	d. 0.002765		
8	Color of Methyl Orange in alkali is -------				3	1
	a. green	b. yellow	c. red	d. orange		
9	Wavelength range of UV radiation is ---------				4	1
	a.700-800nm	b. 600-700nm	c. 600-400nm	d. 200-380nm		
10	Flame Photometer is based on ---------- of radiation.				4	1
	a. Substitution	b. Addition	c. Emission	d. refraction		

11	Which of the following is not an example of thermoplastic resin?				5	1
	a. Poly ethylene	b. Poly propylene	c. Poly styrene	d. Urea formaldehyde		
12	The Chemical formula of Gypsum is ----				5	1
	a. $MgSO_4$	b. $AgSO_4$	c. $CaSO_4.2H_2O$	d. FeSO4.2H2O		
Q.2	**Solve the following.**					**12**
A)	Explain in detail Hot Lime-soda process of Softening of water.				1	**6**
B)	Discuss aeration, sedimentation and disinfection process used in domestic water treatment.				1	**6**
Q.3	**Solve the following.**					**12**
A)	What is Calorific value? Explain in detail Bomb calorimeter.				2	**6**
B)	Describe any three Physical Properties of lubricants.				2	**6**
Q.4	**Solve Any Two of the following.**					**12**
A)	Explain Ostwald's theory of Acid-base indicator.				3	**6**
B)	Write a note on Conductometric titration with suitable examples.				3	**6**
C)	What is rechargeable battery? Explain in detail Lithium-ion battery.				3	**6**
Q.5	**Solve Any Two of the following.**					**12**
A)	Explain in detail Laws of absorption of UV-visible spectroscopy.				4	**6**
B)	What is Chromatography? Discuss the classification of Chromatography				4	**6**
C)	Discuss instrumentation, working and applications of Flame Photometry.				4	**6**
Q.6	**Solve Any Two of the following.**					**12**
A)	Write a note on Portland Cement.				5	**6**
B)	Explain with suitable examples any two types of polymerization.				5	**6**
C)	Discuss the synthesis of Urea Formaldehyde resin, its properties and uses.				5	**6**
	***** End *****					

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Regular Winter Examination – 2024

Course: B. Tech **Branch: Common To All Branches** **Semester: I**

Subject Code & Name: 24AF1EMES104 & Engineering Mechanics

Max Marks: 60 **Date: 11/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
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		(Level /CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	Which of the following is an example of a concentrated load?	L1	1
	a) Self-weight of a beam b) Wind load		
	c) Point force applied at a node d) Hydrostatic pressure		
2	In a free body diagram, the weight of the object is usually represented as acting:	L1	1
	a) Horizontally b) At the centroid vertically downward		
	c) At the support points d) Tangentially		
3	A force couple consists of:	L1	1
	a) Two equal and opposite forces acting along the same line		
	b) Two equal and opposite forces with a separation distance		
	c) A single force acting at a point		
	d) Three non-parallel forces		
4	If a force system is in equilibrium, the algebraic sum of the moments about any point is:	L1	1
	a) Maximum b) Minimum		
	c) Zero d) Constant		
5	The analytical conditions for equilibrium in two-dimensional force systems are:	L1	1
	a) $\Sigma Fx = 0$ and $\Sigma Fy = 0$ b) $\Sigma Fx = 0$, $\Sigma Fy = 0$, and $\Sigma Mz = 0$		
	c) $\Sigma Fx \neq 0$, $\Sigma Fy = 0$ d) $\Sigma Mx = 0$, $\Sigma My = 0$		

L1 1

6 The centroid of a rectangle is located at:

a) One-fourth of the height and one-fourth of the width

b) At the intersection of diagonals

c) At the midpoint of any side

d) One-third of the height from the base

7 In a Hinged or Pinned Support, how many reactions are developed? L1 1

a) Two b) Three

c) Four d) Six

8 The equation used to determine if a truss is perfect: L1 1

a) m+4=2j b) m=2j−3

c) 2m=3+j d) m=j+r

9 If an object is thrown upward with an initial velocity u, the velocity at the highest point is: L1 1

a) Equal to u b) Zero

c) Infinite d) Equal to acceleration

10 The area under the acceleration-time graph gives: L1 1

a) Velocity b) Displacement

c) Momentum d) Force

11 The kinetic energy of a rigid body in pure translation is given by: L1 1

a) ½ mv^2 b) mv^2

c) mgh d) ½ $I\omega^2$

12 The coefficient of restitution for a perfectly elastic collision is: L1 1

a) 0 b) 1

c) Greater than 1 d) Between 0 and 1

Q. 2 Solve the following. 12

A) The following forces act at a point: L2 6

(i) 20 N inclined at 30° towards North of East,

(ii) 25 N towards North,

(iii) 30 N towards North West, and

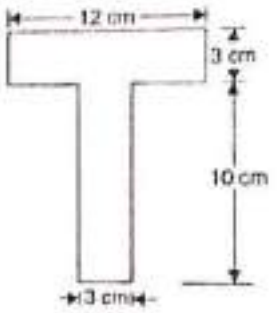
(iv) 35 N inclined at 40° towards South of West.

Find the magnitude and direction of the resultant force.

B) State and prove Varignon's theorem. L1 6

Q.3 **Solve the following.** 12

A) Locate the centroid of the T section shown in figure. L2 6

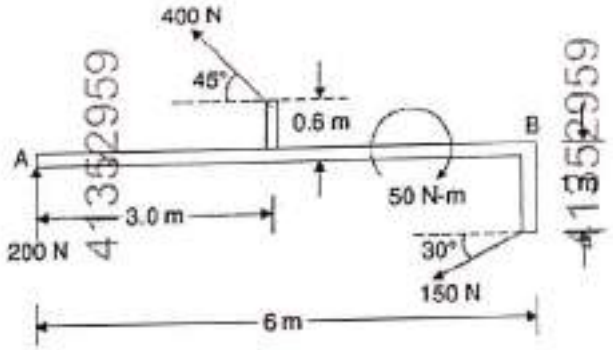


B) A body of weight 500 N is pulled up an inclined plane by a force of 350 N. The inclination of the plane is 300 to the horizontal and the force is applied parallel to the plane. Determine the coefficient of friction. L2 6

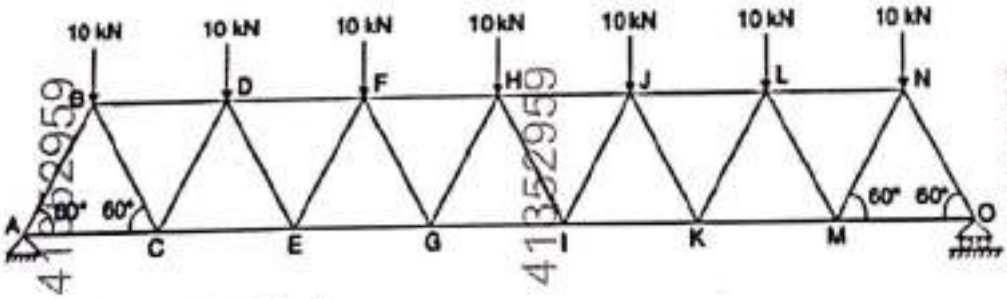
Q. 4 **Solve Any Two of the following.** 12

A) What are the types of loads and explain them in details with neat sketches? L1 6

B) A bracket is subjected to three forces and a couple as shown in figure. Determine magnitude, direction and the line of action of the resultant. L3 6



C) Determine the forces in the members FH, HG and GI in the truss shown in figure. Each load is 10 kN and all triangles are equilaterals with sides equal to 4 m. L3 6



Q.5 **Solve Any Two of the following.** 12

A) Prove equations of motion of a body moving with constant acceleration. L2 6

B) The motion of a particle moving in a straight line is given by the expression L3 6

$$s = t^3 - 3t^2 + 2t + 5$$

where, s is the displacement in metres and t is the time in seconds.

Determine: (1) velocity and acceleration after 4 seconds;

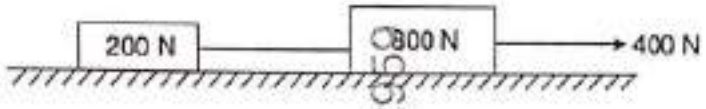
(2) maximum or minimum velocity and corresponding displacement;

(3) time at which velocity is zero.

C) A ball is dropped from the top of a tower 30 m high. At the same instant a second ball is thrown upward from the ground with an initial velocity of 15 m/sec. When and where do they cross and with what relative velocity? L1 6

Q. 6 Solve Any Two of the following. **12**

A) Two weights 800 N and 200 N are connected by a thread and they move along a rough horizontal plane under the action of a force of 400 N applied to the 800 N weight as shown in figure. The coefficient of friction between the sliding surface of the weights and the plane is 0.3. Using D' Alembert's principle, determine the acceleration of the weight and tension in the thread. L2 6



B) State and prove work energy principle. L1 6

C) A 1500 N block is in contact with a level plane, the coefficient of friction between two contact surfaces being 0.1. If the block is acted upon by a horizontal force of 300 N, what time will elapse before the block reaches a velocity of 16 m/sec starting from rest? If 300 N force is then removed, how much longer will the block continue to move? Solve the problem using impulse momentum equation. L3 6

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular Winter Examination – 2024

Course: B. Tech | Branch: Common to all Branches | Semester: I

Subject Code & Name: 24AF1000ES106 & Programming for Problem Solving

Max Marks: 60 | Date: 13/02/2025 | Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		12
1	Which generation of computers introduced the use of integrated circuits (ICs)? a. First Generation / b. Second Generation / c. Third Generation / d. Fourth Generation	Remember	1
2	Which of the following is a primary function of an operating system? a. Word processing / b. Understand / c. Image editing / d. File encryption	Understand	1
3	Which component acts as the brain of a computer system? a. Input device / b. Processor / c. Output device / d. Memory	Understand	1
4	Which of the following is not a valid C data type? a. int / b. char / c. bool / d. string	Remember	1
5	What is the output of the following expression in C? int x = 10, y = 5; printf ("%d", x > y && y < 10); a. 0 / b. 1 / c. 5 / d. 10	Apply	1
6	Which operator is used for bitwise AND operation in C? a. && / b. & / c. | / d. ||	Remember	1
7	What is the correct syntax for a do-while loop in C? a. do {...} while(condition); / b. do { ... } while(condition) / c. while(condition) { ... } do / d. do { while(condition); }	Understand	1
8	Which statement is used to exit a loop prematurely in C? a. exit / b. break / c. continue / d. return	Remember	1

9	What will be the output of the following code?
	int x = 5;
	if (x == 5)
	printf("Hello");
	else
	printf("World");
	a. Hello / b. World / c. HelloWorld / d. Compilation Error
		Apply	1

10	What is the index of the first element in a C array? a. 1 / b. 0 / c. -1 / d. Depends on the	Remember	1

				array		
11	What does the following pointer declaration mean? int *ptr;				Understand	1
	a. ptr is a pointer to an integer	b. ptr is an integer	c. ptr is a pointer to a float	d. None of the above		
12	Which of the following is used to write data to a file in C?				Understand	1
	a. fread	b. fwrite	c. fprintf	d. All of the above		
Q. 2	**Solve the following.**					12
A)	What are the steps involved in programming? Briefly describe each step.				Understanding	6
B)	What is the role of memory management in a computer system? Differentiate between primary and secondary memory.				Analyze	6
Q.3	**Solve the following.**					12
A)	What is operator precedence? Write an expression and explain how it is evaluated.				Understand & Apply	6
B)	Describe the conditional (ternary) operator and write a program to find the maximum of two numbers using it.				Understand & Apply	6
Q. 4	**Solve Any Two of the following.**					12
A)	Differentiate between while, for, and do-while loops with example programs.				Understand & Apply	6
B)	Write a c program to demonstrate the use of break and continue in loops.				Apply	6
C)	Describe the basics of user-defined functions and write a function to calculate the factorial of a number.				Understand & Apply	6
Q.5	**Solve Any Two of the following.**					12
A)	Explain the initialization of arrays in C with examples.				Understand & Apply	6
B)	Write a program to create and display a 3x3 matrix using a two-dimensional array in C.				Apply	6
C)	Write a c program to demonstrate the use of a pointer to an array.				Understand & Apply	6
Q. 6	**Solve Any Two of the following.**					12
A)	What is an array of structures? Write a c program to store and display details of 5 students.				Understand & Apply	6
B)	Discuss file opening and closing in c with examples of different modes.				Understand & Apply	6
C)	Write a c program to read and write data to a file using fprintf() and fscanf().				Understand & Apply	6
	***** End *****					

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular Examination Winter – 2024

Course: B. Tech. **Branch: Common to All Branches** **Semester: I**

Subject Code & Name: (24AF1000VS109) Communication Skills

Max. Marks: 60 **Date: 22/02/2025** **Duration: 3 Hrs.**

Instructions to the Students:

1. Each question carries 12 marks.
2. Question No. 1 will be compulsory and include objective-type questions.
3. Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.
4. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
5. Use of non-programmable scientific calculators is allowed.
6. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1)	**Objective type questions. (Compulsory Question)**		**12**
i)	..... is communication? a. The process of sending and receiving messages with proper feedback b. The process of sending messages only c. The process of receiving messages only d. The process of thinking and feeling	**L1/CO1**	**1**
ii)	The teacher collected samples from ..... M Tech student. a. A b. An c. The d. No article	**L1/CO1**	**1**
iii)	What should one do to prepare for common interview questions? a. Read books on the company history b. Practice answering behavioral questions c. Learn about the company's competitors d. Review your social media profiles	**L1/CO1**	**1**
iv)	..... should be done before starting a formal presentation. a. Apologize for being nervous b. Introduce yourself and establish credibility c. Start speaking immediately d. Ask the audience if they are ready	**L1/CO1**	**1**
v)	Which of the following can be called as a type of communication? a. Verbal and non-verbal b. Written and unwritten c. Formal and informal d. All of the above	**L1/CO1**	**1**

vi) The mango fell ..... the basket. L1/CO2 1

a. Up
b. To
c. At
d. Off

vii) The subject communication skills ..... one of the important subjects. L1/CO2 1

a. Is
b. Are
c. Were
d. None of the above

viii) ..... is one of the pre-conditions of speaking L1/CO2 1

a. Listening
b. Speaking
c. Reading
d. Writing

ix) Skimming is a type of L1/CO2 1

a. Speaking
b. Reading
c. Listening
d. Writing

x) The number of students ..... increasing every year. L1/CO2 1

a. is
b. are
c. has been
d. have been

xi) The basic communication skills are L1/CO2 1

a. LSRW
b. BASIC
c. UNO
d. None of the above

xii) ..... is an effective way to show enthusiasm and interest in the company. L1/CO2 1

a. Asking questions during the interview
b. Sending a thank-you note after the interview
c. Wearing formal attire
d. Bringing extra copies of your resume

Q. 2) Solve the following: 12

A) Explain the Dos and DON'Ts of group discussion in detail. L3/CO5 6

B) How does the exchange of words from foreign languages enrich a L2/CO2 6

language? Elaborate with appropriate examples.

Q. 3)	**Solve the following:**		**12**
A)	'Proper use of punctuation marks increases the beauty of communication', illustrate.	**L3/CO4**	**6**
B)	Draw the figure of human mouth, mention any of the four organs of speech and explain them.	**L3/CO4**	**6**
Q. 4)	**Solve any TWO of the following:**		**12**
A)	Taking into consideration the existing scenario, write a 12 sentence essay on 'India in 2047'	**L3/CO4**	**6**
B)	a) Transcribe the following i) Economy ii) Gender iii) Universe b) Spell the following: i) /dɪ'gri:/ ii) /'ɪŋglɪʃ/ iii) /jʊə/	**L2/CO1**	**6**
C)	How does the study of RP help to standardize pronunciation in English?	**L2/CO1**	**6**
Q. 5)	**Solve any TWO of the following:**		**12**
A)	Fill in the blanks: i) ..... project report on the table is yours. (a, an, the) ii) ..... good administrator is hard to find. (a, an, the) iii) I think you are reading ..... book on polity. (a, an, the) iv) It's history is ..... interesting fact about the city. (a, an, the) v) A beautiful sunset can be seen from .... beach. (a, an, the) vi) The students study for their exam in .... library. (a, an, the)	**L1/CO2**	**6**
B)	Rewrite using appropriate preposition: i) The new policy will come ..... effect next month. (on, in, into) ii) The organization is looking for someone ..... experience in the domain of AI. (in, with, on)	**L1/CO2**	**6**

iii) The dog is spotted running ..... the park. (in, around, between)

iv) This university has a beautiful view ..... the ocean. (for, of, by)

v) Democracy is the government of the people, ... the people, for the people. (on, in, by)

vi) Lucknow is located ..... the north. (on, in, under)

C) i) Suggest synonyms for: Novelty, Happiness, Enthusiasm — L1/CO2 — 6

ii) Suggest antonyms for: Success, Gorgeous, Empty

Q. 6) Solve any ONE of the following: — 12

A) Write an application (and compose a resume) for the post of engineer in Tata Motors, A Block, Shivasagar Estate, Dr. Annie Besant Road, Worli, Mumbai – 400 018. (The Indian Express 27 January 2025) — L3/CO3 — 12

B) i) Explain the difference between formal writing and informal writing in professional domain. — L2/CO4 — 6

ii) What are the ways of composing an email effectively? Elaborate in detail. — L2/CO4 — 6

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular Winter Examination – 2024

Course: F. Y. B. Tech | Branch: Common To All Branches | Semester: I

Subject Code & Name: 24AF2PHYBS102, Engineering Physics

Max Marks: 60 | Date: 08/02/2025 | Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**					**12**
1	The speed of propagation of ultrasonic waves increases with increase in				Remember (CO1)	1
	a. Wavelength	b. Frequency	c. Amplitude	d. Intensity		
2	Dielectric materials are generally				Remember (CO1)	1
	a. Insulating Materials	b. Ferri Electric Materials	c. Ferro Electric Materials	d. Superconducting Materials		
3	In Newton's ring shape of interference pattern is				Remember (CO2)	1
	a. Straight fringes	b Circular fringes	c. Elliptical fringes.	d. Straight & Equidistant lines		
4	The substance which rotates the plane of polarization to left is called as				Remember (CO2)	1
	Dextrorotatory	b. Levorotatory	c. Oscillatory	d. None of these		
5	The principle of Laser is				Remember (CO2)	1
	a. Spontaneous emission	b. Stimulated emission	c. Thermionic emission	d. All of these		
6	Numerical aperture is also called as _____ of the fiber				Remember (CO2)	1
	a. Reflecting angle	b. Sine of Acceptance angle	c. Scattering angle	d. Recoiling angle		
7	According to Heisenberg's principle, certainty in position involves				Remember (CO3)	1
	a. Uncertainty in momentum	b. certainty in momentum	c. uncertainty in position	d. certainty in position		
8	What is the fundamental unit of information in quantum computing				Remember	1

	a. Bit	b. Qubit	c. Byte	d. Quantum Byte	(CO3)	
9	Geiger Muller Counter is used to measure				Remember (CO4)	1
	a. α particles	b. β and Y particles	c. α, β & Y particles	d. None of these		
10	Number of atoms per unit cell for Face centered Cubic structure is				Remember (CO4)	1
	a.1	b. 4	c. 2	d. 6		
11	The temperature at which normal material turns into superconductor is				Remember (CO5)	1
	a. Absolute Temperature	b. Critical Temperature	c. Mean Temperature	d. Crystallization Temperature		
12	1 Nanometer=_____m				Remember (CO5)	1
	a.10^{9}	b. 10^{-10}	c. 10^{-9}	d. 10^{10}		
Q. 2	**Solve the following.**					**12**
A)	What is Piezoelectric effect? Describe the production of ultrasonic waves by using Piezoelectric method.				**Remember/ Understand (CO1)**	**6**
B)	Explain any three factors affecting architectural acoustics of a building. A cinema hall has a volume of 7500 m^3. It is required to have reverberation time of 1.5 sec. What should be the total absorption in the hall?				**Understand (CO1)**	**6**
Q.3	**Solve the following.**					**12**
A)	Derive an expression for diameter of n^{th} bright and dark Newton's rings.				**Understand (CO2)**	**6**
B)	Explain the construction and working of Helium Neon laser.				**Understand (CO2)**	**6**
Q. 4	**Solve Any Two of the following.**					**12**
A)	What is Heisenberg's uncertainty principle? If the uncertainty in position of an electron is $4X10^{-10}$m. Calculate the uncertainty in its momentum.				**Remember/ Understand (CO3)**	**6**
B)	Derive time independent Schrodinger wave equation.				**Understand (CO3)**	**6**

C)	Derive time dependent Schrodinger wave equation.	Understand (CO3)	6
Q.5	**Solve Any Two of the following.**		12
A)	Define atomic packing fraction. Calculate the atomic packing fraction in SC, BCC, FCC lattices.	Remember/ Understand (CO4)	6
B)	Derive the relation between lattice parameter 'a' and crystal density 'ρ' Copper has FCC structure and its atomic radius is 1.278 A^{0}. Calculate density of Cu. Given atomic weight of Cu=63.5.	Understand (CO4)	6
C)	With neat diagram explain the construction & working of Geiger Muller Counter.	Understand (CO4)	6
Q. 6	**Solve Any Two of the following.**		12
A)	Explain the B-H curve for ferromagnetic materials. Define Coercivity and retentivity	Understand (CO5)	6
B)	Define superconductivity and distinguish between Type I & Type II superconductors.	Understand (CO5)	6
C)	What is nanomaterial? Explain top-down and bottom-up approach for synthesis of nanomaterial	Understand (CO5)	6
	*** End ***		

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular Winter Examination – 2024

Course: B.Tech. Branch: Common To All Branches

Semester: I

Subject Code & Name: 24AF2EGRES104; Engineering Graphics

Max Marks: 60 Date: 11/02/2025 Duration: 4 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level /CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
	Set squares are primarily used for drawing which angles? A) 30°, 45°, 60°, and 90° B) 15°, 35°, 75°, and 95° C) 10°, 20°, 50°, and 80° D) 25°, 50°, 70°, and 100°	(CO1)	1
2	What is the purpose of a center line in a drawing? A) To show visible outlines B) To represent symmetry and centers of circles C) To indicate section lines D) To show cutting planes	(CO1)	1
3	Which of the following is true for first-angle projection? A) The object is placed between the observer and the projection plane B) The projection plane is placed between the observer and the object C) Views are placed as they appear in reality D) It is the standard method in the United States	(CO2)	1
4	If a point is located on the XY plane in orthographic projection, which of the following is true? A) Its Z-coordinate is zero B) Its X-coordinate is zero C) Its Y-coordinate is zero D) It is in the first quadrant	(CO2)	1
5	The true length of a line is seen in which of the following conditions? A) When the line is parallel to the plane B) When the line is perpendicular to the plane C) When the line is inclined to both HP and VP D) When viewed from the side	(CO3)	1
6	If a line is located in the first quadrant and is inclined to HP, where will its front view be located? A) Above the XY line B) Below the XY line C) On the XY line D) At the origin	(CO 3)	1

7 A pentagonal plane resting on HP with an edge inclined to VP will have its top view appearing as: (CO 4) 1

A) A pentagon
B) A horizontal line
C) A distorted pentagon
D) A vertical line

8 If a plane is inclined to both HP and VP, its projections appear as: (CO 4) 1

A) A true shape in both views
B) A point in both views
C) Inclined lines in both views
D) A horizontal and vertical line

9 When a prism is lying on HP with its axis inclined to HP, its front view will be: (CO 4) 1

A) A rectangle
B) A parallelogram
C) A line
D) An ellipse

10 Which of the following is NOT a principal plane in orthographic projection? (CO 5) 1

A) Horizontal plane (HP)
B) Vertical plane (VP)
C) Side plane (SP)
D) Profile plane (PP)

11 The angles between the projection of the x-axis, y-axis, and z-axis in an isometric view are: (CO 5) 1

A) 90°
B) 120°
C) 45°
D) 60°

12 When a solid is cut by a plane, the shape of the section depends on: (CO 5) 1

A) The position of the plane
B) The material of the solid
C) The color of the solid
D) The surface texture of the solid

Q.2 Solve the following. 12

A) Draw the following lines by stating their description and general applications: (CO 1) 6

i. Continuous thick or Continuous wide
ii. Dashed thin (narrow)
iii. Chain thin Long-dashed dotted (narrow)

B) Differentiate Aligned and Uni-directional system of placing the dimensions on a drawing with the help of diagrams. (CO 2) 6

Q.3 Solve the following. 12

A) A line AB, 50 mm long, is inclined to the HP at 30° and parallel to the VP. The end nearest to the HP is 40 mm above it and 25 mm in front of the VP. Draw the projections. (CO 3) 6

B) A point P is in the first quadrant. Its shortest distance from the intersection point of H.P., V.P. and Auxiliary vertical plane, perpendicular to the H.P. and V.P. is 70 mm and it is equidistant from principal planes (H.P. and V.P.). Draw the projections of the point and determine its distance from the H.P. and V.P. (CO 2) 6

Q. 4 Solve Any Two of the following. 12

A) Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60° to the V.P., and its surface making an angle of 45° with the H.P. (CO 4) 6

B) A square pyramid of side of base 40 mm and length of axis 60 mm is resting on its corner of base on ground with an edge of the base through that corner making an angle of 60° with the HP. The apex is away from the observer and the axis is parallel to the HP. Draw the projections if the axis is inclined to the VP at 20°. (CO 4) 6

C) A cone of diameter 60 mm and height 60 mm is resting on the HP on one of its generators. Draw its projections if its axis is parallel to the VP. (CO 4) 6

Q.5 Solve Any Two of the following. 12

A) A pentagonal pyramid having a base side of 45 mm and a slant length of 80 mm rests on its base on the HP with a base edge AB perpendicular to the VP. A section plane passing through corner D and perpendicular to the slant face ABO cuts the solid. Draw FV and sectional TV. (CO 5) 6

B) A cylinder of 40 mm diameter, 60 mm height and having its axis vertical, is cut by a section plane, perpendicular to the V.P., inclined at 45° to the H.P. and intersecting the axis 32 mm above the base. Draw its front view, sectional top view, sectional side view and true shape of the section (CO 5) 6

C) Draw the development of the lateral surface of the part P of the triangular pyramid as shown in Fig. 1. The line o'1' in the front view is the true length of the slant edge because it is parallel to xy in the lop view. The true length of the side of the base is seen in the top view. (CO 6) 6

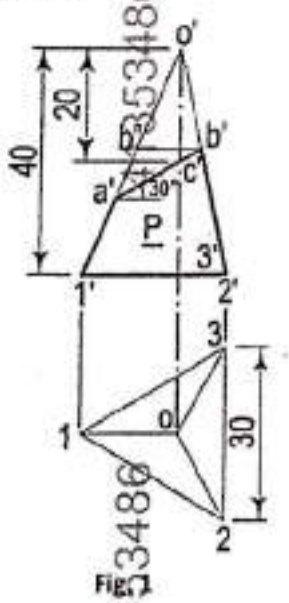


Fig. 1

Q.6 Solve Any Two of the following. 12

A) Draw the FV and TV of the object shown in Fig. 2 using the third-angle method. (CO 5) 6

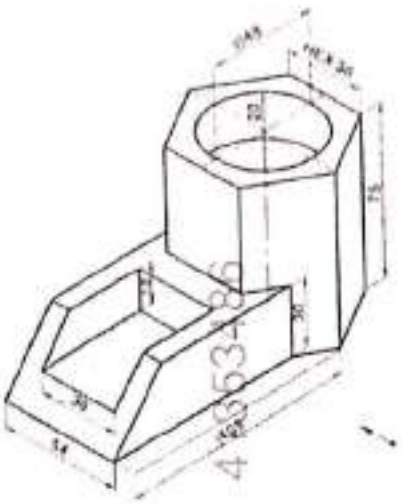


Fig. 2

B) Draw the half-sectional FV, and half-sectional RHSV of the object as shown in Fig.3 (CO 5) 6
by using first angle method.

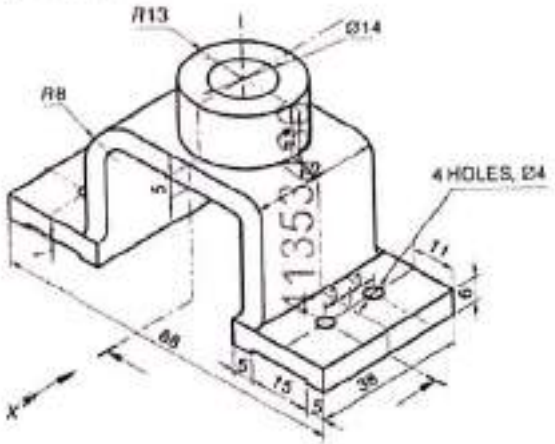


Fig. 3

C) Fig. 4 shows the FV and LHSV of an object. Draw its isometric view. (CO 5) 6

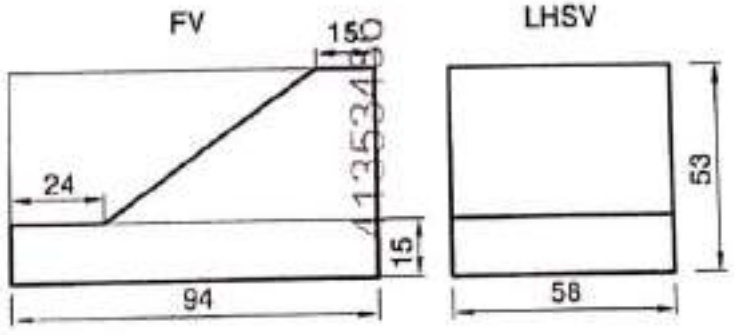


Fig. 4

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B.Tech Branch : Common To All Branches Semester : I

Subject Code & Name: 24AF1000ES106 & Basic Electrical & Electronics Engineering

Max Marks: 60 Date:13/02/2025 Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	What is the equivalent resistance when two 4Ω resistors are connected in parallel? A) 2Ω B) 4Ω C) 8Ω D) 1Ω	CO1	1
2	In nodal analysis, the unknown variables are A) Currents in each branch B) Voltage at each node C) Resistance of each branch D) Inductance of each loop	CO3	1
3	In a purely capacitive AC circuit, the current A) Leads the voltage by 90° B) Lags the voltage by 90° C) Is in phase with voltage D) Is zero	CO2	1
4	What is the purpose of back EMF in a DC motor? A) To increase the current in the armature B) To regulate the speed of the motor C) To reduce torque in the motor D) To stop the motor from running	CO1	1
5	The working principle of an induction motor is based on A) Mutual Induction B) Self Induction C) Fleming's Right-Hand Rule D) Static Magnetic Field	CO2	1
6	In a PN junction diode, current conduction in forward bias is mainly due to A) Electrons only B) Holes only C) Both electrons and holes D) Majority carriers only	CO1	1
7	In a DC power supply, the function of a rectifier is to A) Convert AC to DC B) Convert DC to AC C) Convert DC to DC D) Regulate voltage	CO1	1

8	In a Zener diode voltage regulator, the output voltage						
	A) Varies with input voltage	B) Remains constant if input voltage is within limits	C) Is always equal to input voltage	D) Depends on load current only	CO3		1
9	In an NPN transistor, the majority charge carriers in the base are						
	A) Electrons	B) Holes	C) Both electrons and holes	D) Ions	CO2		1
10	The DC load line of a transistor amplifier circuit helps in						
	A) Determining the operating point	B) Reducing power consumption	C) Increasing gain	D) Decreasing leakage current	CO3		1
11	A moving coil instrument operates on the principle of						
	A) Electromagnetic induction	B) Electrostatic force	C) Magnetic field interaction	D) Heating effect of current	CO1		1
12	In a function generator, which parameter cannot be adjusted directly?						
	A) Frequency	B) Waveform shape	C) Output voltage	D) Load resistance	CO2		1
Q. 2	**Solve the following.**						**12**
A)	State and explain Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL).				CO1		**6**
B)	A resistor of 10Ω is connected across a 230V, 50Hz AC supply. Find: (a) The RMS current (b) The power dissipated in the resistor				CO1		**6**
Q.3	**Solve the following.**						**12**
A)	Define and derive the expression for the RMS (Root Mean Square) value of a sinusoidal waveform.				CO3		**6**
B)	Define back EMF in a DC motor and derive the torque equation of a DC motor				CO2		**6**
Q. 4	**Solve Any Two of the following.**						**12**
A)	Explain the working of a full-wave bridge rectifier				CO1		**6**
B)	Explain the function of a capacitor filter in a rectifier circuit.				CO3		**6**
C)	A full-wave rectifier is supplied with a 230V RMS AC input. If the transformer has a turns ratio of 10:1, calculate: a) The secondary voltage b) The peak output voltage (Assume diode drop = 0.7V)				CO2		**6**

Q.5	**Solve Any Two of the following.**			**12**
A)	Derive the relationship between current gains (α and β) in Common Base (CB) and Common Emitter (CE) configurations.	CO2		6
B)	Explain the construction and working principle of PNP.	CO3		6
C)	Explain the construction and working principle of a DC motor.	CO1		6
Q.6	**Solve Any Two of the following.**			**12**
A)	Explain the construction and working of a Moving Iron instrument.	CO3		6
B)	Draw and explain the block diagram of a digital multimeter.	CO2		6
C)	Describe the operation of a function generator.	CO1		6

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: Engineering | Branch: Common To All Branches

Semester : 1st Sem

Subject Code & Name: 24AF2CMEES108 (Basic Civil and Mechanical Engineering)

Max Marks: 60 | Date:22/02/2025 | Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**				Remember	**12**
1	A..... is a horizontal member which is placed across an opening to support the position of the structure above it.					1
	a. Doors	b. Windows	c. Sill	d. Lintel		
2	what is the primary function of a shallow foundation					1
	a. To transfer loads to a deeper	b. To distribute loads over a larger area to reduce soil pressure	c. To provide Lateral Support to the superstructure	d. To resist uplift forces		
3	What is the primary function of cement in concrete?					1
	a. To provide Strength	b. To improve workability	c. To reduce shrinkage	d. To increase durability		
4	The entire assembly of styles, Pannels & rails is known as the.....					1
	a Putty	b. Horn	c. Sash	d. Shutter		
5	What is surveying?					1
	a. To find elevations w.r to datum	b. Show's the relative positions of the object on the	c. To find elevations of points having	d. All of above		

		surface of the earth	same contour intervals			
6	What is the term used for an imaginary line on the ground Joining of equal elevations					1
	a. Level Line	b. Line of sight	c. Datum	d. Contour		
7	Which of the following kind of energy output is obtained from a 'Steam Power Plant'					1
	a. Electricity	b. Thermal energy	c. Sound energy	d. Heat energy		
8	Which of the following is a classification of automobiles based on Load?					1
	a. Heavy transport vehicle (HTV)	b. Sedan Hatchback car	c. Four wheeler vehicle	d. Front-wheel drive		
9	Petrol engines are..... than diesel engines.					1
	a. Lighter	b.Unpredictable	c. Heavier	d. None of the mentioned		
10	Which of the following is a type of thermodynamic system?					1
	a. Open system	b. Closed system	c. Thermally isolated system	d. All of the mentioned		
11	Sand mold and permanent mold are the parts of..... manufacturing process.					1
	a. Machining	b. Casting	c. Welding	d. None of above		
12	Which of the following operation is not carried out on Lathe Machine.					1
	a. Welding	b. Facing	c. Turning	d. Parting		
Q. 2	**Solve the following.**				**CO2**	**12**
A)	Describe in detail concrete with its types & properties?					6
B)	Explain the role of Civil engineer in the field of Construction engineering?					6

Q.3	**Solve the following.**	CO3	12
A)	Explain the foundation with its types & function of foundation?		6
B)	Describe in detail "lean to roof" with sketch?		6
Q. 4	**Solve Any Two of the following.**	CO4	12
A)	Describe in detail "Metric chain" with sketch?		6
B)	Describe Advantages & Disadvantages of "Plane Table surveying"?		6
C)	Define the terms? i) Reduced level ii) Height of instrument iii) Contour line iv) Bench marks v) Change Point vi) Contour interval		6
Q.5	**Solve Any Two of the following.**	CO5	12
A)	Describe first law of thermodynamics. Enlist the limitations of the same?		6
B)	Classify Internal combustion engines based on (i) Cycle of operation, ii) Fuel used, iii) Cylinder Arrangement, (iv) No. of strokes, (v) Application, (vi) Ignition method.		6
C)	What is the function of Power plant. Explain in brief working of thermal power plant with suitable sketch?		6
Q. 6	**Solve Any Two of the following.**	CO5	12
A)	What is the difference between machine and mechanism? Explain any two types of mechanism with suitable diagrams.		6
B)	Classify engineering materials. Describe in detail properties and applications of any two non-ferrous metals?		6
C)	With suitable diagrams describe any six operations performed on Lathe machine?		6
	*** End ***		

Q.3	**Solve the following.**	CO3	12
A)	Explain the foundation with its types & function of foundation?		6
B)	Describe in detail "lean to roof" with sketch?		6
Q. 4	**Solve Any Two of the following.**	CO4	12
A)	Describe in detail "Metric chain" with sketch?		6
B)	Describe Advantages & Disadvantages of "Plane Table surveying"?		6
C)	Define the terms? i) Reduced level ii) Height of instrument iii) Contour line iv) Bench marks v) Change Point vi) Contour interval		6
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	*** End ***		