

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Examination – Winter 2023

Course: B. Tech.

Branch: All Branches

Semester: I/II

Subject Code & Name: (BTHM204/ CS1204) Communication Skills

Max Marks: 60

Date: 30-01-24

Duration: 3 Hours

**Instructions to the Students:**

1. All the questions are compulsory.
2. 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
<b>Q.1 Solve any TWO of the following:</b>		
A) 'The non-verbal communication contributes more to an effective communication than the verbal communication does', justify.	L3/CO2	6
B) What elements make the cycle of communication complete? How?	L3/CO2	6
C) According to you, what are the ways to deal with psychological, physical and linguistic barrier to communication?	L3/CO1	6
<b>Q.2 Solve any TWO of the following:</b>		
A) According to you, how a presentation can be made effective?	L3/CO1	6
B) Assume you are going to appear for an interview next week; how will you get prepared for this interview?	L2/CO2	6
C) Write your views on the DOs and DON'Ts of Group Discussion?	L2/CO3	6
<b>Q.3 Solve the following:</b>		
A) Transcribe the following: i) Student ii) Cupboard iii) Universal iv) English	L2/CO3	4
B) Spell the following: i) /ten/ ii) /daut/ iii) /dɪkʃən/ iv) /ækʃən/	L3/CO3	4
C) Explain the importance of pitch, rhythm and tone in speaking.	L3/CO3	4
<b>Q.4 Solve the following:</b>		

**A) Fill in the blanks:**

**L3/CO4**

6

- i. .... university, where you are graduated from, is one of the best universities in this country. (a, an, the)
- ii. The notepad is lied ..... the table. (in, between, on)
- iii. Mahatma Gandhi was born ..... 2<sup>nd</sup> October 1869. (at, in, on)
- iv. They want to visit ..... Taj Mahal. (a, an, the)
- v. You are advised to go through ..... fifth chapter of *Godan*. (the, a, an)
- vi. The students are not restricted to enter ..... the office of Chairperson. (at, for, on, into)

**B) Do as directed:**

**L1/CO4**

6

- i. You was complete the B Tech course in the upcoming 10 years. (find the common error and rewrite the sentence)
- ii. It is the duty of every Indian to follow the Constitution. (Rewrite using appropriate modal auxiliary)
- iii. She lived in Mumbai for twenty years. (Rewrite using present perfect continuous tense)
- iv. Lingering around the fences is strictly prohibited. (Rewrite using appropriate modal auxiliary)
- v. Write the synonym of KNOWLEDGE.
- vi. Write the antonym of FAILURE.

**Q. 5 Solve the following:**

- A) Compose a resume and write an application for the post of engineer in Tata Technologies Ltd., Plot No. 25, Hinjawadi Rajiv Gandhi Infotech Park, Hinjawadi, Pune – 411057.**

**L3/CO5**

12

**\*\*\* End \*\*\***

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Course: B. Tech.

Branch : All Branches

Semester : II

Subject Code & Name: Engineering Chemistry ( BTBS202 )

Max Marks: 60

Date: 17/01/2024

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. Draw a neat diagram wherever necessary
3. Figures to right indicates full marks

		(Level /CO)	Marks
<b>Q. 1</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Explain Hot Lime-Soda process of softening of water with its advantages and disadvantages.	2	6
B)	Discuss disadvantages of hard water in Domestic and Industrial use.	1	6
C)	Explain the determination of hardness of water by EDTA method.	2	6
<b>Q.2</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Explain the Phase diagram of one component Water system.	2	6
B)	Discuss the term component and degrees of freedom involved in Phase rule equation with examples.	1	6
C)	Explain Phase diagram of two component Ag-Pb alloy system.	2	6
<b>Q. 3</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Discuss Hydrogen evolution mechanism involved in electrochemical corrosion.	2	6
B)	Describe in brief Direct (Dry) chemical corrosion.	1	6
C)	Explain Cathodic protection method to minimize the rate of corrosion.	2	6
<b>Q.4</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	What is Coal? Explain various types of coal.	1	6
B)	Write a note on Refining of Petroleum.	2	6
C)	Describe in brief solid, semi-solid & liquid lubricants.	2	6
<b>Q. 5</b>	<b>Solve Any Two of the following.</b>		<b>12</b>
A)	Describe Ostwald's theory of Acid-Base indicator.	1	6
B)	Explain Conductometric titration with any two examples.	2	6
C)	Discuss H <sub>2</sub> -O <sub>2</sub> Fuel cell with its advantages.	2	6

\*\*\*\*\*END\*\*\*\*\*

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Examination – 2023

Course: B. Tech.

Branch : All Branches

Semester :II

Subject Code & Name: BTES203G & Engineering Graphics

Max Marks: 60

Date:19-01-24

Duration: 4 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

**Q.1 Solve Any Two of the following.**

12

- A) Draw the following sentence according to drawing standard SP 46. (or any other standard convention) Remember 6

GOOD job, INSTAGRAM, Work is Worship.

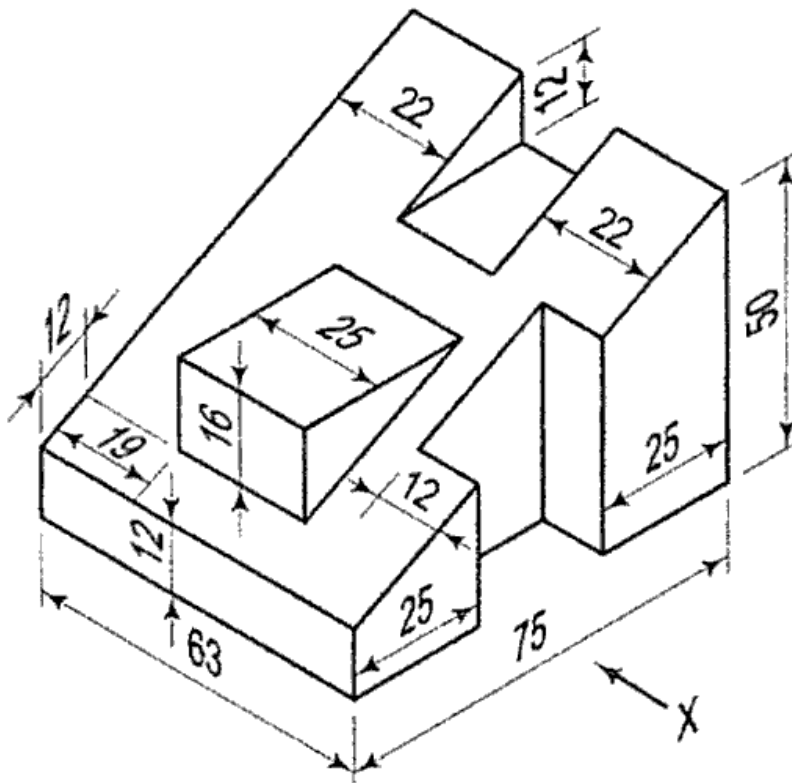
- B) Draw a regular pentagon of 30 mm side. Remember 6

- C) Explain different methods of dimensioning by drawing suitable diagrams. Understand 6

**Q.2 Solve Any one of the following.**

12

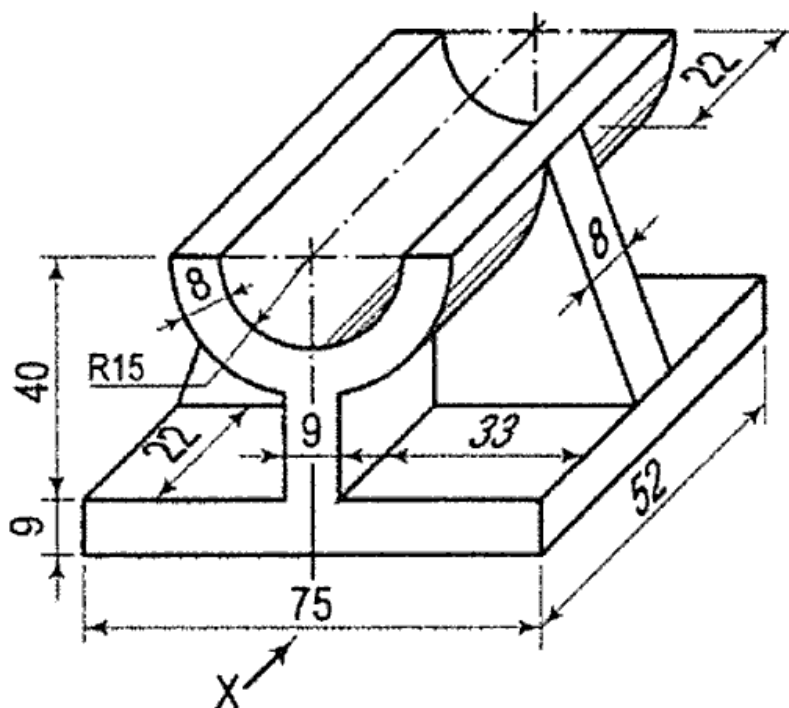
- A) Fig, shows the pictorial view of an object, draw its front view looking from direction of X, TV and left hand side view by using First angle Projection method. Apply 12



B) Fig. shows the pictorial view of an object, draw its front view looking from direction of X, TV and right hand side view by using Third angle Projection method.

12

Apply



Q. 3 Solve Any Two of the following.

12

A) A line AB of 70 mm long has its end 'A' 15 mm from both H.P. and V.P. The other end B is 40 mm above H.P. and 60 mm in front of V.P. Draw the projections of the line and determine the inclination of the line with H.P. and V.P. Line is in first quadrant.

6

Evaluate

B) A square ABCD of 50 mm side has its corner A in the HP, its diagonal AC inclined at  $30^\circ$  to the H.P. and the diagonal BD inclined at  $45^\circ$  to the V.P. and parallel to the H.P. Draw its projection

6

Evaluate

C) A rectangle length of side 50 mm and 80 mm has its shortest side AB in H.P. and incline  $30^\circ$  to V.P. Complete the projection of plane if surface of the plane is inclined  $45^\circ$  to H.P. <https://www.batuonline.com>

6

Evaluate

Q.4 Solve Any One of the following.

12

A) A cone of diameter of base 50 mm and height 75 mm is resting on H.P. on the point of its periphery of the base, The axis of the cone is inclined to H.P. by  $30^\circ$  and top view of the axis inclined at  $45^\circ$  with V.P. Draw the projection when apex is nearer to the observer.

12

Evaluate

B) A pentagonal pyramid base 25 mm side and axis 50 mm long has one of its triangular faces in the V.P. and edge of the base contained by that face makes an angle of  $30^\circ$  with the H.P. Draw its projections.

12

Evaluate

**Q. 5 Solve Any one of the following.**

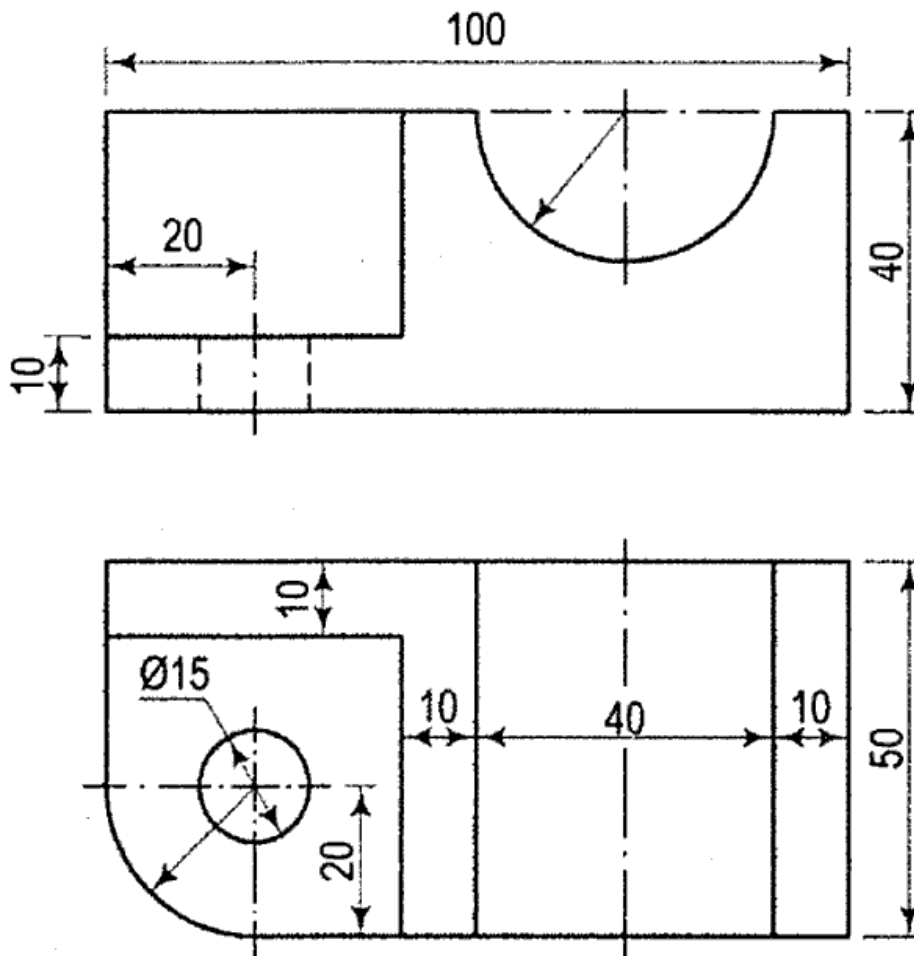
**12**

- A) A hexagonal pyramid, base 30 mm side and axis 70 mm long is resting on its slant of the face on the horizontal plane. A section plane, perpendicular to the V.P. inclined to the H.P. passes through the highest corner of the base and intersecting the axis at 25 mm from the base. Draw the projections of the solid and determine the inclination of the section plane with the H.P.
- B) Draw the isometric view of the following object having FV and TV drawn by first angle projection method.

**12**

Evaluate

Synthesize



**\*\*\* End \*\*\***

25/06/24, 14:47:12

**DR BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE, RAIGAD**  
**Regular & Supplementary Summer Examination- 2024**

Branch Name: Common to All Branches

Subject Code: BIFS203G

Subject Name: Engineering Graphics

Semester: II

Max Marks: 60

Duration: 04Hrs

Date: 18/06/2024

Instructions:-

1. Attempt any FIVE questions out of the following
2. Assume the suitable data wherever necessary.
3. Mention the Question numbers correctly on the drawing sheet.

Marks

**Q.1** Attempt the following questions

- a. Draw the Regular Pentagon of 50mm side by any method
- b. Redraw the following sketch and show dimensions with any one of the correct method (Fig-1)

CO-1 07

CO-1 04

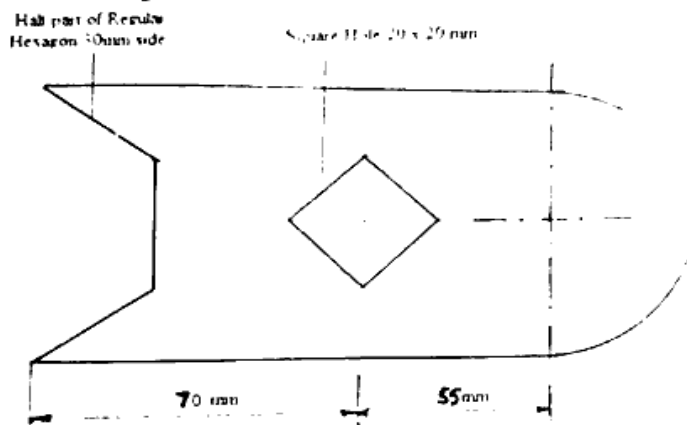


Fig-1

- c. Draw the Front view & Top view of following points
  - i) Point A 15mm below HP and 20mm behind VP
  - ii) Point B in VP and 20mm above HP
  - iii) Point C in HP and 25mm in front of VP

CO-2 03

**Q.2** Draw the Front view in X- direction, Top view and Side view of the following sketch by First angle Method of Projection (Fig.2)

CO-4 12

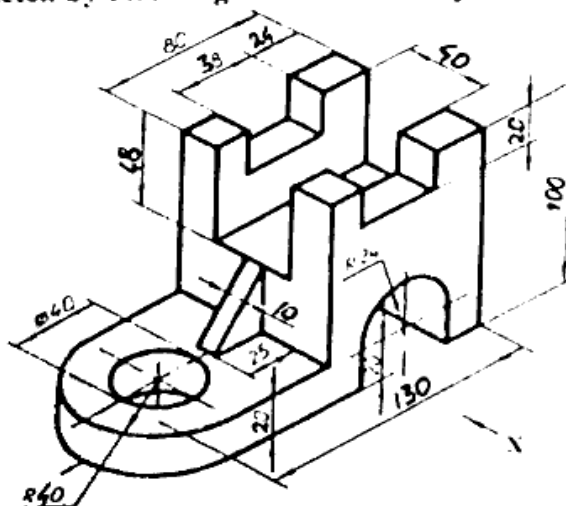


Fig.2

**Q.3 Attempt the following questions**

a. Horizontal Line AB 75mm long is inclined to VP by  $40^\circ$ . Point A is 20mm above HP and 15mm in front of VP. Complete the projections and find its Plan Length and Elevation Length CO-2 04

b. A regular Pentagon of 40mm side is resting in VP on one of its edges with surface inclined to VP by  $45^\circ$ . Complete the projections. CO-2 08

OR

c. A Rectangular Plate of 70 x 40 mm sides resting on edge is inclined in such a way that it is observed as a Square of 40x 40 mm in the TOP VIEW. Complete the projections and find inclination of plate with HP. CO-2 08

**Q.4 Attempt the following question (Any One)**

a. A triangular pyramid of base edges 50 mm and slant edges 70 mm is resting on one of its base edges in HP in such a way that triangular face contained by that base edge is Vertical and resting base edge is inclined to VP by  $45^\circ$  CO-3 12

b. A cone of base diameter 50 mm and height of Axis 75 mm is lying down on one of its generators in HP with top view of the axis inclined to VP by  $40^\circ$ . Complete the projections if apex is towards the observer CO-3 12

**Q.5 Attempt the following question (Any One)**

a. A cylinder of base diameter 50mm and its axis 80 mm is inclined to HP by  $50^\circ$ . An auxiliary inclined plane, passing through the highest point of the top circumference & axis at point 20mm from the top, cuts the cylinder. Draw the FV, TV view and true shape of the section. <https://www.batuonline.com> CO-3 12

b. A true shape of the cut section of Cube 50mm side is Rhombus with largest possible major diagonal. Complete the projections and show FV, TV and true shape of the section. CO-3 12

**Q.6 Draw the Isometric View of the following object (Fig-3).**

CO-4 12

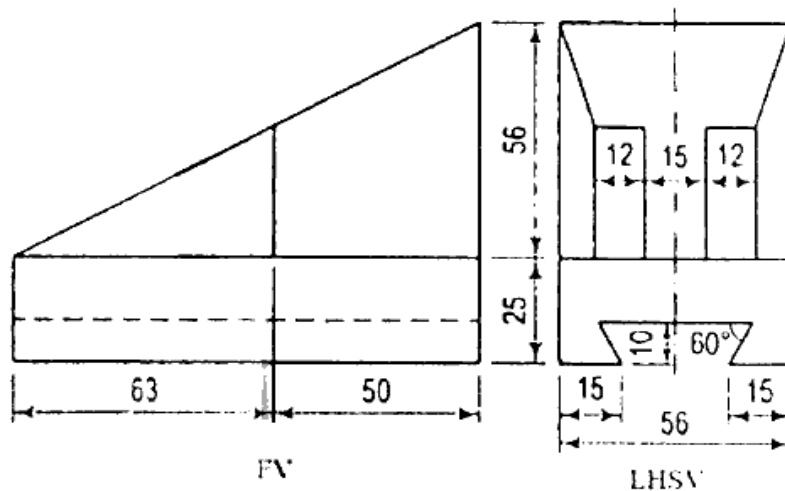


Fig-3

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**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

Regular/Supplementary Summer Examination – 2024

Course: B. Tech.

Branch: FE All

Semester: II

Subject Code & Name: BTBS201/ Engineering Mathematics-II

Max Marks: 60

Date:12/06/2024

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of questions expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

<b>Q. 1</b>	<b>Solve any two of the following.</b>		<b>12</b>
A)	If $z_1$ and $z_2$ are any two complex numbers such that $ z_1 + z_2  =  z_1 - z_2 $ , show that the difference of their amplitude is $\frac{\pi}{2}$	Apply (CO1)	6
B)	Find continued product of four values of $\left[\frac{1}{2} + i\frac{\sqrt{3}}{2}\right]^{\frac{1}{4}}$	Understand (CO1)	6
C)	Show that $\tan\left[i\log\left(\frac{a-ib}{a+ib}\right)\right] = \frac{2ab}{a^2-b^2}$	Understand (CO1)	6
<b>Q.2</b>	<b>Solve any two of the following.</b>		<b>12</b>
A)	Solve $(x+y-2)dx + (x-y+4)dy = 0$	Apply (CO2)	6
B)	Solve $\cos^2 x \frac{dy}{dx} + y = \tan x$	Apply (CO2)	6
C)	A coil is having resistance of $15\Omega$ & inductance L of 10H is connected to 90V supply. Determine the value of current after two sec.	Apply (CO2)	6
<b>Q. 3</b>	<b>Solve any two of the following.</b>		<b>12</b>
A)	Solve $(D^2 - 4D + 4)y = xe^{2x} \sin x$	Apply (CO3)	6
B)	Solve by variation of parameters $(D^2 + 6D + 9)y = \frac{e^{-3x}}{x^3}$	Apply (CO3)	6
C)	Solve $x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} + 3y = x^2 \log x$	Apply (CO3)	6
<b>Q.4</b>	<b>Solve any two of the following.</b>		<b>12</b>
A)	Find the Fourier series of $f(x) = \frac{1}{2}(\pi - x)$ over $(0, 2\pi)$	Understand (CO4)	6

B)	Find the Fourier series of $f(x) = 9 - x^2$ over $(-3, 3)$	Understand (CO4)	6
C)	Expand $\pi x - x^2$ as a half range Fourier cosine series for $0 \leq x \leq \pi$	Understand (CO4)	6
Q. 5	Solve any two of the following.		12
A)	If $\varphi = x^2y + 2xy^2 + 3yz$ then find $\nabla\varphi$ and if $\vec{F} = 2xy\mathbf{i} - yz\mathbf{j} - 2zk\mathbf{k}$ then find $\nabla \cdot \vec{F}$ and $\nabla \times \vec{F}$	Remember (CO5)	6
B)	Evaluate $\oint_C [(xy + y^2)dx + x^2dy]$ by Green's theorem, where C is the boundary of the region bounded by the parabola $y = x^2$ and $y = x$ .	Apply (CO5)	6
C)	Use Gauss divergence theorem to evaluate $\iiint_V \vec{F} \cdot d\vec{s}$ where $\vec{F} = 4x\mathbf{i} - 2y^2\mathbf{j} + z^2\mathbf{k}$ and S is the surface bounding the region $x^2 + y^2 = 4, z = 0$ and $z = 3$ .	Apply (CO5)	6
*** End ***			

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**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

Regular/Supplementary Summer Examination – 2024

Course: B. Tech.

Branch: FE All

Semester: II

Subject Code & Name: BTBS201/ Engineering Mathematics-II

Max Marks: 60

Date:12/06/2024

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of questions expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

<b>Q. 1</b>	<b>Solve any two of the following.</b>		<b>12</b>
A)	If $z_1$ and $z_2$ are any two complex numbers such that $ z_1 + z_2  =  z_1 - z_2 $ , show that the difference of their amplitude is $\frac{\pi}{2}$	Apply (CO1)	6
B)	Find continued product of four values of $\left[\frac{1}{2} + i\frac{\sqrt{3}}{2}\right]^{\frac{1}{4}}$	Understand (CO1)	6
C)	Show that $\tan\left[i\log\left(\frac{a-ib}{a+ib}\right)\right] = \frac{2ab}{a^2-b^2}$	Understand (CO1)	6
<b>Q.2</b>	<b>Solve any two of the following.</b>		<b>12</b>
A)	Solve $(x+y-2)dx + (x-y+4)dy = 0$	Apply (CO2)	6
B)	Solve $\cos^2 x \frac{dy}{dx} + y = \tan x$	Apply (CO2)	6
C)	A coil is having resistance of $15\Omega$ & inductance L of 10H is connected to 90V supply. Determine the value of current after two sec.	Apply (CO2)	6
<b>Q. 3</b>	<b>Solve any two of the following.</b>		<b>12</b>
A)	Solve $(D^2 - 4D + 4)y = xe^{2x} \sin x$	Apply (CO3)	6
B)	Solve by variation of parameters $(D^2 + 6D + 9)y = \frac{e^{-3x}}{x^3}$	Apply (CO3)	6
C)	Solve $x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} + 3y = x^2 \log x$	Apply (CO3)	6
<b>Q.4</b>	<b>Solve any two of the following.</b>		<b>12</b>
A)	Find the Fourier series of $f(x) = \frac{1}{2}(\pi - x)$ over $(0, 2\pi)$	Understand (CO4)	6

B)	Find the Fourier series of $f(x) = 9 - x^2$ over $(-3, 3)$	Understand (CO4)	6
C)	Expand $\pi x - x^2$ as a half range Fourier cosine series for $0 \leq x \leq \pi$	Understand (CO4)	6
Q. 5	Solve any two of the following.		12
A)	If $\varphi = x^2y + 2xy^2 + 3yz$ then find $\nabla\varphi$ and if $\vec{F} = 2xy\mathbf{i} - yz\mathbf{j} - 2zk\mathbf{k}$ then find $\nabla \cdot \vec{F}$ and $\nabla \times \vec{F}$	Remember (CO5)	6
B)	Evaluate $\oint_C [(xy + y^2)dx + x^2dy]$ by Green's theorem, where C is the boundary of the region bounded by the parabola $y = x^2$ and $y = x$ .	Apply (CO5)	6
C)	Use Gauss divergence theorem to evaluate $\iiint_V \vec{F} \cdot d\vec{s}$ where $\vec{F} = 4x\mathbf{i} - 2y^2\mathbf{j} + z^2\mathbf{k}$ and S is the surface bounding the region $x^2 + y^2 = 4, z = 0$ and $z = 3$ .	Apply (CO5)	6
*** End ***			

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Course: First Year B. Tech.

Branch: Group A / Group B

Subject Name: Engineering Mechanics

Subject Code: BTES203

Max Marks: 60

Date: 19-01-24

Duration: 3 Hr.

**Instructions to the Students:**

1. All the questions are compulsory.
2. 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

**Q. 1 Solve Any Two of the following.**

12

A) Define characteristics of system of forces.

Remember

6

B) The forces 20 N, 30 N, 40 N, 50 N and 60 N are acting at one of the angular points of a regular hexagon, towards the other five angular points, taken in order. Find the magnitude and direction of the resultant force.

CO2

6

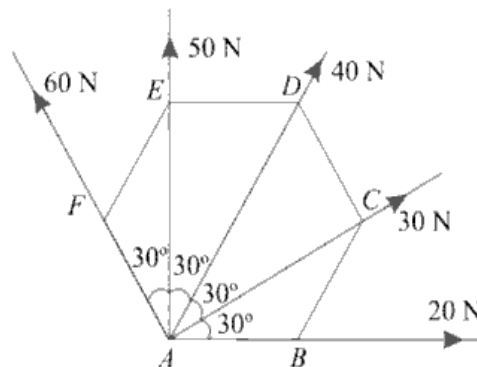


Fig. 1

C) A uniform wheel of 600 mm diameter, weighing 5 kN rests against a rigid rectangular block of 150 mm height as shown in Fig. 2.

CO2

6

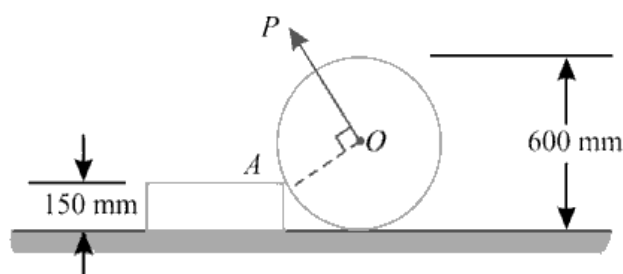


Fig. 2

Find the least pull, through the centre of the wheel, required just to turn the wheel over the corner A of the block. Also find the reaction on the block. Take all the surfaces to be smooth.

**Q.2 Solve Any Two of the following.**

12

A) a) What are the characteristics of a couple?

CO1 6

b) Fig. 3 shows a crank-lever ABC with a tension spring (T). The lever weighs 0.2 N/mm. Determine the tension developed in the spring, when a load of 100 N is applied at A.

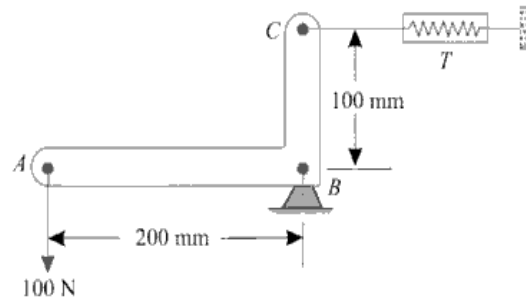


Fig. 3

B) A light string ABCDE whose extremity A is fixed, has weights  $W_1$  and  $W_2$  attached to it at B and C. It passes round a small smooth peg at D carrying a weight of 300 N at the free end E as shown in Fig. 4

CO2 6

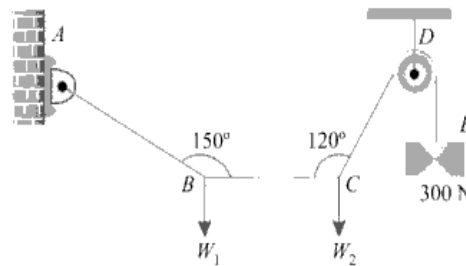


Fig. 4

If in the equilibrium position, BC is horizontal and AB and CD make  $150^\circ$  and  $120^\circ$  with BC, find

- (i) Tensions in the portion AB, BC and CD of the string and
- (ii) Magnitudes of  $W_1$  and  $W_2$

C) A semicircular area is removed from a trapezium as shown in Fig. 5 (dimensions in mm).

CO3 6

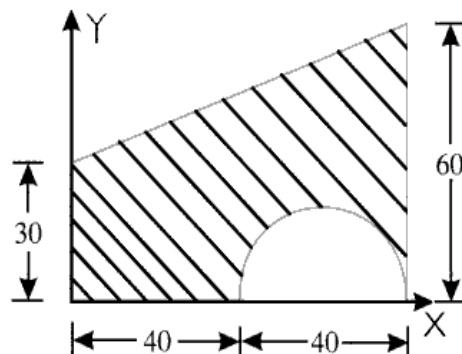


Fig. 5

Determine the centroid of the remaining area (shown hatched).

**Q. 3 Solve Any Two of the following.**

12

A) i. Define Following

CO1 6

- a. Static Friction
- b. Dynamic Friction
- c. Coefficient of Friction

ii. Find the horizontal force required to drag a body of weight 100 N along a horizontal plane. If the plane, when gradually raised up to  $15^\circ$ , the body will begin to slide.

B) Fig. 6 shows a Warren girder consisting of seven members each of 3 m length freely supported at its end points.

CO2 6

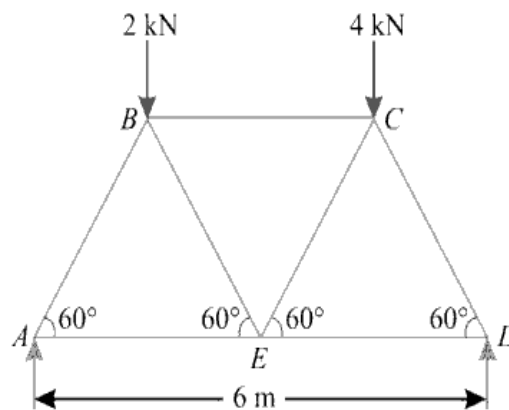


Fig. 6

The girder is loaded at B and C as shown. Find the forces in all the members of the girder, indicating whether the force is compressive or tensile.

C) A simply supported beam AB of span 5 m is loaded as shown in Fig. 7.

CO5 6

Using principle of virtual work, find the reactions at A and B.

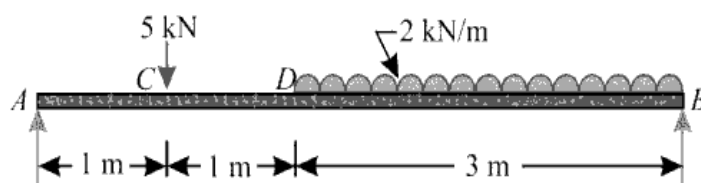


Fig. 7

**Q.4 Solve Any Two of the following.** <https://www.batuonline.com>

12

A) i. Define D'Alembert's Principle and write down its equation.

CO1 6

ii. Define Newton's First, Second and Third Law of Motion.

B) Two electric trains A and B leave the same station on parallel lines. The train A starts from rest with a uniform acceleration of  $0.2 \text{ m/s}^2$  and attains a speed of 45 kmph., which is maintained constant afterwards. The train B leaves 1 minute after with a uniform acceleration of  $0.4 \text{ m/s}^2$  to attain a maximum

CO4 6

speed of 72 kmph., which is maintained constant afterwards. When will the train B overtake the train A?

- C) A car moves along a straight line whose equation of motion is given by  $s = 12t + 3t^2 - 2t^3$ , where (s) is in metres and (t) is in seconds. Calculate  
(i) velocity and acceleration at start, and  
(ii) acceleration, when the velocity is zero. CO4 6

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

- A) Derive equation of the path of a projectile and write equation of time of flight, horizontal range, and maximum height of a projectile. CO5 6
- B) A flywheel is making 180 r.p.m. and after 20 sec it is running at 120 r.p.m. How many revolutions will it make and what time will elapse before it stops, if the retardation is uniform? CO4 6
- C) A bullet of mass 20 g is fired horizontally with a velocity of 300 m/s, from a gun carried in a carriage, which together with the gun has mass of 100 kg. The resistance to sliding of the carriage over the ice on which it rests is 20 N. Find  
a) velocity, with which the gun will recoil,  
b) distance, in which it comes to rest, and  
c) time taken to do so. CO5 6

\*\*\* End \*\*\*

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE			
Regular and Supplementary Summer 2024			
Course: B. Tech.	Branch: All	Semester: II	
Subject Code & Name: B1BS202P Engineering Physics			
Max Marks: 60	Date: 14/06/2024	Duration: 3 Hr.	
<b>Instructions to the Students:</b>			
1. All the questions are compulsory			
2. The level of question expected answer as per OBF or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question			
3. Use of non-programmable scientific calculators is allowed			
4. Assume suitable data wherever necessary and mention it clearly			
		(Level CO)	Marks
Q.1	Solve Any Two of the following.		12
A)	Define Damped oscillations. Derive an expression for differential equation of Damped oscillations.	(CO1) (Remember & Understand)	6
B)	Define i) Magnetostriction Effect ii) Piezoelectric Effect iii) Resonance. Calculate the natural frequency of the ultrasonic waves generated by a quartz crystal having thickness of 5.5 mm. [Given $Y = 8 \times 10^{10} \text{ N/m}^2$ , $\rho$ (density) = 2650 $\text{Kg/m}^3$ ]	(CO1) (Remember & Understand)	6
C)	Derive differential equation of wave motion.	(CO1) Understand)	6
Q.2	Solve Any Two of the following.		12
A)	Derive an expression for diameter of n <sup>th</sup> bright and dark Newton's ring.	(CO2) (Understand)	6
B)	Explain the construction & working of Helium Neon Laser with neat labeled diagram.	(CO2) (Understand)	6
C)	State any six applications of optical fiber. Numerical aperture of a fiber is 0.5 and core refractive index is 1.48. Find cladding refractive index.	(CO2) (Remember & Understand)	6
Q.3	Solve Any Two of the following.		12
A)	Explain the construction & working of Bainbridge mass spectrograph with neat & labeled diagram.	(CO3) (Understand)	6
B)	Explain the construction & working of Geiger Muller Counter.	(CO3) (Understand)	6

C)	Derive Schrodinger's time independent wave equation.	(CO3) (Understand)	6
Q.4	Solve the following questions.		12
A)	Calculate atomic radii for Simple cubic, Body centered, and face centered cubic structure.	(CO1) (Understand)	6
B)	Explain Continuous X-ray spectra. Prove that, $\lambda_{\min} = \frac{12400}{V} \text{ \AA}^0$	(CO4) (Understand)	6
Q. 5	Solve Any Two of the following.		12
A)	Explain B-H Curve for ferromagnetic materials. Define the terms Retentivity & Coercivity.	(Understand)	6
B)	Explain Type-I & Type II superconductors.	(Understand)	6
C)	Explain Conductor, Semiconductor, and Insulator on the basis of band theory of Solids.	(Understand)	6
*** End ***			

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