Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV EXAMINATION – WINTER 2025

Subject Code:3142201 Date:13-11-2025

Subject Name:Mining Machinery - I

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Differentiate between Lang's lay and Ordinary lay with neat sketch.	**03**
	(b)	Discuss advantages & disadvantages of endless rope haulage.	**04**
	(c)	What do you mean by capping of rope? Explain Interlocking wedge type capel (Reliance capel) with neat sketch.	**07**
Q.2	**(a)**	Why rope clips are used in rope haulage system? Explain cam clip with neat sketch.	**03**
	(b)	Discuss the process of Rope splicing.	**04**
	(c)	An endless haulage operates on a roadway 650 m long dipping at 1in 12 and draws 630 tonnes of coal a shift (1 shift = 7.5 hours effective time). An empty tub weighs 500 kgf and its carrying capacity is 1000 kgf of coal. The rope mass 3.5kgf/m, tub friction is 1/50 and rope friction is 1/20. Speed of the rope is 6.5 km/hr. Estimate the power required by the motor. The loads are pulled up the gradient.	**07**
		OR	
	(c)	Explain main & tail rope haulage system with neat sketch.	**07**
Q.3	**(a)**	Name the parameters affecting the selection of wire rope.	**03**
	(b)	State the type of rope to be used for: (a) Coal Cutting Machine (b) Winding Rope (c) Haulage Ropes (d) Dragline Hoist Rope	**04**
	(c)	What are the different types of safety devices used on haulage roads? Explain with neat sketches.	**07**
		OR	
Q.3	**(a)**	What is space factor of wire rope? How mass and strength of wire ropes is determined?	**03**
	(b)	Explain various types of aerial ropeway system.	**04**
	(c)	What are the types of compressor used in mine? Explain any one in detail.	**07**
Q.4	**(a)**	What are the limitations on the use of different types of locomotives in underground mines?	**03**
	(b)	Write the applicable conditions and application of aerial ropeway system.	**04**
	(c)	Write a brief note on belt conveyor system.	**07**
		OR	
Q.4	**(a)**	Write the applications and construction of shuttle car.	**03**
	(b)	Sketch the layout of battery charging room used for battery operated electric locomotives in underground mines.	**04**
	(c)	A locomotive and train have a total mass of 470 tonnes. The resistance opposing motion can be assumed to be constant and amounts to 60 N/tonne. If the locomotive can exert a constant pull of 90 kN. Find how long it will take to accelerate the train from 2 km/hr to 40 km/hr on level track.	**07**

Q.5	**(a)**	What are the advantages of compressed air over other power sources?	**03**
	(b)	A wire rope, flattened stranded with fibre core, has a diameter of 35 mm. If the steel has a tensile strength of 160 kg/mm2, find out the total mass of the rope and breaking strength in SI units if the length of the rope is 125 m.	**04**
	(c)	What are the types of locomotives used in mines? Explain any one in detail.	**07**

OR

Q.5	**(a)**	Sketch track layout of direct rope haulage.	**03**
	(b)	What precautions should be taken for gage selection and lying down of tracks?	**04**
	(c)	Explain the rope tensioning arrangement of aerial ropeway.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE –4th SEMESTER (New Syllabus) EXAMINATION- WINTER 2021

Subject Code: 3142201 Date:

Subject Name: MINING MACHINERY-I

Time: Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Mention the advantages of using compressed air as a source of power.	**03**
	(b)	Classify different types of air compressors.	**04**
	(c)	Explain transmission and distribution of compressed air in mines.	**07**
Q.2	**(a)**	Classify types of aerial ropeways.	**03**
	(b)	List the necessary conditions in which aerial ropeway can be used for haulage and transportation.	**04**
	(c)	Using neat diagram explain the constructional features of aerial ropeway.	**07**
		OR	
	(c)	Explain different methods used for rope tensioning.	**07**
Q.3	**(a)**	Define: i. Wire ii. Rope iii. Core	**03**
	(b)	Classify wire ropes based on its construction.	**04**
	(c)	Explain the method of rope splicing.	**07**
		OR	
Q.3	**(a)**	Explain the factors influencing choice of wire ropes.	**03**
	(b)	Explain the use of rope capels. List different types of rope capels.	**04**
	(c)	Explain stepwise construction of coned socket type capel.	**07**
Q.4	**(a)**	Explain the factors influencing gauge size of tracks.	**03**
	(b)	Using neat diagram explain the constructional features of mine cars.	**04**
	(c)	Write a note on safety provisions in mine transportation.	**07**
		OR	
Q.4	**(a)**	List types of locomotives used in mines.	**03**
	(b)	Write a note on maintenance of mine locomotives.	**04**
	(c)	Explain any one type of locomotive in detail.	**07**
Q.5	**(a)**	Classify rope haulage systems.	**03**
	(b)	Discuss the applicability of gravity rope haulage system.	**04**
	(c)	Explain main and tail rope haulage system with its advantages and disadvantages.	**07**
		OR	
Q.5	**(a)**	Write a note on: i. Buffers ii. Stop block	**03**
	(b)	Write a note on safety devices used in rope haulage systems.	**04**
	(c)	Explain direct rope haulage system with its advantages and disadvantages.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2023

Subject Code:3142201 Date:11-01-2024

Subject Name: Mining Machinery - I

Time: 10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Discuss the various applications of aerial ropeway.	**03**
	(b)	Describe the advantages of compressed air over other power sources.	**04**
	(c)	Explain pipeline and distributions of compressed air used mines.	**07**
Q.2	**(a)**	List out different methods of transport system used in underground mine.	**03**
	(b)	Describe the process of capping and rope capels in brief.	**04**
	(c)	Explain the construction of mine tubs and car with neat sketch.	**07**
		OR	
	(c)	Explain the construction and operation of mine locomotives.	**07**
Q.3	**(a)**	Define the following term: Backstay, Back catch and Drop warwick.	**03**
	(b)	Describe the criteria for selection of wire ropes.	**04**
	(c)	Explain endless rope haulage with neat sketch.	**07**
		OR	
Q.3	**(a)**	Explain the working of scraper chain conveyor.	**03**
	(b)	Explain various types of aerial ropeway system.	**04**
	(c)	Explain main & tail rope haulage with neat sketches.	**07**
Q.4	**(a)**	Discuss the important feature of a good haulage track.	**03**
	(b)	List out types of mine locomotives. Explain anyone.	**04**
	(c)	Explain lang's lay and ordinary lay in wire rope.	**07**
		OR	
Q.4	**(a)**	Discuss the advantages of gravity rope haulage.	**03**
	(b)	Describe rope tensioning arrangement in aerial ropeway.	**04**
	(c)	Explain the various types and construction of wire ropes.	**07**
Q.5	**(a)**	Describe rope splicing in detail.	**03**
	(b)	Describe the construction and operation of shuttle car.	**04**
	(c)	Describe haulage track, its laying and maintenance in brief.	**07**
		OR	
Q.5	**(a)**	Explain any one loop take up arrangement for belt conveyor system.	**03**
	(b)	Describe the construction and operation of low-profile dumper.	**04**
	(c)	Explain the construction and installation of aerial ropeway.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(NEW) EXAMINATION – WINTER 2022

Subject Code:3142201 Date:13-12-2022

Subject Name:Mining Machinery - I

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What is space factor of wire rope? How mass and strength of wire ropes is determined?	**03**
	(b)	Explain various types of aerial ropeway system.	**04**
	(c)	What do you mean by rope splicing? Describe the full procedure of splicing a wire rope with neat sketch.	**07**
Q.2	**(a)**	Discuss the important feature of a good haulage track	**03**
	(b)	Describe the advantages of compressed air over other power sources.	**04**
	(c)	What do you understand by Capping of Rope? Write a brief note on coned-socket type capel with neat sketch.	**07**
		OR	
	(c)	A locomotive and train have a total mass of 400 tonnes. The resistance opposing motion can be assumed to be constant and amounts to 70 N/tonne. If the locomotive can exert a constant pull of 90 kN. Find how long it will take to accelerate the train from 4 km/hr to 50 km/hr on level track.	**07**
Q.3	**(a)**	Discuss the various applications of aerial ropeway.	**03**
	(b)	Differentiate between the term stranded and non-stranded rope.	**04**
	(c)	Explain pipe line and distributions of compressed air used in mines.	**07**
		OR	
Q.3	**(a)**	Write short note on Clifton pulley.	**03**
	(b)	A wire rope, flattened stranded with fibre core, has a diameter of 2.56 cm. If the steel has a tensile strength of 160 kg/mm2, find out the total mass of the rope and breaking strength in SI units if the length of the rope is 105 m.	**04**
	(c)	Explain the following terms with neat sketch: (a) Monkey or Back Catch (b) Drop Warwick	**07**
Q.4	**(a)**	Discuss the causes of deterioration of wire ropes.	**03**
	(b)	Sketch the layout of battery charging room used for battery operated electric locomotives in underground mines.	**04**
	(c)	Explain endless rope haulage system with neat sketch.	**07**
		OR	
Q.4	**(a)**	Suggest the suitable type of rope to be used as: Mobile Cranes, Dozers, Dipper shovel ropes, Arial Rope way.	**03**
	(b)	Describe the construction and operation of low profile dumper.	**04**

	(c)	Why rope clips are used in rope haulage system? Explain different types of rope clips with neat sketch.	**07**
Q.5	**(a)**	Discuss the care of wire ropes during storage and usage.	**03**
	(b)	Differentiate between direct rope haulage system and endless rope haulage system.	**04**
	(c)	Write a brief note on trolley wire locomotive.	**07**
		OR	
Q.5	**(a)**	Draw the sketch of mine track layout	**03**
	(b)	What different test should be carried out for wire testing prescribed by IS specifications?	**04**
	(c)	An endless haulage operates on a roadway 600 m long dipping at 1in 12 and draws 650 tonnes of coal a shift (1 shift = 7 hours effective time). An empty tub weighs 500 kgf and its carrying capacity is 1000 kgf of coal. The rope mass 3.5kgf/m, tub friction is 1/50 and rope friction is 1/20. Speed of the rope is 5.5 km/hr. Estimate the power required by the motor. The loads are pulled up the gradient.	**07**

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