Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3142201 Date:07-07-2023

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)**	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)	Explain main & tail rope haulage system with neat sketch.	**07**
		OR	
	(c)	An endless haulage operates on a roadway 550 m long dipping at 1in 12 and draws 550 tonnes of coal a shift (1 shift = 6 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 5.0 km/hr. Estimate the power required by the motor. The loads are pulled up the gradient.	**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)	A locomotive and train have a total mass of 550 tonnes. The resistance opposing motion can be assumed to be constant and amounts to 68 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 45 km/hr on level track.	**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)	Write a brief note on belt conveyor system.	**07**

Q.5	**(a)**	What are the advantages of compressed air over other power sources?	**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**

OR

Q.5	**(a)**	Sketch track layout of direct rope haulage.	**03**
	(b)	A wire rope, flattened stranded with fibre core, has a diameter of 32 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 115 m.	**04**
	(c)	Explain overhead trolley wire locomotive in detail.	**07**

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