GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2024

Subject Code: 3152201   **Date:18-05-2024**

Subject Name: Mine Machinery II

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)**	How the height of the headgear is decided? Also write the purpose of headgear.	03
	(b)	Explain ward Leonard method of speed control in winders with neat sketch.	04
	(c)	What is friction winder? State the advantages and disadvantages of multi-rope friction winder.	07
Q.2	**(a)**	What do you mean by angle of fleet? Explain with neat sketch.	03
	(b)	What are the objectives of pit top & pit bottom layout? Also write the factors affecting pit top & pit bottom layout.	04
	(c)	What is the role of safety detaching hook? Explain king detaching safety hook with neat sketch.	07
		OR	
	(c)	What are the different methods of electrical braking of winders? Describe in detail.	07
Q.3	**(a)**	Draw the sketch of cage attachment to winding rope.	03
	(b)	Explain Lofco system with neat sketch.	04
	(c)	Explain the construction and operation of shearer. Also state its advantages.	07
		OR	
Q.3	**(a)**	What is good about Simba Drill machine using in metal mine?	03
	(b)	Explain Low Profile Dump Trucks (LPDT) with its features. Also write the name of its manufacturers.	04
	(c)	A turbine pump has six impellers, 30 cm diameter running at 1440 r.p.m. angle of blade tip = 90° (Backward blade), efficiency = 60 %, radial velocity of water = 2.4 m/s, area of impeller outlet = 0.0175 m^2 For what rate of delivery of water in m^3/min and total head should the pump be suitable? Also calculate the width of impeller outlet around its periphery.	07
Q.4	**(a)**	How torque is generated in winding? Also write the importance of Torque in winding system?	03
	(b)	What are the advantages of using a coal cutting machine in a mine?	04
	(c)	Describe the components or parts of Reciprocating pump in detail with diagram.	07
		OR	
Q.4	**(a)**	Write the factors affecting the selection of load haul dumper. Also state the advantages and disadvantages.	03
	(b)	Explain loop type and Reversing track type layout for locomotive haulage.	04
	(c)	Explain the working of Reciprocating Pump in detail. Also state its advantages and disadvantages.	07

Q.5 **(a)** How carrying capacity of belt conveyor is calculated? Explain with one example. **03**
(b) Write a brief note on Armoured Face Conveyor (AFC). **04**
(c) Explain the following terms with neat sketch: **07**
         (a) Turntable Circuit   (b) Back Shunt Circuit

OR

Q.5 **(a)** Write a short note on side discharge loader. **03**
(b) What are the factors affecting the design of belt conveyor? Also state its limitations. **04**
(c) Calculate the torques for a tower mounted friction winder with the following data; **07**
     Shaft Depth: 360 m,   Empty skip weight: 3.5 tef,   Loaded skip weight: 6.0 tef
     friction drum diameter: 3.0 m,   Acceleration time: 15 s,   Retardation time: 12 s
     Constant speed time: 25 s,   Rope mass: 3.5 kg/m length,   decking time: 12 s
     Rope speed: 7.50 m/s,   Tower height: 25 m,   Bottom rope loop: 10 m
Moment of inertia of the friction pulley and the motor is 22 te-m^2 and assume static torque due to friction 0.09 times the torque due to loaded skip plus empty skip.

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