

3063912031

SINGH

**339556 (39)**BE (5<sup>th</sup> Semester)

Examination, Nov.-Dec., 2014

Branch : Mining

**MINE MACHINERY - I (NEW)**

Time Allowed : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt any two questions from each unit. Each question carries equal marks.

**Unit-I**

**Q. 1.** Enumerate the different types of wire ropes used in mining for various purposes. What do you understand by strands in wire rope ? Explain its importance. 8

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**Q. 2.** Explain the following : 8

- (a) Testing of wire ropes
- (b) Care and maintenance of wire ropes.

**Q. 3.** Describe with a neat diagram the Reliance Cappel. 8

**Unit-II**

**Q. 1.** Describe the various safety devices used and provided with rope haulage. Give a neat diagram in this regard also. 8

**Q. 2.** 650 tonnes of coal shift will have to be hauled up from an incline 1000 m long. Calculate the size of rope and coal carried per effective pay journey on the basis of the following : 8

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Tare weight of Car – 1.25 tonnes

Capacity of Car – 3 tonnes of coal

Speed – 20 km/hr.

Inclination – 1 in 10.

- Q. 3.** Calculate the chief dimensions of an electric direct rope haulage to haul 350 tonnes in 7 hours effective hauling time up an incline 1000 metres long having a gradient of 1 in 12. Assume each tub of weight 0.25 tonne and to carry 0.5 tonne of coal. Speed of haulage is 225 metres per minute. 8

**Unit-III**

- Q. 1.** Describe the head gear arrangement related to drum winding. 8

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- Q. 2.** List out the sequence of shaft fittings for cage winding. Give a neat sketch also. 8
- Q. 3.** Enumerate in detail about the safety devices used in electric winding system in an underground mine. 8

**Unit-IV**

- Q. 1.** Describe with a neat diagram the construction of various types of drums used in drum winding. What is the role of tail rope? Explain. 8
- Q. 2.** Explain the following: 8
- Multilevel winding and Automatic winding
  - Pit-top and pit bottom arrangements.
- Q. 3.** (a) Find out the static torque at the beginning, middle and at the end of the wind when each cage weighs 10 tonnes, carries 6 tubs taring

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0.5 tonnes and holding 1 tonnes of coal. Take drum diameter to be 2.5 m and the depth of the shaft 1000 metres. The rope weighs 10 tonnes. 4

- (b) Find out the static torque at the beginning at the middle and at the end of the wind when the cylindrical drum is 6 m in diameter, the loaded cage weighs 8 tonnes and the empty cage 4 tonnes. The shaft is 400 metres deep and the rope weighs 10 kg per metre run. 4

### Unit-V

- Q. 1. Explain the construction and working of centrifugal pump. What are its disadvantages as compared to roto pumps? 8

(6)

- Q. 2. Describe with the help of characteristic curves the performance of turbine pump. Enumerate various pump fittings. 8

- Q. 3. A turbine pump has 5 impellers 33.02 cm diameter running at 1440 rpm. The delivery branch is 17.78 cm bore and the suction branch is 20.32 cm bore. For what rate of delivery and head should this pump suitable? 8

Assume suction inlet velocity 1.7 m/s and manometric efficiency to be 0.6.