CBCS Scheme

Fourth Semester B.E. Degree Examination, June/July 2018
Mine Mechanization - I

Time: 3 hrs.   Max. Marks: 80

Note: *Answer FIVE full questions, choosing one full question from each module.*

Module-1

1 a. Define Isothermal Compression. Derive the expression for work done. **(08 Marks)**
   b. With a neat sketch, explain the loss of compressed air. **(08 Marks)**

OR

2 a. With a neat sketch, explain about the working principle and construction of Jack hammer. **(08 Marks)**
   b. What are the factors to be considered for the techno – economic indices of mine transport system? Explain them. **(08 Marks)**

Module-2

3 a. A loaded cage weighing 18 tonnes starts from the bottom of a shaft 750m deep with an acceleration of 1.2m/sec. The rope weighs 12 kg/m and have a breaking strain of 184 tonnes. Calculate the maximum pull in the rope and compare its actual factor of safety with the static factor of safety. **(08 Marks)**
   b. With a neat sketch, explain about the double rope double drum balanced rope haulage. **(08 Marks)**

OR

4 a. With a neat sketch, explain the procedure of Reliance Capel type of Socketing. **(08 Marks)**
   b. The given data below are available in respect of a direct rope haulage installed at the top of an incline : **(08 Marks)**

Length of the incline	- 500m
Gradient	- 1 in 7
Number of loaded tubs / set	- 6
Weight of each loaded tub	- 1.50 ton
Speed of rope	- 9 km/hr
Weight of rope	- 1.54 kg/m
Co-eff. of tub friction	- 1/50
Co-eff. of rope friction	- 1/10

Calculate the minimum size of the electric motor in KW required to work the haulage assuming a gear efficiency of 70% and motor efficiency of 90%. What type of motor would you use?

Module-3

5 a. With a neat sketch, explain about Cable – belt conveyor. **(08 Marks)**
   b. With a neat sketch, explain about trolley – wire locomotive. **(08 Marks)**

OR

6   a.   A diesel locomotive weighing 10 tonnes hauls a train of 80 tonnes out lye on a down gradient of 1 in 200 at a speed of 12km/hour. Find   i)   gross braking effort of the locomotive   ii)   the effective retarding force   iii)   the rate of retardation   iv)   the time taken to stop the train by applying the brakes and   v)   the stopping distance. Assume a co-efficient of static friction of 0.16 and a running resistance of 8 kg/tone.   **(08 Marks)**

    b.   A 900mm trunk belt is to be installed in a roadway 2000m long rising 1 in 100. Calculate the power of the motor to run the loaded belt when it is rated to carry 280 tonnes of coal an hour at a speed of 125 meters per minute. Assume F to be 0.02 and G to be 70 kgs. The belt takes 50 sec to pick up the velocity.   **(08 Marks)**

Module-4

7   a.   With a neat sketch, explain the multi – rope winder.   **(08 Marks)**

    b.   With a neat sketch, explain about skip.   **(08 Marks)**

OR

8   a.   What are the advantages and disadvantages of Koepe winders?   **(08 Marks)**

    b.   i)   Find the net static torque at the start and at the end of the wind in the following winding installation :   Weight of cage 10 tonnes complete

       Tare of 6 tubs in each cage 0.5 tonnes / tub.

       Each tub holds 1 ton of coal.

       Depth of the shaft 800m.

       Rope weighs 8 tonnes.   Diameter of drum 2.5m and 1.5m.

      ii)   What should be the ratio of the diameter for the complete balancing at the start, end (or) the whole period of the wind?   **(08 Marks)**

Module-5

9   a.   Write a detailed note on regenerative electrical braking system.   **(08 Marks)**

    b.   With a neat sketch, explain the pit – top with shunt back system.   **(08 Marks)**

OR

10   a.   What are the safety devices for winding?   **(08 Marks)**

    b.   Explain about the track laying and maintenance.   **(08 Marks)**

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