

CBCS SCHEME

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15MN44

Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Mine Mechanization – I

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Derive the expression for work done by a gas in case of adiabatic compression. (08 Marks)
b. Explain the utilization of compressed air in Jack Hammer with neat sketch. (08 Marks)

OR

- 2 a. A gas at STP is isothermally compressed to half of its initial volume. If the initial volume occupied by gas is 2m^3 . Then determine the workdone by gas. (08 Marks)
b. Explain the utilization of compressed air in air turbines with neat sketch. (08 Marks)

Module-2

- 3 a. Explain the splicing of wire rope. (08 Marks)
b. Classify the aerial ropeways on the basis of construction. Write the application, advantages and disadvantages of aerial ropeways. (08 Marks)

OR

- 4 a. Calculate the power required by motor in a direct rope Haulage system containing 10 mine cars having empty weight of 500kg and capacity of 1500kg, round strand wire rope with fibre core is used for haulage purpose, length of the haulage is 1500m,
Given: Diameter of wire rope = 2.2cm
Coefficient of friction of mine car = 1/50
Coefficient of friction of wire rope = 1/20
Gradient of haulage road = 1/10
Velocity of mine cars = 1-5 m/s
Efficiency of motor = 60%. (12 Marks)
b. What are the factors to be considered for the selection of a wire rope? (04 Marks)

Module-3

- 5 a. Explain the arrangement of Belt conveyor with neat sketch. (06 Marks)
b. A conveyor belt of length 1200m having capacity of 50 ton/hours runs with a velocity of 20km/hour. Calculate the power required by motor if the gradient of roadway is 1/10 and coefficient of friction of belt conveyor is 1/40. (10 Marks)

OR

- 6 a. A locomotive of 100 Tonne is connected to set of trains having total weight of 330 tonnes. The locomotive is running up a velocity of 40 km/h and has acceleration of 0.2 m/s^2 . Let the resistance force be 80N per tones of mass. Calculate the power required by locomotive if the slope of road is 1/80. (10 Marks)
b. Explain over head wire locomotive with its merits and demerits. (06 Marks)

Module-4

- 7 a. Explain Koepe Winder with its merits and demerits. (08 Marks)
 b. Explain Drum winding system. (08 Marks)

OR

- 8 A winding drum without Tail rope hoist 2 mine cars up a vertical shaft, 1000m deep. As loaded mine cars comes up, 2 empty cars goes down.

Given:

Weight of cage and suspension gear	= 5 ton
Weight of empty mine car	= 500 kg
Capacity of mine car	= 2000 kg
Weight of rope per unit length	= 6 kg /m
Diameter of winding drum	= 4.4 m
Time for acceleration	= 10 sec
Time for de-acceleration	= 10 sec
Time for constant speed	= 30 sec
Decking period	= 10 sec
Coefficient of friction	= 1/20

Calculate the torques at different stages of winding.

(16 Marks)

Module-5

- 9 a. Describe the mechanism of mechanical breaks on winders. (08 Marks)
 b. What are the various safety devices used on winders. (08 Marks)

OR

- 10 a. Explain the traverse circuit of tracks, with neat sketch. (08 Marks)
 b. Make a sketch showing the pit bottom and pit top arrangement for skip. (08 Marks)
