



10MN44

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Mining Machinery - I

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 Explain the relative merits and field of application of power generation by electricity and Compressed air. (20 Marks)
- 2 a. Explain the Transmission and distribution of compressed air in mines. (10 Marks)
b. Explain the working principles of Jack Hammer. (10 Marks)
- 3 a. Explain the Techno Economic indices of mine transport system. (08 Marks)
b. Explain the application, merits and demerits of different Haulage system. (12 Marks)
- 4 a. A fully locked coil rope is used for winding. A loaded cage weighing 9 tonnes starts from the bottom of a shaft 450 mts deep with an acceleration of 1.5 mts/sec^2 . The rope weighs 12 kg/mts and has a breaking strength of 135 tonnes and ultimate tensile strength 8 tonnes/cm^2 . Calculate the static factor of safety, Actual factor of safety and the Dia of the rope. (10 Marks)
b. A fully locked coil rope is used for winding purpose for a depth of 850 mts, being an engineer when do you consider the rope to be removed from service and state the steps that should be taken for a safe storage and protection of new rope. (10 Marks)

PART - B

- 5 a. Draw a neat sketch and explain a Battery charging layout of an Electric battery locomotive. (06 Marks)
b. A battery locomotive weighs 4 tonnes and pulls a train of 12 mine cars up an incline of 1 in 55. If the train is accelerated from rest up the incline to speed of 23 km/hr in 22 secs. Find the weight of each mine car if the locomotive is 260 horse powers. Assume rolling friction is $1/60$. (14 Marks)
- 6 a. Explain belt conveyor, with a neat sketch and mention the factors affecting the capacity of a belt conveyor. (10 Marks)
b. Mention the types of conveyors used neat the coal faces. Explain any one with neat sketch. (10 Marks)
- 7 a. Draw a neat sketch of a king's detaching safety hook, showing its different parts and its position if an over - winding occurs. (10 Marks)
b. Name the four different shapes of drums used in Indian mines for winding systems and explain any two with neat sketches. (10 Marks)
- 8 a. Find out the static torque at the beginning, Niddle and at the end of the wind when each cage weighs 10 tonnes, carries 6 tubs taring 0.6 tonnes and holding 1 tonne of coal. Take drum diameter to be 2.5m and the depth of the shaft 1000m. The rope weighs 9 tonnes. (10 Marks)
b. Draw the neat sketches of single drum and double drum systems of hoisting. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8 = 50$, will be treated as malpractice.