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Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
Mine Electrical Engineering

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain any ten Indian Electricity Rules applicable to Mining. (10 Marks)
b. What is an Electric Drive? Explain with a neat block diagram. (10 Marks)

OR

- 2 a. Explain the Roles and Responsibilities of an Electrical Engineer in Mining. (08 Marks)
b. Explain:
(i) Slip ring induction motor drive
(ii) Ward Leonard DC motor drive
(iii) Converter fed DC motor drive employed for control of Mine Winders. (12 Marks)

Module-2

- 3 a. Explain the construction and working principle of DC Motors with neat sketch. (10 Marks)
b. A 250 V dc shunt motor has armature resistance of 0.25 Ω . On load it takes an armature current of 50 A and runs at 750 rpm. If the flux of the motor is reduced by 10% without changing the load torque, find the new speed of the motor. (10 Marks)

OR

- 4 a. Explain Armature Resistance Control, Voltage Control and Field Control of speed control of a DC shunt motor. (10 Marks)
b. Explain open circuit characteristics, internal characteristics and external characteristics of a DC shunt generator. (10 Marks)

Module-3

- 5 a. With a neat diagram, explain the construction and working principle of a 3 phase induction motor. (10 Marks)
b. Write the methods employed for speed control of induction motors and explain any two methods. (10 Marks)

OR

- 6 a. Explain plugging of an induction motor. (05 Marks)
b. With a neat diagram, explain the construction of an alternator. (10 Marks)
c. Derive the emf equation of an alternator. (05 Marks)

Module-4

- 7 a. With a neat diagram, explain the working principle of bulk oil circuit breaker. (10 Marks)
b. Explain Flame proof and intrinsically safe apparatus. (06 Marks)
c. Draw the single line diagram of underground power distribution in Mines. (04 Marks)

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.

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OR

- 8 a. List and explain the different types of Motor-Enclosures in mines. (10 Marks)
b. Write a note on cables used in mines for power distribution. (10 Marks)

Module-5

- 9 a. Explain standards for mine lighting at different places in a mine. (10 Marks)
b. Explain LED Lighting giving its advantages. (10 Marks)

OR

- 10 a. Briefly explain the different lighting sources. (10 Marks)
b. Define the following terms related to illumination:
(i) Steradian
(ii) Candle power
(iii) Luminous intensity
(iv) Reflectance
(v) Glare (10 Marks)

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