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**Fifth Semester B.E. Degree Examination, July/August 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 that is applicable to underground mining. (10 Marks)  
b. Draw a neat block diagram of an electric drive and explain its parts. (10 Marks)

OR

- 2 a. Mentioning the qualification requirements of Electrical and Assistant Electrical Inspectors, describe the scope and importance of Electrical Engineer in mines. (10 Marks)  
b. What are the factors to be considered for choosing an electric drive? (06 Marks)  
c. Discuss the status of AC and DC drives. (04 Marks)

**Module-2**

- 3 a. Classify and explain the types of DC motors and give its applications. (10 Marks)  
b. Explain the methods of speed control of a DC shunt motor. (10 Marks)

OR

- 4 a. Briefly explain dynamic, plugging and regenerative braking of DC shunt motor. (10 Marks)  
b. Derive the EMF equation for a DC generator. (10 Marks)

**Module-3**

- 5 a. Draw neat sketches and explain the construction and working principle of a 3 phase Induction Motor. (10 Marks)  
b. Explain the working principle of a synchronous motor with supporting sketches. (06 Marks)  
c. Explain plugging of an induction motor. (04 Marks)

OR

- 6 a. With a neat diagram, explain the working principle of an alternator. (10 Marks)  
b. Explain the methods of speed control of an induction motor. (10 Marks)

**Module-4**

- 7 a. With a neat sketch, explain the working of an Air blast circuit breaker. (10 Marks)  
b. Explain the method of signalling in underground mines. (06 Marks)  
c. Differentiate and explain Flame proof apparatus and Intrinsically safe apparatus. (04 Marks)

OR

- 8 a. Draw the single line diagram of power distribution in surface or underground mine and explain in brief. (10 Marks)  
b. List and explain the various types of motor enclosures used in mines. (10 Marks)

**Module-5**

- 9 a. Explain the following terms related to illumination:  
i) Luminous flux,  $\phi$  ii) Reflectance iii) MHCP  
iv) lumen v) Steradian (10 Marks)  
b. Give the standards for mine lighting at various places in mines. (10 Marks)

OR

- 10 a. Briefly explain the laws of Illumination. (06 Marks)  
b. Write a short note on LED lighting explaining its advantages. (07 Marks)  
c. What do you understand by Glare? What are the measures to avoid Glare? (07 Marks)

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