V-B.Tech.(PE & MLE)   Session: 2006-07   Semester: Monsoon
Applied Electrical Engineering   Max Marks: 100   Time: 3 Hours

GROUP – A (Attempt any two questions)

1. a. With the help of necessary diagrams discuss the various starting methods of a three-phase induction motor   [10]
   b. With the help of necessary diagrams briefly explain the V/f method of speed control for a three-phase induction motor.   [10]

2. a. What is a DC chopper circuit? With the help of necessary diagrams explain a DC chopper for motoring operation of a separately excited DC motor.   [2+8]
   b. Describe the operating principle of a CBT based earth fault relay.   [10]

3. a. Discuss the various types of tariff for consumption of the electrical power.   [10]
   b. With the help of neat diagrams describe the basic principle of operation of an air circuit breaker. Mention the important features of it.   [6+4]

GROUP – B (Attempt all the questions)

4. a. Draw the characteristic curves of an induction type over current relay for different values of time multiplier setting. Define the PSM for such a relay.   [2+2]
   b. An induction type over current relay of current rating 5A and current setting of 100%, is connected to the secondary of a CT of ratio 300:5. The CT is connected to a line of a three-phase supply. Calculate the minimum line current for which the relay will operate.   [6]

5. A 5kW, 220V, 1000rpm separately excited DC motor is fed from a 240V AC source through a single-phase full-control converter. At no-load and zero firing angle the motor draws 2A and runs at 1100rpm. The armature resistance of the rotor is 0.5Ω and voltage drop in the conducting SCRs is 2V. For a firing angle of 135° and rated armature current of 25A, compute the torque and the speed of the motor.   [10]

6. The input power to a three-phase induction motor is 60kW. The stator losses are 1kW. Find the total mechanical power developed and the rotor copper losses per phase, if the motor is running with a slip of 3%.   [5]

7. A 230V, 960rpm, 200A separately excited DC motor has an armature resistance of 0.02Ω. The motor is fed from a DC source of 230V through a chopper circuit. Calculate the duty ratio of the chopper for motoring operation at the rated torque and 350rpm.   [5]

8. An 800kW, 1.5kV, 3-phase, 50Hz induction motor runs at 0.74 power factor lagging. Determine the capacitance value and the kVA rating of an ideal static condenser bank employed in delta configuration to improve the overall power factor to the highest value.   [10]

9. What are the advantages in using a cable for electrical power transfer? What are the technical considerations that are to be fulfilled by the various components of it?   [3+7]

10. Write short notes on the followings:
    (a) Vacuum circuit breaker, and (b) V-I characteristics of an SCR.   [5+5]

ESTER:MONSOON
MINATION & SEMESTER: VTII B.TECH MINERAL ENGG. END SEMESTER
ECT: MATERIAL HANDLING SYSTEM

SESSION: 2006-07
MAX. MARKS: 100
TIME: 3 HRS

ctions: I. ANSWER ANY TWO QUESTIONS FROM **GROUP A** AND ALL
            QUESTIONS FROM **GROUP B**
          II. ANSWERS TO BE SUPPLEMENTED WITH NECESSARY
            SKETCHES, WHEREEVER REQUIRED.

Group-A *(Answer any Two)*

	Marks
Discuss the main considerations for selecting a crusher for crushing Raw-Coal.	10
Discuss about the different types of materials used in mineral processing industry for manufacturing of equipment components with special emphasis to a crushing plant.	10
(a)Name the different types of crushers used for crushing coal.	4
Discuss about the merits and demerits of Gyratory crusher with respect to Primary crusher.	6
What are the advantages of using Roll-crusher as secondary or tertiary crusher ?	6
Why crushing is done in stages ?	4
Define a feeder. Discuss about the design requirements for a mechanical feeder.	5
With respect to specific use, name the various types of feeders used in coal handling plant.	5
Why the use of apron-feeder is preferred for coal handling system ?	5
Give some of the uses of belt feeder in a material handling plant.	5

Group-B *(Answer all)*

What are the advantages of storage systems in a mineral processing plant ?	4
Discuss about the various factors to be considered while designing bunkers for coal storage.	5
With respect to the specific use, name the types of bunkers installed in coal handling plants.	3

5. (a) Draw a neat labeled sketch of a Gyratory crusher, showing the different parts. Also mention the factors on which the crushing capacity depends.

   (b) What are the cares to be taken in the operation of crushers ?

   (c) What should be the maximum size as input to primary crusher and what is the expected output size from the same ?

6. Explain the following: $3 \times 4 =$

   (a) Screening Efficiency   (b) Lagging of Pulleys for Belt-Conveyers

   (c) Pulley face width   (d) Properties of Belt materials

7. (a) What are the problems faced during the operation of a Belt conveyer system ? Suggest the remedial measures to be taken to overcome them.

   (b) Mention the factors to be considered for the selection of a centrifugal discharge bucket elevator.

   (c) Define 'Slime-Loss' that occurs in Iron Ore washing process.

8. (a) Mention the uses of impact crushers.

   (b) Discuss the functions of Stacker and Reclaimer in material handling system.

   (c) Mention the problems faced during the operation of a screen.

Time: 3 Hours   Max. Marks: 100

Instructions, if any:
1. Answer Sections A & B.
2. Use separate answer book for each section.
3. Assume necessary data wherever required.

Section – A : Mining Methods

Answer All questions

1. Explain the method of extracting a 3 m thick coal seam, dipping at 1 in 12 and occurring at a depth of 400 m. Give layout of the face and explain, with the help of neat sketches, the full-face system of cutting by DERDS.   20

2. Explain the terms 'level' and 'level interval' with context to underground metalliferous mining. Discuss the factors that influence the choice of level interval. What are the merits and demerits of 'stull stoping' method.   20

OR

Draw a neat layout of an opencast mine showing the deployment of dragline for extraction of 30 m thick overburden over a 10 m thick coal seam. State the typical production capacity achieved (tonnes/hour) by a dragline of 24 m³ bucket capacity and boom of length, 95 m.   20

3. Explain the advantages of emulsion explosives over conventional explosives.

   Design a charging and blasting pattern for a 10 m bench in a sandstone formation and compute the powder factor & specific drilling.   10

4. Write short notes on the following: 5x2=10
   a) NONEL
   b) Box cut

Section – B : Surveying
Answer All questions

5(a). Discuss in brief, the principles of surveying   10

(b). Following bearings were taken in running a compass traverse

Line	F. B.	B. B.
AB	124°30'	~~394°30'~~ 304°30'
BC	68°15'	246°00'
CD	310°30'	135°15'
DA	200°15'	17°45'

At what station do you suspect local attraction? Find the correct bearing of the lines and also compute the included angle at B.   10

6. Following consecutive readings were taken with a dumpy level:

0.534, 0.300, 0.935, 3.150, 4.250, 2.740, 3.090, 3.510, 4.180.

The level was shifted after 4th, 6th and 9th readings. The reduced level at first point was 100 m. Indicate the highest and lowest points with their R. L. Apply the usual arithmetic checks.   10

OR

Explain the temporary adjustments of a theodolite having three foot-screws.   10

7. Write short notes on the following: 5 x 2 = 10

    a) Magnetic Declination

    b) Tilting Level