

B.E. Mining Engineering Sixth Semester
MN605 - Surface Mining

P. Pages : 2

Time : Three Hours



GUG/W/18/1721

Max. Marks : 80

- Notes :
1. Due credit will be given to neatness and adequate dimensions.
 2. Assume suitable data wherever necessary.
 3. Illustrate your answers wherever necessary with the help of neat sketches.
 4. Weightage to the question indicated to its right.

1. a) Define and Explain the below mentioned terms - **3x3**
=9
- Bench and overall slope angle and the factors governing the choice of slope angles in each case.
 - Overall and instantaneous stripping ratio with reference to the open-pit mining method.
 - Loose Cubic Meters (LCM) and Bank Cubic Meters (BCM) with reference to over burden handling.

- b) Briefly discuss various design parameters of haul road construction in case open-pit mines. **7**

OR

2. a) Sketch and define below given operational parameters of a open-pit. **1x6**
=6
- Bench Height
 - Bench Width
 - Crest and toe
 - Bench face / slope angle
 - Overall pit slope angle
 - Berms

- b) "Bench slope angles are a steep than overall pit slope". Justify the statement giving supporting statistics. **4**

- c) Discuss the concept of stripping ratio and explain how does haul road gradient, bench and overall pit slope angle affects it. **6**

3. a) In surface mining, two excavation systems namely cyclic and continuous are defined. Why are the two systems differentiated ? Illustrate the components of each system in terms of ground preparation excavation, transport and dumping. **6**

- b) A 22 m thick cement grade limestone orebody having average dip of 25° occurs at a depth of 9 m. Design a open pit operation for a annual capacity of 3.3 million tonnes of cement grade limestone. Estimate configuration and fleet size of HEMM, manpower required to achieve the target. **10**

OR

4. a) The following information is provided for an Iron ore Mine **4**
- Number of waste blocks - 10
Number of ore blocks - 5
Volume of each waste block - 600 m³
Total cost of waste handling - Rs 100/m³
Tonnage of each ore block - 400T
Cost of Mining - Rs 150/T
Sale Price - Rs 500/T
Calculate the average economic stripping ratio.

- b) Discuss at length various transport systems (continuous and cyclic) in respect of suitability conditions, components, combination of the two and the degree to which they may be successfully applied and used in each type of surface mining method. **3x4 =12**

5. A coastal sand deposit with no overburden and marginal vegetation, extending for more than 100 kms contains high quality zircon and ilmenite. The resources are estimated at 27.90 MT spread over an area of 445.70 sq.km select suitable method of extraction to produce ROM @ 7000 TPH giving details of equipment, layout, manpower and productivity. **16**

OR

6. With reference to Dimensional stone, enumerate the following in detail w.r.to India. **16**
- Stone Resources
 - Applications and uses
 - Consumption, export etc
 - Mining technology
 - Diamond wire saw technique with merits and demerits
 - Problems and prospects
 - Case study

7. a) Enlist and explain in brief, various objectives of methods of working a developed coal seam. Sketch and explain with cross sectional view, method of tight blasting and leaving a cushion of blasted over burden material for extracting a developed coal seam. **2+8 =10**
- b) Enumerate various reasons leading to necessity of ventilation of deep seated open pits. State and discuss in brief serious ventilation issues concerned with deep open cast mining. **3+3 =6**

OR

8. a) Explain at length necessity of application of surface miner technology in India in present day context. **4**
- b) With the help of schematics, explain in brief continuous surface mining method employing mobile in-pit crushing and conveying system giving details like suitability conditions, equipment used for crushing, ore and waste transport, economics of the operation, merits and demerits. **12**
9. With the help of neat sketches, discuss in brief below mentioned methods of dumping waste materials. **4x4 =16**
- End dumping
 - Push dumping
 - Free or plug dumping
 - Dragline / Direct spoiling

OR

10. A open cast coal mine involves 480 Ha of land and handles 350 million cum of over burden throughout the life of the mine. The average stripping ratio is 3.40 cum/t and total depth of the quarry to the point of closure will be 166 m. The mine is being worked out by Shovel-Dumper-Dragline equipment system. **16**
- Discuss in brief the reclamation scheme covering internal and external dumps with due attention to technical and biological aspects. The objective of reclamation is to restore the given land to its original use i.e. forest.
