10MN71

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Mine Planning & Design

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. What are the environmental impacts due to mining activities? Justify your answer with a case study.
    (10 Marks)
   b. With examples, mention any five factors influencing mining activities.
    (10 Marks)

2 a. With neat sketch, explain any one embankment design suitable for seepage control.
    (10 Marks)
   b. Discuss briefly about "THE COAL BEARING AREAS (Acquisition and Development) ACT – 1957" which as to be considered during land acquisition for coal mining.   **(10 Marks)**

3 a. It is proposed to open a new underground coal mine. Give the details of various aspects to be incorporated in such detailed project reports.
    (14 Marks)
   b. Give the basis of division of coal fields into mining area.
    (06 Marks)

4 a. With a neat sketch, explain pit top layout with back shunts for underground coal mines.
    (10 Marks)
   b. What is the role of computer in mining engineering? Name four mine planning software widely used in the mining industries across the world.
    (10 Marks)

PART – B

5 a. Find the dimensions of the mining property, S and H, if annual production is 5,00,000 tons/years, term of life of the mine is 50 years, co-efficient of recovery is 0.9, thickness of seam 1, seam 2 and seam 3 are 1.0, 0.8 and 0.6 respectively, the weight of cubic meter of the solid coal is 1.2 t/m^3 and the gradient of the seams is 12.
    (06 Marks)
   b. At the planning stage it has been decided to carry out level division of a local mine to be worked by underground method. Given the following data, find the inclined length of the level and the number of levels into which the mining property is to be divided.

(i)	Projected daily output	2500 tonnes
(ii)	Seam thickness.	2.5 m
(iii)	Insitu density of coal.	1400 kg/m^3
(iv)	Web width.	60 cm
(v)	Recovery.	85%
(vi)	Dimension of shaft field along the strike.	2000 m
(vii)	Number of wings to be worked simultaneously	Two
(viii)	Number of working cycles in coal face per day.	Five
(ix)	Angle of inclination of the seam.	15º
(x)	Number of working days per year.	350
(xi)	Cycle co-efficient.	0.9
(xii)	Reserve co-efficient	0.8

Assume any other data required. Explain any relationship – formula used. Draw explanatory sketches wherever required.
    (14 Marks)

6   Discuss on the following:
- a. Vertical shafts Vs Surface drift/inclines. **(10 Marks)**
- b. Various locations of vertical shafts to open up a coal seam. **(10 Marks)**

7   a. Define mine closure. Describe the effects of unplanned mine closure. **(12 Marks)**
- b. An underground panel in a coal mine is being developed on bord and pillar system. The pillar size is 30 m centre to centre of the adjacent galleries are 4 m wide. Calculate the percentage of extraction during development. **(04 Marks)**
- c. A double ended ranging drum shearer is employed in a long wall mine of face length 140 m. The extraction height is 3.5 m and depth of the web cut is 0.7 m. The cycle time for unidirectional cutting is 40 min. Considering bulk density of coal to be 1.3 t/m^3, determine monthly production from the face in ton. If effective working hour is 5 hours per shift and 25 working days per month (Assume 2 production shifts per day). **(04 Marks)**

8   Write a short note on any two:
- a. Coal Bed Methane.
- b. Marine mining.
- c. Coal gasification. **(20 Marks)**

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