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## Seventh Semester B.E. Degree Examination, Feb./Mar. 2022 Underground Mine Planning and Design

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Explain the environmental consequences of mining on air, water, land and list the cause and preventive measures. (10 Marks)
- b. Explain the general principles of mine development and the process of Land Acquisition. (10 Marks)

OR

- 2 a. Explain the Government role of mining development. (10 Marks)
- b. Write a short note on Plant Silting and its construction and impoundments and Dams. (10 Marks)

### Module-2

- 3 a. Explain the principles of mine planning and stages planning new mines. (10 Marks)
- b. Explain the geological aspects of mine planning. (10 Marks)

OR

- 4 a. Explain the various applications of computers in mine planning. (10 Marks)
- b. With a neat sketch, explain the surface layout of a large colliery. (10 Marks)

### Module-3

- 5 a. Determine the planned output from the faces and the number of productive faces in the mining property and make arrangement of the faces within the mining area, given the following data :

Thickness of the seam :  $M_1 = 0.9m$ ,  $M_2 = 1.2m$ ,  $M_3 = 1.5m$ , Weight of / cubic meter of load insitu :  $Y_1 = 1.3t/m^3$ ,  $Y_2 = 1.35 t/m^3$ ,  $Y_3 = 1.4 t/m^3$ .

Annual planned output of mine

$$A_y = 1,200,000 \text{ tons/year}$$

Daily planned output of mine

$$A_d = 4000 \text{ tons}$$

Coal recovery coefficient, equal for all seams

$$c = 0.95$$

Length of the productive face, equal for all seams

$$L_w = 150m$$

Width of web (equal for all seam)

$$r = 1.0m$$

Number of cycles in face per day (equal for all seams)

$$i = 2$$

Cyclic coefficient (equal for all seams)

$$K_c = 0.8$$

Coefficient accounting for the percentage of coal output from productive faces (equal for all seams)

$$K_p = 0.95$$

Gradient of seams (equal for all seams)

$$\alpha = 10^\circ$$

(10 Marks)

- b. Explain the following terms: Mining area, Term of life and mine capacity.

(10 Marks)

OR

- 6 a. Calculate the cross sectional area for a circular shaft equipped with cages, given the following initial data :  
 $A_y = 450,000$  tons/year Annual capacity of the mine  
 $A_w = 35000$  tons of waste per annum  
 $H_s = 300\text{m}$  – Depth of the shaft  
 Only one hoisting installation with two self dumping cages is to be installed in the shaft. Besides, Manway and Pipeway are to be constructed in the shaft the shaft is to be lined with monolithic concrete and grides and buntons are made of steel. (12 Marks)
- b. Find the inclined length of the level and a number of level in a mining area, given the following  $A_d = 1000$  tons ;  $m = 1.6\text{m}$ ,  $\gamma = 1.3 \text{ t/m}^3$ ,  $r = 1.6\text{m}$ ,  $C = 0.85$ ,  $H = 1400\text{m}$ ,  $n_w = 2$ ,  $i = 1$ ,  $\alpha = 15^\circ$ ,  $N = 300$ ,  $K_c = 0.9$ ,  $b = 0.8$ . (08 Marks)

Module-4

- 7 a. Explain the selection criteria for stopping methods. (10 Marks)  
 b. Explain cut of grade and list the application of computers in stop design. (10 Marks)

OR

- 8 a. Explain the optimization of mine size (mine production capacity) based on techno – economic considerations. (10 Marks)  
 b. Explain the methods of improving production by time and work study. (10 Marks)

Module-5

- 9 a. Explain Mine Closure Plan and factors to be considered for mine closure. (10 Marks)  
 b. Explain rehabilitation process. (10 Marks)

OR

- 10 a. Explain Novel and innovative mining method. (14 Marks)  
 b. Explain the factors to be considered for mine closure. (06 Marks)

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