

# CBCS SCHEME

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15MN71

## Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019 Underground Mine Planning and Design

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. As a planning engineer, describe on what factors you would select the optimum plant site locations for construction. (08 Marks)
- b. What do you mean by Stockholm conference 1972? Where it was organized? What are the main agenda and outcome of this conference? (08 Marks)

OR

- 2 a. Name the types of spillways and explain any one with neat sketch. (08 Marks)
- b. Discuss briefly about "THE COAL BEARING AREAS (Acquisition & Development) ACT – 1957" which as to be considered during land acquisition for coal mining. (08 Marks)

### Module-2

- 3 a. What is a Prefeasibility study? When and why do companies undertake that study? What information does it include? What action would you as a member of the study, initiate in case of positive or negative outcomes of prefeasibility study? (08 Marks)
- b. Draw a neat sketch of pit top layout with back shunts for underground coal mines and indicate its salient features. (08 Marks)

OR

- 4 a. Mention the factors affecting the division of coal field into mining areas and areas into colliery unit. (06 Marks)
- b. Draw a neat sketch of pit bottom layout for skip winding for underground coal mines and indicate its salient features. (10 Marks)

### Module-3

- 5 The following are the data of a new underground coal mine :  
Thickness of the Seam A = 1.0m , Seam B = 1.2m and Seam C = 1.4m ; Weight of 1m<sup>3</sup> coal (in -situ) seams (equal for all seams) = 1.35t/m<sup>3</sup> , Annual planned output of the mine = 11,00,000 t/year ; Daily planned output of mine = 4000 tons ; Coefficient of recovery (equal for all seams) = 0.95 ; length of the productive face , equal for all seams = 120m ; width of web , equal for all seams = 1.3m ; number of cycles in the face per day (equal for all seams) = 2 ; Cyclic coefficient (equal for all seams) = 0.8 ; Coefficient accounting for the percentage of coal output from productive faces (equal for all seams) = 0.95 and gradient of the seam = 10°. Determine
  - a. The planned output from the faces. (06 Marks)
  - b. The number of the productive faces in the mining property. (06 Marks)
  - c. Make arrangement of the faces within the mining area. (04 Marks)

OR

- 6 a. Determine the inclined length of the level and number of levels can be developed in a mining area for the given conditions :
- i) daily coal output of the mine is 1500 tons   ii) annual rate of face advance 400m  
 iii) life of the mine is 35 years   iv) the gradient of the seam is  $15^{\circ}$    v) weight of 1 cubic meter of the coal seam is  $1.3\text{t/m}^3$    vi) thickness of the seam is 1.5m   vii) co-efficient of recovery of the coal is 0.88. (08 Marks)
- b. Calculate the percentage of extraction of coal during extraction from a long wall retreating panel having 150m face length (edge to edge) , 1500m panel length (actual extraction length from edge to edge) , 4.8m wide main gate, 4.2m tail gate, barrier pillar of 36m (edge to edge) on all sides, thickness of the seam 4.5m , 3.6m height of extraction, width of the face initially 8.0m and existing at a depth of 200m from the surface. Assume missing data if any. (04 Marks)
- c. A double ended ranging drum shearer is employed in a long wall mine of face length 140m. The extraction height is 3.5m and depth of the web cut is 0.7m. The cycle time for unidirectional cutting is 40min. Considering bulk density of coal to be  $1.3\text{ t/m}^3$ , 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)

**Module-4**

- 7 a. What are the Social impacts due to unplanned mine closure? Justify your answer with a case study. (10 Marks)
- b. Mention the factors to be considered for effective mine closure. (06 Marks)

**OR**

- 8 Write a short note on any two of the following :
- a. Hydraulic Mining.  
 b. Coal Bed Methane.  
 c. Coal gasification. (16 Marks)

**Module-5**

- 9 a. Define the following : i) Cut off grade   ii) break even grade   iii) balancing cut-off grade. (06 Marks)
- b. Describe the selection criteria for Stopping methods in underground metal mines. (10 Marks)

**OR**

- 10 a. Draw a suitable flow diagram for computer assisted stope design and economic analysis of the stope design. (10 Marks)
- b. What is Work study? What are the advantages of work study in improving production? (06 Marks)

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