

# CBCS Scheme

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15MN54

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

## Underground Coal Mining

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Define the following: i) Incubation period ii) Goaf iii) spontaneous heating of coal vi) face vii) barrier. (05 Marks)
- b. Determine the dimensions of the mining property along strike and along Dip for the following conditions: year production – 1500000 tons/yrs, term of life of mine – 45 yrs, recovery – 0.9. Thickness of the seams 0.9m, 0.6m and 0.7m, weight of cubic meter of the coal is 1.4 ton/m<sup>3</sup> and gradient of the seam is 15°. (05 Marks)
- c. The following Fig Q1(c) shown the position of the coal deposit, as a manager of mine planning department, which method do you prefer to access the coal deposit, give reason. Explain the method in detail along with its merits and demerits. (06 Marks)

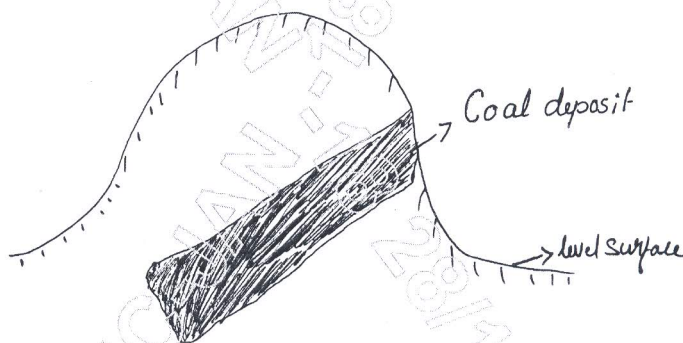


Fig Q1(c)

OR

- 2 a. Discuss how depth and thickness of the seam influences the choice of coal mining method. (05 Marks)
- b. What are the different degrees of gassiness of Indian coal mine? How gas content of a coal seam influences the choice of mining method? (05 Marks)
- c. What are the advantages of long wall method over bord and pillar method of mining? (06 Marks)

### Module-2

- 3 a. Illustrate tributary area loading for pillar in bord and pillar panel. Determine the tributary area for each pillar in Sq. meters if the size of square pillars in a bord and pillar panel are 32m (centre to centre) and the galleries are of width 4.2m (05 Marks)
- b. Mention the factors to be considered to determine the size of pillar in bord and pillar method of mining. (05 Marks)
- c. Mention the standard pillar sizes to be considered with respect to seam depth and gallery width as per CMR 1957 Reg – 99, in Bord and Pillar method. (06 Marks)

OR

- 4 a. Explain the sequence of extraction pillar for correct declination of fracture of roof strata. (06 Marks)
- b. The 4m thick coal seam dipping 1 in 7 and occurring at a depth of 240m is proposed to be developed by B and P pattern. The mine is expected to produce 500 tons per day per panel. Draw a neat layout of panel showing number of heading, number of faces air stopping, intake and return airway. List out the equipments you would deploy and workers in the panel. Give the quantity of air to be supplied to each panel. Assume any other relevant conditions. Final determine OMS. (10 Marks)

Module-3

- 5 a. Explain the elements of long wall panel with a neat sketch. (04 Marks)
- b. With neat sketches, explain the characteristics of types of immediate roof which are encountered in long wall panels during extraction. (12 Marks)

OR

- 6 a. Draw neat layouts on conventional and modern long wall faces. (12 Marks)
- b. A double ended ranging drum shearer is employed in a longwall mine of face length 150m. The mining height is 3.5m and depth of the web cut is 0.76m. The cycle time for unidirectional cutting is 40min. considering bulk density of coal to be  $1.4 \text{ t/m}^3$ , determine hourly production from the face in ton? (04 Marks)

Module-4

- 7 a. Explain briefly the exploitation of thin coal seam with the combination of plough and powered supports. (08 Marks)
- b. Explain briefly the exploitation of thick coal seam by sub-level caving method. (08 Marks)

OR

- 8 a. Explain briefly the exploitation of thin coal seam with the combination of buttock and powered supports. (08 Marks)
- b. Explain briefly the exploitation of thick coal seam by Top coal caving method. (08 Marks)

Module-5

- 9 The Coal seam of 11m thick, dipping at 1 in 9, is lying at a depth of 250m from the surface. It is planned to extract the coal seam by 'Blasting Gallery method'? Explain the method in detail with suitable layout and necessary figures, by giving following details. Assume relevant data, wherever necessary.
- Drilling and blasting, loading and transportation of coal
  - Supports used and machinery required
  - O.M.S expected. (16 Marks)

OR

- 10 a. Draw a layout (Plan and Elevation view) for horizon mining, considering the existence of only one coal seam. Explanation of method is not necessary. (09 Marks)
- b. Discuss on 'Hydraulic transport' in Hydraulic mining. (07 Marks)

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