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**B.E. (Full Time) DEGREE END SEMESTER EXAMINATION NOV. / DEC. 2012**

**MINING ENGINEERING BRANCH**

**SEVENTH SEMESTER**

**MI 9405 MINE ENVIRONMENTAL ENGINEERING - III**

**(REGULATION 2008)**

*Time : 3 Hours*

*Max. Marks : 100*

**Answer ALL Questions**

**Part – A (10 X 2 = 20 Marks)**

1. Mechanisation of underground coal mines is a boon or bane?
2. Name the different types of **portable fire extinguishers** used in mines. State the type of fire extinguishers that can be used for dealing with oil fires giving the reasons for your choice.
3. What are the indicators that are favourable for **reopening an area sealed off** because of a large fire due to spontaneous heating?
4. State the steps to be taken to prevent **spontaneous heating** in coal pillars.
5. What are the **conditions** under which **stone dust barriers** fail to prevent the propagation of coal dust explosions?
6. What is the purpose of **generalized stone dusting** in underground coal mines?
7. Calculate the **thickness of a flat brick water dam** to be constructed in an underground excavation of 5.0 m width and 3.0 m height to withstand a maximum water head of 50 m. Assume the compressive, shear and tensile strengths of the rock in which the excavation is made to be 50, 15 and 6.0 MPa respectively and that of the bricks to be 40, 10 and 4.0 MPa respectively. Assume missing data, if any.
8. Comment on the **reliability of old mine plans** from the inundation point of view.
9. Name the different methods of **Artificial Respiration** and state the conditions under which any one of it can be applied.
10. Compare **compressed air, compressed oxygen and liquid oxygen** type of self contaminated breathing apparatus.

**Part – B (5 X 16 = 80 Marks)**

11. A Major **explosion** has taken place in a degree III gassy seam of a mine working totally three seams at 10.00 a.m. when you are on the surface of the mine. As Manager of the mine, what **procedure** would you follow **after the explosion**? Keep in view the statutory obligations (CMR and Mines Rescue Rules) required to be full filled while answering the question.
12. (a) What are the **different methods of detecting spontaneous heating**? Compare them. Also explain the **limitations** of each of the method.

**OR**

- (b) (i) Discuss the merits, demerits, fields of application and limitations of **foam plug method of fire fighting**. (5 Marks)
- (iii) What are the merits and demerits of **intentional flooding** of a mine having a large fire? Also state its limitations. (5 Marks)
- (iv) Give the salient features associated with the design and maintenance of temporary and permanent **explosion proof stoppings**. Also name the **fittings** to be incorporated in them while and after construction? Give the **purpose** of each of it. (6 Marks)

13. (a) State the causes of **inundation** and precautions to be taken to guard against the same from **surface and underground water**.  
**OR**
- (b) (i) What is the purpose of a **bulk head doors** and explain the constructional features of the same with the help of diagrams. **(8 marks)**  
(ii) Discuss a method of **recovering old water logged underground workings** of the neighboring mine located at a horizontal distance of 65 m from your underground mine. The answer should include all the statutory obligations required to be fulfilled before taking up the work. **(8 marks)**
14. (a) A **coal dust explosion** has taken place in a large underground coal mine. Explain the procedure you would like to propose to carryout **rescue and recovery operations** following the incident.  
**OR**
- (b) (i) Explain the role of **self rescuers of different types** in mine rescue along with their limitations. **(6 Marks)**  
(ii) Comment on the **adequacy of the Mines Rescue Rules** currently in vogue. **(4 Marks)**  
(iii) Explain the purpose of each of the **component of a modern self containing breathing apparatus**. **(6 Marks)**
15. (a) Write short notes on **any THREE** of the following  
(i) Parameters influencing proneness of coal to spontaneous heating.  
(ii) Composition of air in a sealed off district.  
(iii) Fires in coal stacks.  
(iv) Procedure to determine the gassiness of a coal seam.  
**OR**
- (b) Write short notes on **any THREE** of the following  
(i) Inert gas flushing of goaf.  
(ii) Precautions in underground mines to prevent spontaneous heating.  
(iii) Rescue through bore holes.  
(iv) Causes of accidental fires.

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