

Examination for Mine Manager's Certificate of Competency under the Coal Mines Regulations, 1957

FIRST CLASS
MINE MANAGEMENT, LEGISLATION & GENERAL SAFETY

Sunday, the 12th December, 2010.

Full Marks : 100

Time : 3 Hours

Answer any SIX Questions

(Question 1 carry 20-marks and all other questions carry 16 marks)

1. (a) Elaborate the terms "fixed cost", "variable cost" and "marginal cost" in respect of a coal mine for its financial viabilities. Assume your own conditions.

(b) What is the economic impact of mining? Define in your own terms and enumerate "corporate social responsibilities".

2. Answer any two:

(a) Composition of Safety Committee and function of Safety Committee.

(b) Withdrawal of supports and standing orders.

(c) Cost of accident, frequencies and severity rate.

3. An intensively Bord & Pillar developed mine is planning to increase production from 2000 to 5000 tonnes per day by introducing highly productive machinery. List out the preparatory work to be undertaken till the targeted production is achieved. Describe the safe operating procedure for one of the machinery used for production.

4. Write short notes on any two:

(a) Special training to front line supervisors with reference to 10th Safety Conference.

(b) Risk management

(c) Goaf edge support in mechanized depillaring

5. A number of incidences/accidents are occurring due to hard landing of cages. List out the main causes and the statutory provision in man-winding in shafts.

6. Define arduous travel with respect to underground mechanized mine. What are the statutory requirements before commissioning of such a system in your mine? Enumerate how to ensure safety of the persons travelling belowground in one such system.

7. Write short notes on any two:

(a) Occupational health survey and its importance.

(b) Objective of Tripartite & Bi-partite meetings. How far it is useful in increasing the status of safety of a mine.

(c) Emergency response procedure for entrapped underground workers.

8. In present day context of heavy mechanization and outsourcing in mines how as a manager of a mine you prevent employment of persons below eighteen years of age. What is laid down under the provisions of the Mines Act, 1952, Regulations, Rules and Orders made thereunder including penalties.

20
10/5 = 52
10

Wp
Wp

THE MINES ACT, 1952

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Sunday, the 13th December, 2009.

Full Marks : 100

Time : 3 Hours

Answer any SIX Questions

(Question no.1 carries 20 marks and all other carry 16 marks each)

Q1. Write short notes on any four of the following:

- ✓ i) Site mixed slurry as compared to other explosives.
- ✓ ii) Flameproof apparatus.
- ✓ iii) Corporate social responsibility.
- ✓ iv) Risk management as a tool to reduce accidents.
- v) Methods to make Pit Safety Committee, more effective.
- vi) Behavior based safety.

Q2. An explosion has been reported in a mechanized development district with five persons missing. Draw a list of action, in order of priority that you would take to deal with the emergency and rescue/recover operations.

Q3. In the present day context of heavy mechanization and outsourcing, draw up a scheme of training and retraining to ensure effective safety awareness amongst the workers at the mine.

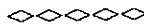
Q4. What are the statutory provisions relating to emergency plan? Briefly describe the essential elements of an effective emergency plan and their rationale. How would you incorporate modern technology advancement into an emergency plan?

Q5. Enumerate various sources of conflict in a mining project. As manager of a mine how would you organize to deal with a conflict arising out of a complaint of neighboring villagers regarding ground vibrations being generated by the blasting being conducted at your mine.

Q6. What do you understand by pay back period of a project? Describe in details any one cost analysis and cost control methods used to operate a mine.

Q7. A 8 MT per annum opencast mine is being planned in a virgin area. Draw up a scheme for selection training and development of human resources for the project. Also state the statutory notices to be sent and the permission/relaxation to be obtained.

Q8. (a) What are the causes of Pneumoconiosis? What are its symptoms? Enumerate the precautions to be taken to prevent it.
(b) State statutory provisions relating to periodical medical examinations and discuss its relevance to ILO classification of radiographs for detection of pneumoconiosis.



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Sunday, the 14th December, 2008.

Full Marks: 100
Time: 3 Hours

Answer any SIX Questions
(All questions carry equal marks)

- ✓ 1. In the present day context of large demand of coal, what are the recommendations of 10th Conference for safety in mines with respect to:
- (a) Mechanization with a view to phase-out manual loading & to improve standards.
 - (b) Reduction of risk from roof and side falls in coal mine.
- ✓ 2. What are the various problems of safety when a part of the work in an opencast mine is outsourced? How will you ensure enforcement of Mines Act, Rules and Regulations by the workers of the hired contractor?
3. What is workers participation in safety management? How can this help attain high safety standards? Suggest some deterrents for habitual unsafe workers.
4. Enumerate various types of instruments (along with the objective, principle and functioning of each) which are used for monitoring ground movement in a deep underground mine.
- ✓ 5. Enumerate the provisions of Mines Rescue Rules, 1985 regarding any two of the following:
- (a) Establishment and location of rescue stations.
 - ✓ (b) Appointment of rescue trained persons in mines, their disposition and accommodation.
 - (c) Apparatus and equipment to be provided in a belowground mine where no rescue room is located.

✓ 6. Write short notes on any four of the following:

- ✓(a) Angle of Draw and its relevance in long wall mining.
- ✓(b) Risk assessment as a tool to improve safety.
- (c) Vocational Training as an effective tool in improving safety and productivity.
- (d) Role of Internal Safety Organisation in reducing accidents.
- ✓(e) Direct and indirect costs of accidents.
- ✓(f) Use of diesel locomotives.

✓ 7. What are the provisions of Electricity Rules with respect to:

- ✓(a) Portable and transportable apparatus.
- ✓(b) Switch gears
- ✓(c) Appointment and duties of electrical supervisor.

8. Spontaneous heating in advanced stage has been detected in a caving district.

- ✓ i. How would you deal with the situation, and
- ✓ ii. What are the statutory obligations that should be fulfilled?



THE MINES ACT, 1952

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MINE MANAGEMENT, LEGISLATION & GENERAL SAFETY

Sunday, the 16th December, 2007.

Full Marks : 100

Time : 3 Hours

(Question No.1 is compulsory and carries 20 marks. Answer any five questions from the rest and these carry equal marks)

1. You are the manager of a mine which uses continuous miners and shuttle cars for extraction of pillars at a depth of about 400 m. The seam dips at 1 in 5 and has a thickness of 4.0 m. Immediate roof is hard sandstone.
 - a. List what you would consider the five major risks in such an operation which are needed to be managed.
 - b. List and describe control measures for the three highest ranked risks.
 - c. Who would you involve in the risk assessment process.
2. A 6.0 m thick coal seam was being extracted by opencast method deploying HEMMs. The overburden consisted of a 25 m thick cover of softsoil followed by shale and sandstone. A sudden failure of benches for length of about 400 m and part of a dump lying near the edge of the query occurred burying two shovels and four dumpers resulting in death of six operators and an overman. Write an enquiry report of the accident bringing out contraventions, responsibilities and suggestions to prevent similar accidents in future. Assume your own conditions.
3. In the present day context of heavy mechanization and outsourcing, give your views on adequacy of the provisions of Mines Vocational Training Rules. Suggest improvements and steps to be taken to make vocational training effective.
4. Design an emergency plan of a belowground mine with dangers from spontaneous heating and inflammable gas. How can you make it effective?
5. Describe different type of man-riding systems available and their limitations. Discuss safety provisions of each system.
6. What are notified diseases? Which of other diseases you would like to be included in notified diseases. Discuss the system of "Occupational Health Surveillance" in your organization, its short comings and suggest improvement. 25
7. Discuss the following:
 - a. Information Technology in mine safety
 - b. Development of communication systems in mines
 - c. Use of site mixed slurry explosives with special reference to safety
 - d. Electronic detonators.
8. Write detailed note on the following as per IER, 1956.
 - a. Overhead lines in opencast mines
 - b. Precautions to be taken in use of electricity in degree III gassy mines.

THE MINES ACT, 1952Examination for Mine Manager's Certificate of Competency under the Coal Mines Regulations, 1957FIRST CLASSMINE MANAGEMENT, LEGISLATION & GENERAL SAFETYSunday, the 17th December, 2006.

Full Marks : 100

Time : 3 Hours

Answer any SIX Questions

(All questions carry equal marks)

- Q.1. There has been considerable increase in mechanization of underground and opencast mines. Discuss the adequacy of the provisions of Coal Mines Regulations, 1957 in respect of qualifications and appointment of Safety Officers, First Class and Second Class Managers and Engineers in mines. Assume your own condition.
- Q.2 (i) What is meant by remote operation of coal face apparatus with pilot core protection? Discuss the associated voltage and current limits.
(ii) Describe a transwitch unit used belowground. What are (a) its special features and (b) the protective devices incorporated in it?
- Q.3 (a) What are bye-laws? How are they framed?
(b) Frame a set of bye-laws for use of continuous miner in a degree-I seam.
- Q.4. An explosion has occurred in a Degree-III mine in a depillaring district with stowing. How will you determine the cause of the explosion and its point of origin How would you ascertain whether the explosion has occurred due to inflammable gas or coal dust or both. Assume your own conditions.
- Q.5. Write short notes on:
(i) Initial and periodical medical examination
(ii) Workmen's Inspectors and their duties.
(iii) Medical attention in case of injury.
(iv) Disability allowance and compensation for occupational disease.
- Q.6. Describe the provisions of the Mines Act 1952 in respect of the following :
(i) Duties and responsibilities of owners, agents and managers.
(ii) Powers of inspectors of mines.
(iii) Annual leave with wages.
- Q.7. What are statutory provisions in respect of:
(i) Precautions after a fire has broken out.
(ii) Danger from underground inundation.
(iii) Splits and airways.
- Q.8. A thick coal seam that was developed in two sections was being extracted by opencast mining. There was active fire on a coal face and a shovel was under operation at a distance of 50 metres on a lower coal bench of the same seam. Suddenly, water gas explosion occurred and the shovel was covered by hot ash/dust etc. causing instantaneous death of the shovel operator. Write an enquiry report of the accident suggesting out contraventions, responsibilities and suggestions to prevent similar accidents in future. Assume your own conditions.

THE MINES ACT, 1952

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UNDER THE COAL MINES REGULATIONS, 1957

FIRST CLASS

MINE MANAGEMENT, LEGISLATION & GENERAL SAFETY

MONDAY, THE 19th DECEMBER, 2005.

Full Marks : 100

Time : 3 Hours

Answer any SIX Questions

(All questions carry equal marks)

Q1. What are the objectives of convening the National Safety Conferences? Briefly state major recommendations made by it till date and their impact on legislation and status of safety in mining industry.

Q2. Inundation continues to be a major hazard in belowground workings. As a manager, what action would you take to identify and eliminate this hazard from your mine? Draw an action plan for the same.

Q3. Define the following in the context of statutory provisions :

- (a) Hand-held portable apparatus
- (b) Transportable apparatus
- (c) Portable apparatus
- (d) Voltage
- (e) Flame proof apparatus
- (f) Owner
- (g) Serious bodily injury
- (h) General body of air
- (i) Ordinarily employed
- (j) Person employed in a mine

Q4. (a) What are the statutory provisions relating to Systematic Supports? Explain the factors that you will take into account while formulating Systematic Support Rules for your mine?

(b) What do you understand by the term "RMR"? What is its application in strata control?

[Contd.....2/-]

Q 5. What are the statutory provisions relating to "Emergency Plan"? Briefly explain the essential elements of a good Emergency Plan and their rationale. How will you incorporate modern technology advancements into the emergency plan for a large colliery with belowground workings?

- Q 6. (a) What are the causes of Pneumoconiosis? What are its symptoms? What precautions should be taken to prevent it?
- b) State statutory provisions relating to periodical medical examinations and discuss its relevance to ILO classification of radiographs for detection of Pneumoconiosis.

Q 7. A large opencast mine is approaching a village hutments that can not be vacated. What actions would you take to fulfill production targets with due regard to safety. Draw a detailed plan of action for the same.

Q 8. (a) In an underground coal mine three persons of shotfiring crew including shotfirer, several hours after returning home, complain of chest pain and breathing difficulty and have to be hospitalized. One of them dies next day. What may be the possible causes of this episode? How would you enquire into it? Discuss possible causes and statutory contraventions.

(b) At the end of a working shift, the assistant manager is informed that one underground worker is missing. What actions should he take?

THE MINES ACT, 1952

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MINES REGULATIONS, 1957

FIRST CLASS

MINE MANAGEMENT, LEGISLATION & GENERAL SAFETY

MONDAY, THE 20th DECEMBER, 2004.

Full Marks : 100
Time : 3 Hours

Answer any SIX Questions
(All questions carry equal marks)

1. What do you understand by the term "flame proof equipment"? Draw a list of instructions, responsibility for compliance and records that should be maintained to ensure that flame proof features remain effective.
2. A large mechanised opencast mine is being planned in a virgin area. Briefly state and discuss the statutory notices that are to be sent and permissions/relaxations to be obtained. What steps should be taken to select, recruit and train the workmen, staff and officers?
3. Answer the following:
 - a. What should be the syllabus for pre-employment training for workers for an underground mine? What is the need for refresher training?
 - b. State the differences in statutory provisions relating to haulage and winding ropes?
4. Write short notes on the following:
 - a. Statutory provisions relating to working near mine boundaries, their rationale and adequacy.
 - b. Functions of Committee under Section 12 of the Mines Act.
 - c. Statutory provisions relating to supply and use of dust respirators.
 - d. Fly rocks in opencast mines, their causes and prevention.
5. (a) State and discuss statutory provisions relating to taking shelter while blasting in opencast mine. How would you ensure adequate shelter when there are private hutments and public road within the danger zone?
(b) In an underground mine, the Overman has reported probable explosion in a mechanised development district and 16 persons missing. Draw a list of actions, in order of priority that you would take to deal with the emergency and rescue/recover the missing persons.
6. What could be the occupational health problems with increasing mechanization? What steps should be taken to guard against the same.
7. Write short notes on the following:
 - a. Risk management
 - b. Effectiveness of Safety Committee
 - c. Statutory provisions relating to Rescue Rooms
 - d. Condition for use of trolley where locomotive belowground.
8. The management of a large opencast mine has entrusted the work of removal of overburden to a contractor. Deployment of contractor's trucks and workers for removal of overburden has led to increase of accidents. Discuss the reasons for increase in accidents and suggest preventive measures.

THE MINES ACT, 1952

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UNDER THE COAL MINES REGULATIONS, 1957

FIRST CLASS

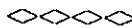
MINE MANAGEMENT, LEGISLATION & GENERAL SAFETY

TUESDAY, THE 23RD DECEMBER, 2003.

Full Marks : 100
Time : 3 Hours

Answer any SIX Questions
(All questions carry equal marks)

1. Spontaneous heating in advanced stage has been detected in a caving district. How would you deal with the situation and what are the statutory obligations that should be fulfilled?
2. What could be the occupational health problems with increasing mechanisation? What steps should be taken to guard against the same.
3. Design emergency plan of a belowground mine with dangers from fire and inundation. How can you make it effective?
4. Write short notes on the following:
 - (a) Risk management
 - (b) Effectiveness of Safety Committee
 - (c) Cables
 - (d) Training Officers
5. How can you make effective use of:
 - (a) Electronics and information technology in mine safety
 - (b) Site mixed slurry explosives with special reference to safety.
6. Roof fall continues to be the single largest cause of fatal accidents in our coal mines. How would you reduce such accidents?
7. Under the present scenario comment on adequacy of safety statute along with suggested improvements on:
 - (a) Duties and responsibilities of owner
 - (b) Statutory records and registers
 - (c) Duties and responsibilities of manager
 - (d) Workmen's Inspector
8. A large blower has been encountered in a development district of a first degree gassy seam. How will you deal with it and what are the statutory obligations that need to be fulfilled.



THE MINES ACT, 1952

EXAMINATION FOR MINE MANAGER'S CERTIFICATE OF COMPETENCY UNDER THE COAL
MINES REGULATIONS, 1957

FIRST CLASS

MINE MANAGEMENT, LEGISLATION & GENERAL SAFETY

SATURDAY, THE 28TH DECEMBER, 2002.

Full Marks : 100
Time : 3 Hours

Answer any SIX Questions
(All questions carry equal marks)

Q.No.1. How can you properly harness human resource to make mining safe and efficient?

Q.No.2. Draw up conditions for use of:

- (a) LHD
- (b) Belt Conveyors belowground.

Q.No.3. What precautions are required to be taken under the Indian Electricity Rules where gas exists?

Q.No.4. What are the statutory requirements before abandonment of belowground workings? What are dangers from such workings and how can it be reduced?

Q.No.5. Write short notes on:

- (a) Duties of Manager in emergency.
- (b) Respirable dust.
- (c) Firing of shots near surface structures.
- (d) Accident prone mines.

Q.No.6. What are the improvements necessary for better and safer use of opencast mining machinery?

Q.No.7. Draw a scheme of safe operating practice with continuous miner. How would you implement it?

Q.No.8. A moderately thick seam at shallow cover is proposed to be extracted for the first time in the mine by longwall powered support. How would you make a statutory application for extraction and what informations are required?
