

Sampling for Respirable Coal Mine Dust Certification Examination

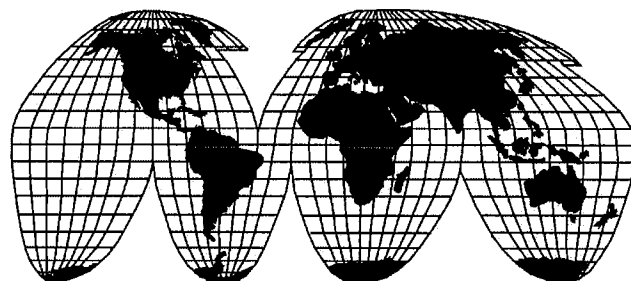


U.S. Department of Labor
Mine Safety and Health Administration
National Mine Health and Safety Academy

Instruction Guide Series
IG 100

2007

Visit the Mine Safety and Health Administration
website at www.msha.gov



Sampling for Respirable Coal Mine Dust Certification Examination

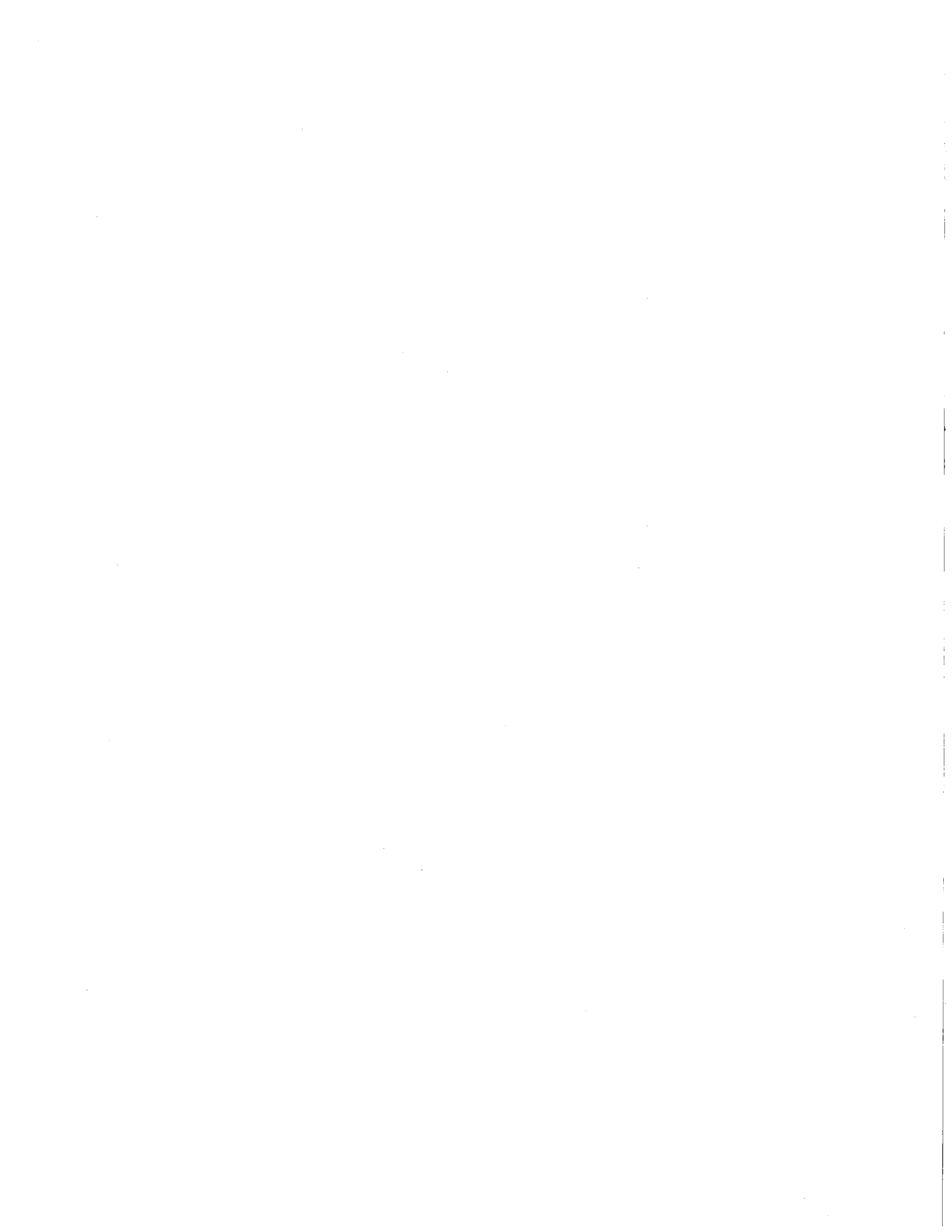


U.S. Department of Labor
Elaine L. Chao
Secretary

Mine Safety and Health Administration
Assistant Secretary

Instruction Guide Series
IG 100

2007



Certification Sampling for Respirable Coal Mine Dust Examination Question Pool

I. General Knowledge

1. Turning the sampling head assembly upside down _____.
 - a. has no effect on the sample
 - b. makes the pump run harder
 - c. is a common cause of voided samples
 - d. is the recommended means of collecting samples

2. The purpose of the _____ is to separate respirable and non-respirable dust.
 - a. nylon cyclone
 - b. tubing
 - c. vortex finder
 - d. grit pot

3. Scratches or cuts on the inside of the sampling head's nylon cyclone are called _____.
 - a. scoring
 - b. bruising
 - c. scratching
 - d. marking

4. There are _____ nickel cadmium cells in the battery pack of an MSA Escort ELF[®] personal dust sampler.
 - a. 3
 - b. 4
 - c. 5
 - d. 6

5. To become a person certified to sample for respirable coal mine dust, the applicant must _____.
 - a. petition the state
 - b. pass an examination conducted by MSHA
 - c. attend a dust certification course conducted by MSHA
 - d. apply to the county in which the mine is located

6. A personal respirable coal mine dust sampler must be approved by _____ for electrical safety.
 - a. the Academy
 - b. MSHA
 - c. the District Manager
 - d. the inspector

7. The respirable coal mine dust standard in the United States is based in part on the British dust sampling instrument known as the _____.
 - a. impinger
 - b. precipitator
 - c. MRE
 - d. grit pot

8. An MMU identification number looks most like _____.
 - a. 002-0
 - b. 00-20
 - c. 0-020
 - d. 0020

9. A DWP identification number looks most like _____.
 - a. 045-1
 - b. 001-0-376
 - c. 12345
 - d. 1-2-3

10. The mine operator must comply with _____ provisions of the approved dust control plan.
 - a. 2
 - b. 5
 - c. all
 - d. no

11. Dust concentrations may be controlled by the use of _____.
 - a. water sprays
 - b. ventilation
 - c. scrubbers
 - d. all of the above

12. Falsifying respirable coal mine dust samples is a (an) _____ practice under the coal regulations.
 - a. common
 - b. prohibited
 - c. accepted
 - d. legitimate

13. The concentration of respirable coal mine dust is reported to the operator in _____.
 - a. pounds per pint
 - b. parts per million
 - c. feet per minute
 - d. mg/m^3 (milligrams/cubic meter), MRE equivalent

14. The _____ is a porous membrane housed in plastic and used to collect the respirable dust.
 - a. scoring
 - b. latex
 - c. calibration mark
 - d. filter

15. A mine operator may hire a contract sampler to collect samples if the contract sampler is _____.
 - a. certified by MSHA
 - b. available
 - c. handicapped
 - d. the operator's uncle

16. The only coal mine dust personal sampler units currently approved [2007] for use are made by _____.
 - a. Ford Motor Company
 - b. MSA Company
 - c. MSHA
 - d. Sony

17. Typical designated areas (DAs) in a mine include _____ and belt entries.
 - a. pump locations
 - b. roof bolter operators
 - c. miner operators
 - d. fan installations

18. A typical designated occupation (DO) in a mine is the _____.
 - a. brattice man
 - b. belt man
 - c. face boss
 - d. continuous miner operator

19. Certified persons (sampling) have a moral and legal obligation to collect and submit _____.
 - a. the mine operators' excise tax payments on coal
 - b. respirable dust coal mine samples representing the coal mine work-place atmosphere
 - c. miners' chest x-rays
 - d. respirable dust control plans

20. The miners' chest x-ray program is regulated and administered by the _____.
 - a. Mine Safety and Health Administration
 - b. state in which the mine is located
 - c. Black Lung Coalition
 - d. NIOSH (Department of Health and Human Services)

21. The _____ pump is not affected by radio frequency interference.
- Flow-Lite™
 - Model G
 - Flow-Lite ET™
 - Escort ELF®
22. Questions regarding respirable coal mine dust sampling pumps affected by radio frequency interference should be directed to the _____.
- MSHA District Manager
 - state mine inspector
 - Mine Safety Appliances Company
 - lamp house
23. The _____ pump does not have a float-type flow rate meter.
- Flow-Lite™
 - Model G
 - Escort ELF®
 - Flow-Lite ET™
24. Respirable coal mine dust presents the greatest danger to the human _____.
- windpipe
 - nose
 - lungs
 - eyes
25. The human respiratory system can defend against respirable dust particles by _____.
- collecting dust in the nose and mouth
 - collecting dust in the windpipe
 - attacking dust particles in the lung
 - a, b, and c above
26. In addition to coal dust, another more toxic dust found in coal mines is _____.
- quartz [silica]
 - rock dust along belts
 - wood dust from sawing timbers
 - none of the above
27. CWP is an acronym for _____.
- cold weather pajamas
 - cash with payment
 - chicken with potpie
 - coal workers' pneumoconiosis

28. Particles capable of reaching the air sacs in the lungs are generally less than _____ microns in diameter.
- a. 3
 - b. 5
 - c. 7
 - d. 10
29. The most effective means of controlling respirable coal mine dust are water application and _____.
- a. good ventilation
 - b. dry roadways
 - c. good lighting
 - d. good eye protection
30. The battery "surface charge" generally dissipates within _____ minutes after the pump is turned on.
- a. 15
 - b. 30
 - c. 45
 - d. 60
31. Modifications to the sampling head assembly are permitted _____.
- a. upon approval of the District Manager
 - b. at no time
 - c. by the Mine Safety Appliances Company
 - d. by the state mine inspector

II. Sampling Procedure

1. The dust sampling device shall in no case operate more than _____.
 - a. 10 hours
 - b. 8 hours
 - c. 6 hours
 - d. 12 hours

2. The flow rate of the personal respirable coal mine dust sampler shall be checked by a certified person sampling _____ and during the last hour of operation.
 - a. during the second hour of operation
 - b. daily
 - c. weekly
 - d. every hour

3. The dust sampling device shall operate _____.
 - a. only during high dust levels
 - b. only while coal is being produced
 - c. portal to portal, but no more than 8 hours
 - d. only when the certified person is present

4. If an improper flow rate is observed during the last hour of operation, the respirable coal mine dust sample shall be _____.
 - a. discarded
 - b. reported in writing to the District Manager
 - c. transmitted to MSHA with a notation on the dust data card stating that the proper flow rate was not maintained
 - d. postponed until the following bimonthly period

5. Designated occupation samples from a mechanized mining unit shall be collected on _____.
 - a. consecutive normal production shifts
 - b. normal production shifts each of which is worked on consecutive days
 - c. either a or b
 - d. none of the above

6. Each designated occupation sample taken on a mechanized mining unit shall be taken on _____.
 - a. a normal production shift
 - b. any shift
 - c. a day when dust is greatest
 - d. a day when dust is least

7. For surface sampling purposes, rainy-day samples may be voided by MSHA if the _____ believes dust concentrations could have been greatly reduced by rain.
- certified person (sampling)
 - weather forecaster
 - plant operator
 - dozer operator
8. Despite the constant-flow feature on approved respirable coal mine dust sampling pumps, the _____ of those pumps must still be checked during the second and last hour of sampling by a certified person (sampling).
- battery voltage
 - hose length
 - permissibility features
 - flow rate
9. Scratches or cuts on the inside of the sampling head's nylon cyclone are called _____.
- scoring
 - bruising
 - scratching
 - marking

III. Sample Set-up & Processing

1. When scoring is found on the _____ of the cyclone, the cyclone must be discarded and replaced.
 - a. grit pot
 - b. outer surface
 - c. inner surface
 - d. none of the above

2. The identification number of the filter cassette must be identical to the identification number on the _____.
 - a. dust data card
 - b. pump
 - c. vortex finder
 - d. tubing

3. Approved sampling devices shall be tested and examined _____ each sampling shift.
 - a. after
 - b. by MSHA after
 - c. immediately before
 - d. none of the above

4. The pre-shift checks of the dust sampling devices must be performed by _____.
 - a. a person certified to sample for respirable coal mine dust
 - b. a person certified to maintain and calibrate dust sampling equipment
 - c. MSHA
 - d. either a or b

5. During the preshift checks, the battery voltage of the dust sampling devices must be checked _____.
 - a. under actual load
 - b. with the pump in the "off" position
 - c. without a sampling head assembly
 - d. both b and c

6. A personal dust sampler unit having the battery-pack screws missing is _____.
 - a. acceptable
 - b. non-permissible
 - c. a cost saver
 - d. not calibrated

7. The hose of the sampling unit must be _____ feet in length.
 - a. 2 (24 inches)
 - b. 3 (36 inches)
 - c. 4 (48 inches)
 - d. 5 (60 inches)

8. After sampling is complete, the filter cassettes must be sent to the address _____.
 - a. published in the regulations or other address as directed by the District Manager
 - b. on the dust data card
 - c. on the dust control plan
 - d. on the sampling pump

9. Cassettes and their dust data cards must be in agreement regarding the cassette _____.
 - a. number
 - b. shape
 - c. color
 - d. size

10. A dust data card not properly completed will result in the dust sample being _____ by MSHA.
 - a. changed
 - b. weighed
 - c. voided
 - d. returned

11. The cut-off voltage for a nickel-cadmium cell in any of the approved respirable coal mine dust sampler battery packs is _____ volt(s).
 - a. 1.0
 - b. 1.25
 - c. 2.0
 - d. 2.5

12. An approved respirable coal mine dust sampler unit consists of _____.
 - a. pump, sampling head assembly, filter cassette, and battery pack
 - b. filter cassette, pump, and battery pack
 - c. pump, sampling head assembly, and battery charger
 - d. sampling head assembly, filter cassette, and battery charger

13. Attempting to charge a battery pack having a voltage reading of less than 1.0 volt per cell may cause the battery to _____.
 - a. melt
 - b. fail
 - c. explode
 - d. discharge

14. Testing and examinations of pumps and sampling assemblies immediately prior to the shift of use must be performed _____.
 - a. within 1 hour of the beginning of sampling
 - b. within 2 hours of the beginning of sampling
 - c. within 3 hours of the beginning of sampling
 - d. within 24 hours of the beginning of sampling

IV. Law, Regulation & Policy

1. A certified person (sampling) may have his/her certification removed by _____.
 - a. MSHA
 - b. a certified person
 - c. the state
 - d. none of the above

2. Damaged samples that may be voided by MSHA _____.
 - a. must be thrown away
 - b. must be submitted by the operator
 - c. should be kept for future reference
 - d. none of the above

3. A _____ shall complete, sign and include his/her certification number on the dust data card.
 - a. person directed by a certified person (sampling)
 - b. certified person (sampling)
 - c. certified person (maintenance and calibration)
 - d. person directed by a certified person (maintenance and calibration)

4. The maximum respirable dust limit for coal mines is _____ milligrams of respirable dust per cubic meter of air.
 - a. 2.0
 - b. 2.5
 - c. 3.0
 - d. 3.5

5. Approved personal respirable coal mine dust samplers shall operate at a flow rate of _____ liters of air per minute.
 - a. 0.5
 - b. 1.5
 - c. 2.0
 - d. 2.5

6. The operator shall deposit into the U.S. Postal or other mail system all respirable coal mine dust samples collected within _____ hours after the end of the sampling shift.
 - a. 8
 - b. 24
 - c. 36
 - d. 48

7. Any status change regarding the mining operation that affects respirable coal mine dust sampling must be reported in writing _____ to the appropriate MSHA office after the status change.
 - a. within 24 hours
 - b. as soon as possible
 - c. within 3 working days
 - d. within 5 working days

8. The regulations require _____ valid dust sample(s) from the designated occupation in each mechanized mining unit during each bimonthly period.
 - a. 1
 - b. 3
 - c. 5
 - d. 10

9. The designated occupation for a conventional mining section using a cutting machine is the _____.
 - a. coal driller
 - b. loading machine operator
 - c. cutting machine operator
 - d. laborer

10. The designated occupation for a continuous mining section, other than auger-type, is the _____.
 - a. continuous mining machine operator helper
 - b. continuous mining machine operator
 - c. roof drill operator
 - d. brattice person

11. If one bimonthly designated area sample exceeds the applicable limit, the operator is required to take _____ valid sample(s) from the designated area within 15 calendar days.
 - a. 1
 - b. 3
 - c. 5
 - d. 7

12. The _____ is responsible for collecting and submitting respirable coal mine dust samples to MSHA.
 - a. state
 - b. mine operator
 - c. authorized representative
 - d. contractor

13. A normal production shift is a shift during which the amount of material produced in a mechanized mining unit is at least _____ percent of the average production reported for the last set of five valid samples.
- 50
 - 60
 - 40
 - 15
14. Upon the request of the _____, the operator shall submit the date on which collecting any respirable coal mine dust samples will begin.
- miners' representative
 - District Manager of MSHA
 - state mine inspector
 - certified person (sampling)
15. After a citation for a violation of a respirable dust standard is issued, the operator must _____.
- sample any five shifts during the time for abatement
 - sample any combination of maintenance or production shifts
 - sample on five consecutive Tuesdays
 - sample each production shift after corrective action has been taken and before the time for abatement expires until 5 valid samples have been submitted
16. A _____ shall collect and submit respirable coal mine dust samples.
- person directed by any certified person (sampling)
 - certified person (sampling)
 - certified person (maintenance and calibration)
 - state enforcement agency
17. When the respirable coal mine dust standard is changed due to the presence of quartz, respirable dust sampling of a mechanized mining unit shall begin _____.
- with the next production shift
 - immediately
 - on the first production shift of the next bimonthly period
 - when sampling equipment becomes available
18. On a continuous mining section other than auger-type, the sampling device can either be worn by the continuous mining machine operator or may be placed on the continuous mining machine within _____ inby the normal working position.
- 36 inches
 - 48 inches
 - 60 inches
 - 72 inches

19. On a longwall mining section, the dust sampling device can either be worn by the miner who works nearest the return air side of the longwall working face or along the working face on the return side within _____ of the corner.
- 36 inches
 - 48 inches
 - 60 inches
 - 42 inches
20. The four digit identification number assigned by MSHA to a mechanized mining unit shall _____.
- remain with that unit wherever that unit relocates within the mine
 - be retired whenever that unit relocates within the mine
 - change with each operating crew
 - both b and c
21. Each mine operator shall take _____ valid respirable coal mine dust sample(s) from each designated area during each bimonthly period.
- 10
 - 5
 - 3
 - 1
22. The designated area locations of the mine are shown in the _____.
- District Manager's quarterly fatality report
 - approved roof control plan
 - approved ventilation system and methane and dust control plan
 - company production report
23. Respirable coal mine dust samples received by MSHA in excess of those required for bimonthly sampling cycles shall be considered _____.
- invalid samples
 - for the next bimonthly sampling cycle
 - only for quartz concentration
 - extra valid samples for the current sampling cycle
24. When quartz is present in a respirable coal mine dust sample in an amount greater than _____%, the respirable dust standard will be lowered by MSHA.
- 1
 - 2
 - 3
 - 5
25. The potential penalty for tampering with respirable coal mine dust samples includes _____.
- a civil monetary penalty and/or imprisonment
 - a criminal monetary penalty and/or imprisonment
 - imprisonment only
 - a civil monetary penalty only

26. A designated work position (DWP) must be sampled by the mine operator at least _____ time(s) during a bimonthly sampling period.
- 5
 - 2
 - 1
 - 3
27. Withdrawal of a DWP from sampling status will be based in part on the respirable coal mine dust samples collected during the past _____ year(s).
- 1
 - 2
 - 3
 - 4
28. Personal dust samplers must bear the approval labels issued by MSHA and _____.
- NIOSH (or HHS)
 - Casella
 - Mine Safety Company
 - Bureau of Mines
29. An occupation code contains _____ digits.
- 2
 - 3
 - 5
 - 6
30. Once a citation for overexposure to dust is received, the operator must take corrective action and then collect _____ valid, normal production shift samples.
- 1
 - 2
 - 3
 - 5
31. Bimonthly sampling periods begin on the _____ day of the first month of the period.
- 15th
 - 20th
 - 10th
 - 1st
32. Dust control plans, other than those for Part 90 miners, must be posted on the mine _____.
- bulletin board
 - foreman's desk
 - change room wall
 - man trip

33. Except for Part 90 miners, computer dust reports from MSHA must be posted on the mine bulletin board for at least _____ days.
- 10
 - 17
 - 20
 - 31
34. Respirable coal mine dust samples received by MSHA in excess of those required shall be considered _____ samples.
- ready-to-use
 - invalid
 - stored-for-later-use
 - required
35. The _____ initially establish the designated occupation on a mechanized mining unit.
- regulations
 - mine operator
 - inspector
 - state
36. A designated area for sampling may be established based on MSHA samples where quartz exceeds _____ percent.
- 1
 - 2
 - 4
 - 5
37. The _____ may waive the rain restriction and permit rainy-day samples to be processed as normal-production samples.
- certified person (sampling)
 - District Manager
 - inspector
 - plant operator
38. For designated occupations (DO) and designated work positions (DWP), any sample with a concentration of greater than _____ milligrams/cubic meter will be considered valid regardless of the production reported by the operator.
- 1.0
 - 1.5
 - 2.0
 - 2.5

39. The standard for respirable coal mine dust in the section intake air is _____ milligram(s) of dust per cubic meter of air.
- 1.0
 - 1.5
 - 2.0
 - 2.5
40. The respirable coal mine dust regulations for underground mines are found in Title 30 CFR _____.
- Part 18
 - Part 70
 - Part 71
 - Part 72
41. The respirable coal mine dust regulations for surface mines are found in Title 30 CFR _____.
- Part 18
 - Part 70
 - Part 71
 - Part 75
42. The clamping, tightness and positioning of all sampler components are _____ by the regulations in Parts 70, 71 and 90.
- required
 - not required
 - not mentioned
 - not discussed
43. The mine operator shall not open or _____ with the seal of any filter cassette.
- play
 - write
 - tamper
 - shave
44. The dust regulations refer to three different statuses that can exist for the mine, including producing, non-producing, and _____.
- mined out
 - abandoned
 - flooded
 - collapsed
45. Mine status changes affecting any respirable coal mine dust sampling must be reported by _____ within three working days.
- the mine operator
 - the state inspector
 - the foreman's wife
 - the truck drivers

46. The Secretary will provide the mine operator with a _____ regarding the samples collected for all DOs, DAs and DWPs.
- note
 - computer report
 - letter
 - book
47. Designated work positions (DWPs) are established by the _____.
- inspector
 - District Manager
 - mine operator
 - superintendent
48. The initial respirable coal mine dust standard under the 1969 Act was established at _____ milligrams of dust per cubic meter (mg/m^3) of mine air.
- 4.5
 - 4.0
 - 3.5
 - 3.0
49. The final respirable coal mine dust standard under the 1969 Act and continuing to the present is _____.
- $3.5 \text{ mg}/\text{m}^3$
 - $3.0 \text{ mg}/\text{m}^3$
 - $2.0 \text{ mg}/\text{m}^3$
 - $1.5 \text{ mg}/\text{m}^3$
50. To ensure the integrity of the mine operators' respirable coal mine dust sampling program, the Mine Safety and Health Administration _____.
- monitors samples to detect irregularities and investigates possible causes
 - provides the operators with dust cassettes
 - transports the operators' cassettes to the weighing laboratory
 - permits operators to submit only "good" samples
51. The Mine Safety and Health Administration has prosecuted and will continue to prosecute persons charged with _____ respirable coal mine dust samples.
- tampering with
 - removing dust from
 - falsifying
 - a, b, and c above
52. If quartz [silica] is found in the respirable dust in an amount greater than 5 percent, a _____ will be imposed by the Mine Safety and Health Administration.
- hiring limit
 - reduced dust standard
 - closure order
 - spot inspection schedule

53. Materials mined during a normal production shift include:
- a. rock
 - b. coal
 - c. clean coal
 - d. a. and b.

V. Part 90 Miners

1. Miners showing evidence of pneumoconiosis as the result of a chest x-ray will be offered an opportunity to _____.
 - a. quit
 - b. retire
 - c. transfer to a less dusty area
 - d. go to lunch

2. A mine operator has _____ days to transfer a miner (initial transfer) under provisions of Part 90.
 - a. 5
 - b. 9
 - c. 10
 - d. 20

3. Once a Part 90 transfer is made, the mine operator must submit _____ valid respirable coal mine dust sample(s) for that miner within 15 days.
 - a. 1
 - b. 2
 - c. 5
 - d. 10

4. A respirable dust control plan will be required from the mine operator for a Part 90 miner if a (an) _____ for the miner's overexposure has been issued.
 - a. order
 - b. citation
 - c. act
 - d. respirator

5. The computer dust reports for Part 90 miners shall be posted for _____ days.
 - a. 0
 - b. 5
 - c. 10
 - d. 31

6. The _____ of the Part 90 miner must be entered on the dust data card.
 - a. name
 - b. age
 - c. address
 - d. identification number

7. A mine operator must pay a Part 90 miner _____.
 - a. \$10 per hour
 - b. no less than his/her previous rate
 - c. monthly
 - d. on Tuesdays

8. A Part 90 miner has received a transfer because he/she _____.
 - a. is a hard worker
 - b. worked at least 90 days at the mine
 - c. shows evidence of pneumoconiosis on a chest x-ray
 - d. lives close to the mine

9. Transfer provisions under Part 90 apply _____.
 - a. only to miners 50 years of age and older
 - b. only to miners employed at a surface coal mine
 - c. only to miners employed at an underground mine or the surface area of an underground mine
 - d. only to miners who have joined a bargaining unit

10. The maximum respirable coal mine dust standard for a Part 90 miner is _____ mg/m³.
 - a. 1.0
 - b. 1.5
 - c. 2.0
 - d. 2.5

11. The respirable coal mine dust regulations for miners who have exercised their option to transfer to a less dusty area of the mine are found in Title 30 CFR _____.
 - a. Part 48
 - b. Part 77
 - c. Part 90
 - d. Part 100

12. The operator may not reduce the _____ of a Part 90 miner.
 - a. tonnage
 - b. rate of pay
 - c. dinner break
 - d. travel time

13. Who is responsible for notifying a miner that he/she is eligible to exercise their option to work in an area of the mine where the average concentration of respirable coal mine dust is maintained to a level at or below 1.0 mg/m³?
 - a. NIOSH
 - b. mine operator
 - c. MSHA
 - d. company physician

14. Samples for evaluating a Part 90 miner's exposure to respirable coal mine dust must be collected _____.
 - a. while the Part 90 miner is performing normal work duties
 - b. only during daylight hours
 - c. on the 15th of every month
 - d. twice a year

15. A copy of the computer dust sample report from MSHA for each Part 90 miner _____.
- a. must be posted on the mine bulletin board for 31 days
 - b. must be provided to all miners at the mine by the mine operator
 - c. must be provided only to the Part 90 miner by the mine operator
 - d. must be mailed to the state mine inspector
16. Within 15 days following termination of a citation where the mine operator has been cited for violating a Part 90 miner respirable coal mine dust standard, the mine operator is required to _____.
- a. file a Part 90 miner dust control plan for approval by the District Manager
 - b. transfer the miner again
 - c. collect a Part 90 miner sample every work day for an entire month
 - d. close the area of the mine where the Part 90 miner normally works

VI. Dust Data Card

You are the certified person (sampling) for respirable coal mine dust at Lunar Creek No. 1 mine of the Jenco Mining Company (mine ID no. 55-91741). You have just collected a respirable dust sample from Joe Smith (SSN 900-88-1955), the continuous miner operator (occupation code 036), which is the designated occupation in mechanized mining unit 004-0. The mechanized mining unit produced 1380 tons of coal during the shift. The personal sampler operated for a total of 8 hours. The sample was collected on today's daylight shift which started at 0800 hours.

Given the above information, properly complete the dust data card.

Performance Criteria. Each applicant will:

1. Perform checks for the MSA Escort ELF[®] and any other approved sampling device.
 - a. Test the voltage of each battery pack while under actual load.
 - b. Examine the cyclone(s) for cleanliness.
 - c. Examine the inner surface of the cyclone for scoring.
 - d. Examine external tubing for leaks, cleanliness, and proper length.
 - e. Examine the clamping and positioning of the cyclone, vortex finder, and cassette to insure they are rigid in alignment, and firmly in contact.
2. Check the airflow rate on the MSA Escort ELF[®] and any other approved sampling device.
3. Correctly place the MSA Escort ELF[®] and any other approved sampling device on another class member or on the instructor.

Instructor's evaluation of the applicant's performance:

_____ Battery pack testing

_____ Cyclone examination - cleanliness

_____ Cyclone examination – scoring

_____ External Examination of tubing

_____ Assembly and examination of sampling head

_____ Examination of flowrate

_____ Placement of sampling train on person to be sampled

_____ Total Score

Answers

Section I

1. C
2. A
3. A
4. B
5. B
6. B
7. C
8. A
9. B
10. C
11. D
12. B
13. D
14. D
15. A
16. B
17. B
18. D
19. B
20. D
21. D
22. C
23. C
24. C
25. D
26. A
27. D
28. D
29. A
30. A
31. B

Section II

1. B
2. A
3. C
4. C
5. C
6. A
7. A
8. D
9. A

Section III

1. C
2. A
3. C
4. D
5. A
6. B
7. B
8. A
9. A
10. C
11. A
12. A
13. C
14. C

Section IV

1. A
2. B
3. B
4. A
5. C
6. B
7. C
8. C
9. C
10. B
11. C
12. B
13. A
14. B
15. D
16. B
17. C
18. A
19. B
20. A
21. D
22. C
23. A
24. D
25. B
26. C
27. A
28. A
29. B
30. D
31. D
32. A
33. D
34. B
35. A
36. D

Section IV (Continued)

37. B
38. D
39. A
40. B
41. C
42. A
43. C
44. B
45. A
46. B
47. B
48. D
49. C
50. A
51. D
52. B
53. D

Section V

1. C
2. D
3. C
4. B
5. A
6. D
7. B
8. C
9. C
10. A
11. C
12. B
13. A
14. A
15. C
16. A