



JAMMU AND KASHMIR PUBLIC SERVICE COMMISSION

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Subject: Conduct of Written Examination for the post of Assistant Mining Engineer in Department of Mining- Provisional Answer Key thereof.

Notification No. PSC/Exam/S/2024/53

Dated: 30.08.2024

In pursuance of Rule 10(c) of the Jammu & Kashmir Public Service Commission (Conduct of Examination) Rules, 2022, as amended upto date, the Provisional Answer Key of Question Paper pertaining to the **Written Test for the post of Assistant Mining Engineer** held on **30.08.2024**, is hereby notified for seeking objections from candidates:

PROVISIONAL ANSWER KEY
ASSISTANT MINING ENGINEER

Test Booklet Question No. (Series A)	
Q1	B
Q2	A
Q3	D
Q4	C
Q5	B
Q6	A
Q7	C
Q8	B
Q9	D
Q10	C
Q11	B
Q12	B
Q13	D
Q14	C
Q15	B
Q16	C
Q17	B
Q18	A
Q19	C
Q20	C
Q21	B
Q22	A
Q23	D
Q24	B
Q25	C
Q26	B
Q27	C

Test Booklet Question No. (Series A)	
Q28	D
Q29	A
Q30	C
Q31	A
Q32	D
Q33	A
Q34	C
Q35	D
Q36	C
Q37	B
Q38	A
Q39	A
Q40	C
Q41	B
Q42	C
Q43	D
Q44	B
Q45	A
Q46	C
Q47	A
Q48	B
Q49	D
Q50	B
Q51	B
Q52	C
Q53	D
Q54	A

Test Booklet Question No. (Series A)	
Q55	B
Q56	B
Q57	C
Q58	B
Q59	C
Q60	C
Q61	B
Q62	C
Q63	C
Q64	D
Q65	A
Q66	B
Q67	C
Q68	A
Q69	C
Q70	B
Q71	D
Q72	A
Q73	C
Q74	A
Q75	B
Q76	D
Q77	D
Q78	C
Q79	B
Q80	C
Q81	B

Test Booklet Question No. (Series A)	
Q82	C
Q83	D
Q84	B
Q85	B
Q86	A
Q87	D
Q88	C

Test Booklet Question No. (Series A)	
Q89	B
Q90	D
Q91	A
Q92	D
Q93	D
Q94	A
Q95	A


Test Booklet Question No. (Series A)	
Q96	C
Q97	B
Q98	B
Q99	D
Q100	A


The candidates are advised to refer to **Question Booklet (Series A)** to match the corresponding question(s) in their respective Question Booklet Series and if any candidate feels that the key to any of the question(s) is/are wrong, he/she may represent on prescribed format/proforma annexed as **Annexure-A** along with the documentary proof/evidence (**hard copies only**) and fee of Rs.500/- per question in the form of Demand Draft drawn in favour of **COE, J&K PSC** (refundable in case of genuine/correct representation) to the Controller of Examinations, Jammu & Kashmir Public Service Commission, from 02.09.2024 to 04.09.2024. **The candidates are further advised to clearly mention the question(s) objected to with reference to its serial number as it appears in the Question Booklet of Series A of the Provisional Answer Key.**

Further, any objection/application not accompanied by the requisite Demand Draft of Rs.500/- as prescribed, shall not be considered/entertained under any circumstances. Candidates are, in their own interest, advised to adhere to these instructions and not submit any objection unaccompanied by the Demand Draft as required under extant rules.

The Commission shall not entertain any such representation(s) after the expiry of the stipulated period i.e. **after 04.09.2024 (Wednesday), 05.00 pm.**

The provisional answer key is available on the website of the Commission <http://www.jkpsc.nic.in>.


(Sachin Jamwal) JKAS,
Additional Secretary

 J&K Public Service Commission
Dated: 30.08.2024

No. PSC/Ex-Secy/2024/36

Copy to the: -

1. Director, Information and Public Relations, J&K for publication of the notice in all leading newspapers published from Jammu/Srinagar.
2. P.S. to Hon'ble Chairman, J&K Public Service Commission for information of the Hon'ble Chairman.
3. P.S. to Hon'ble Member, Shri _____ for information of the Hon'ble Member.
4. P. A. to Secretary, J&K Public Service Commission for information of the Secretary.
5. Main file/Stock file/Notice Board.

Annexure-A

Representation regarding objection(s) to any Question/Answer pertaining to the Written Test conducted for the post of Assistant Mining Engineer on 30.08.2024

(NOTE: USE SEPARATE FORMS FOR SEPARATE QUESTIONS)

Name of the Post : Assistant Mining Engineer

Name of the Applicant : _____

Roll No. : _____

Correspondence Address : _____

Contact/Mobile No. : _____


Date of Application: 09.2024

Demand Draft No. date : _____

Candidates Account No.(16 digit) & IFSC Code : _____

Question No. in Series A	Details of the Objection	Resource Material (copy to be enclosed)	Details of the Website (if any)
<u>Correct Answer/Option as per candidate :</u>			

Signature of the Candidate

 Note: Application for each question/answer shall be made on separate page in the given format, otherwise the first question entered in the format shall only be considered.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

Booklet Serial No. **220845**

Test Booklet Series

TEST BOOKLET
ASSISTANT MINING ENGINEER
Written Test - 2024
(24)



Time Allowed: Two Hours

Maximum Marks: 100

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET **DOES NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series Code A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer /Response Sheet. Any omission/discrepancy will render the Response Sheet liable for rejection.
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside.

DO NOT write anything else on the Test Booklet.
4. This Test booklet contains **100** items (questions). Each item comprises of four responses (answers). You will select the response which you want to mark on the Answer Sheet/Response Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
5. You have to mark all your responses **ONLY** on the separate Answer /Response Sheet provided. See directions in the Response Sheet.
6. **All** items carry equal marks.
7. Before you proceed to mark in the Answer /Response Sheet, the response to various items in the Test Booklet, you have to fill in some particulars in the Answer /Response Sheet as per instructions sent to you with your Admission Certificate.
8. After you have completed filling in all your responses on the Response Sheet and the examination has concluded, you should hand over to the Invigilator **only the Answer /Response Sheet**. You are permitted to take away with you the Test Booklet and **Candidate's Copy of the Response Sheet**.
9. Sheets for rough work are appended in the Test Booklet at the end.
10. While writing Centre, Subject and Roll No. on the top of the Answer Sheet/Response Sheet in appropriate boxes use **"ONLY BALL POINT PEN"**.
11. **Penalty for wrong answers:**

THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY THE CANDIDATE IN THE WRITTEN TEST (OBJECTIVE TYPE QUESTIONS PAPERS).

 - (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **(0.25)** of the marks assigned to that question will be deducted as penalty.
 - (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above for that question.
 - (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

(24) (A)/2024

[P.T.O]

1. Which of the following is the correct order of stages in the life of a mine?

- A) Exploration, Prospecting, Development, Reclamation, Exploitation.
- B) Prospecting, Exploration, Development, Exploitation, Reclamation.
- C) Development, Prospecting, Exploration, Reclamation, Exploitation.
- D) Reclamation, Exploration, Development, Prospecting, Exploitation.

2. Match the descriptions to the chain types:

Chain Type:

- i) Sister hooks
- ii) Hook with a weighted latch
- iii) Hook with a spring latch
- iv) Chain hook

Description:

- 1) Simple and efficient, but both hands are needed to adjust them.
- 2) May be used with one hand and has a safety handle to prevent injuring the hand.
- 3) Made of wrought iron or steel, with a spring latch that can break or become bent back.
- 4) Requires longer to engage and disengage, with little likelihood of coming loose unless overstrained.

Choose the correct option:

- | | i | ii | iii | iv |
|----|---|----|-----|----|
| A) | 1 | 2 | 3 | 4 |
| B) | 2 | 1 | 4 | 3 |
| C) | 4 | 2 | 1 | 3 |
| D) | 1 | 4 | 2 | 3 |

3. The safe method to stop seepage of water through the rock structure.

- A) Rock bolting
- B) Shotcrete
- C) Cast concrete lining
- D) Grouting.

4. Match the following types of drilling operations with their corresponding key words:

Drilling operations:

- 1) Manual drilling
- 2) Mechanized drilling
- 3) Bench drilling
- 4) Production drilling

Key Words:

- i) Extraction
- ii) Mounted
- iii) Systemized
- iv) Hand-held

Choose the correct option:

- | | i | ii | iii | iv |
|----|---|----|-----|----|
| A) | 3 | 2 | 4 | 1 |
| B) | 3 | 2 | 1 | 4 |
| C) | 4 | 2 | 3 | 1 |
| D) | 4 | 3 | 2 | 1 |

5. Which of the following is the first stage of the indentation process in rotary percussive drilling?

- A) Pulverizing the rock
- B) Crushing the rough edges of the rock.
- C) Forming radial cracks
- D) Chipping larger fragments

6. Match the modes of occurrence and origin of the metals:

- | | |
|---------------|-----------------------------------|
| i) Gold | 1) Replacement deposits |
| ii) Silver | 2) Lodes and placers |
| iii) Platinum | 3) Bedded and Lateritoid deposits |
| iv) Manganese | 4) Metasomatic deposits |

Choose the correct option:

- | | i | ii | iii | iv |
|----|---|----|-----|----|
| A) | 2 | 1 | 4 | 3 |
| B) | 2 | 1 | 3 | 4 |
| C) | 1 | 2 | 3 | 4 |
| D) | 4 | 3 | 2 | 1 |

7. The major deposits of wollastonite are found in

- A) Nellore and Nalgonda
- B) Ratnagiri
- C) Pali
- D) Coimbatore, Salem and Tiruchirappalli

8. Hypothermal deposits form near the intrusive body at temperatures ranging from
 A) 200° to 300°C
 B) 300° to 500°C
 C) 50° to 200°C
 D) 0° to 50°C
9. What forms at the bottom of the swamp from the partially decomposed plant debris?
 A) Lignite
 B) Bituminous coal
 C) Anthracite
 D) Peat
10. Why must the structural deformation of rocks not be very severe for an effective oil trap?
 A) Severe deformation increases oil production
 B) Severe deformation creates more space for oil
 C) Severe deformation may cause leakage, rendering traps ineffective
 D) Severe deformation helps in upward migration of oil
11. What is the common practice for installing pumps in the shaft?
 A) Install a temporary pump at the surface
 B) Install a semi-permanent pump in an inset on the shaft side
 C) Use multiple small pumps at the shaft bottom
 D) Install a permanent pump at the shaft bottom

12. Match the following:

Column - A		Column - B	
i)	Vertically below and within a railway, road, public works	1)	15 metres
ii)	Vertically below a river, canal, tank or surface reservoir	2)	45 metres
iii)	Within the common boundary of a mine	3)	7.5 metres
iv)	Within any disused or abandoned workings containing water	4)	60 metres

Choose the correct option:

	i	ii	iii	iv
A)	4	3	2	1
B)	2	1	3	4
C)	1	2	3	4
D)	2	1	4	3

13. The bord and pillar method is adopted for working

- i) Seam thicker than 1.5m
- ii) Seam at moderate depth
- iii) Seam which are not very gassy
- iv) Coal of adequate crushing strength

Choose the correct option:

- A) i, ii, iii only
- B) iv only
- C) i and ii only
- D) i, ii, iii, iv

14. When might an unclosed traverse be used?

- A) For the framework of surveys for housing or factory sites
- B) For determining the perimeters of lakes
- C) For a trunk sewer, pipeline, main trunk road, or rail construction
- D) For setting out shafts to tunnels

15. What type of traverse might have leg lengths up to 50 km measured by microwave EDM?

- A) Second-order traverse
- B) First-order traverse
- C) Precise control traverse
- D) Urban traverse

16. How does a horizontal line relate to a level line at any particular point?

- A) It runs parallel to the level line
- B) It is perpendicular to the level line
- C) It is tangential to the level line
- D) It intersects the level line at multiple points

17. What needs to be measured to calculate the lengths of sides BC and CA in triangle ABC?

- A) The length of side BC
- B) The angles, A, B and C and the length of side AB
- C) The height of triangle ABC
- D) The perimeter of the triangle

18. In the Wild T2-A theodolite, what does the middle window show?

- A) The degrees and tens of minutes.
- B) The relevant micrometer reading.
- C) The coincident graduations.
- D) The central aperture reading.

19. The average triangular error is the average deviation of the sum of the measured angles in a triangle from:

- A) 360°
- B) 90°
- C) 180°
- D) 270°

20. Consider the following statements:

Statement I : Gunpowder is a low explosive

Statement II : Ammonium nitrate is a high explosive

Choose the correct option:

- A) Statement I is true, statement II is false
- B) Statement I is false, statement II is true
- C) Statement I and II are true
- D) Statement I and II are false

21. ANFO stands for

- A) Ammonia-Nitrogen Fertilizer Operation
- B) Ammonium Nitrate-Fuel Oil Explosives
- C) Ammonium Nitrate-Free Oxygen
- D) Ammonium Nitrate-Firearm Operations

22. Match the following explosives group

- | | |
|---------|-----------------------------------|
| i) P1 | 1) Equivalent sheathed explosives |
| ii) P2 | 2) Ultra-safe explosives |
| iii) P3 | 3) Unsheathed explosives |
| iv) P4 | 4) Sheathed explosives |

Choose the correct option:

- | | i | ii | iii | iv |
|----|---|----|-----|----|
| A) | 3 | 4 | 1 | 2 |
| B) | 4 | 3 | 2 | 1 |
| C) | 1 | 2 | 3 | 4 |
| D) | 3 | 4 | 2 | 1 |

23. Drilling of holes in the centre of the drift axis at corners of a square is

- A) Wedge cut
- B) Drag cut
- C) Fan cut
- D) Pyramid cut

24. Match the following:

Manufacturer

Prefix

- | | |
|---|--------|
| i) Karnataka Explosives Ltd. | 1) Mex |
| ii) Tamilnadu Industrial Explosives Ltd. | 2) Te |
| iii) Maharashtra Explosives Ltd. | 3) Raj |
| iv) Rajasthan Explosives and Chemicals Ltd. | 4) Kel |

Codes:

- | | i | ii | iii | iv |
|----|---|----|-----|----|
| A) | 4 | 3 | 2 | 1 |
| B) | 4 | 2 | 1 | 3 |
| C) | 1 | 2 | 3 | 4 |
| D) | 4 | 1 | 2 | 3 |

25. The type of drill bit used for rotary percussive drilling:

- A) Ballistic bits
- B) Retrac bits
- C) Button bits
- D) Drop Center bits

26. Order the following rocks by increasing Quartz content (%)

- A) Quartzite < Sandstone < Limestone < Anorthosite
- B) Anorthosite < Limestone < Sandstone < Quartzite
- C) Sandstone < Quartzite < Limestone < Anorthosite
- D) Anorthosite < Sandstone < Limestone < Quartzite

27. Which of the following is a non-toxic but explosive gas found in mine air?

- A) Carbon monoxide(CO)
- B) Sulphur dioxide(SO₂)
- C) Methane(CH₄)
- D) Radon

28. The distance required for complete mixing of methane in air by turbulent diffusion in a duct is given by equation.

- A) $L \simeq 24r / \sqrt{f}$
- B) $L \simeq 22f / \sqrt{r}$
- C) $L \simeq 24f / \sqrt{r}$
- D) $L \simeq 22r / \sqrt{f}$

29. Power of ventilation or air power (AP) is the rate at which work is done to maintain the air flow through a system, and is given by the relation.

A) $AP = -M \int V dP$

B) $AP = +M \int V dP$

C) $AP = -M \int V / dp$

D) $AP = +M \int V / dp$

30. What does the Reynolds number determine?

- A) The speed of the fluid flow
- B) The density of the fluid
- C) The relative influence of viscosity on the flow pattern
- D) The temperature of the fluid

31. An instrument which utilizes the difference in refractive indices of methane and air for the estimation of the percentage of methane in mine air.

- A) Firedamp Interferometer
- B) Auer methanometer
- C) Acoustic methanometer
- D) Ultrasonic methanometer

32. Which two pressures are compared to determine the Saturation Deficit?

- A) Air pressure and water pressure
- B) Actual vapour pressure and atmospheric pressure
- C) Vapour pressure and wind pressure
- D) Saturation vapour pressure and actual vapour pressure

33. What is meant by "homotropical ventilation"?

- A) Ventilation with air and mineral traveling in the same direction
- B) Ventilation in a single direction
- C) Ventilation in multiple directions
- D) Ventilation with varying air speeds

34. What is the typical range of natural ventilating pressure in deep and hot mines?

- A) 10 Pa to 100 Pa
- B) 100 Pa to 250 Pa
- C) 250 Pa to 750 Pa
- D) 750 Pa to 1200 Pa

35. Which of the following is **NOT** mentioned as a control device in the passage?
- A) Stoppings
 - B) Doors
 - C) Air-crossings
 - D) Elevators
36. What type of ventilation is typically used in double-unit longwall faces with twin gate roads?
- A) Ascensional ventilation
 - B) Descensional ventilation
 - C) Both ascensional and descensional ventilation
 - D) Natural ventilation
37. What are the two general categories of methods used in ore estimation?
- A) Classical and Numerical
 - B) Classical and Weighting
 - C) Weighting and Statistical
 - D) Statistical and Numerical
38. TF represents the tonnage factor in
- A) m^3/tonne
 - B) m^2/tonne
 - C) m/tonne
 - D) $\text{m}^3 \cdot \text{tonne}$
39. Depending on the grade and weight or mass units used, the total amount of metal or other mineral content of each area of influence is calculated as :
- A) Total content=grade at sample location*weight inside the area
 - B) Total content=grade at sample location/weight inside the area
 - C) Total content=weighted average grade at the three sample points*weight or mass inside the area
 - D) Total content=weighted average grade at the three sample points/weight or mass inside the area
40. How is the stripping ratio value expressed in economic analysis?
- A) As a percentage
 - B) In units of weight per volume
 - C) In equivalent yd^3/ton (m^3/tonne)
 - D) As a ratio of cost to volume

41. Which of the following statements is true regarding the strength of most types of rock?
- A) Tensile strength is typically higher than compressive strength.
 - B) Compressive strength is 8 to 10 times greater than tensile strength.
 - C) Tensile and compressive strengths are usually equal.
 - D) Tensile strength is 8 to 10 times greater than compressive strength

42. Match the following:

- | | |
|----------------------|--------------------------------|
| i) Natural stress | 1) Exists prior to engineering |
| ii) Induced stress | 2) Perturbed by engineering |
| iii) Residual stress | 3) Previous tectonic activity |
| iv) Palaeo stress | 4) No longer acting |

Choose the correct option:

- | | i | ii | iii | iv |
|----|---|----|-----|----|
| A) | 4 | 3 | 2 | 1 |
| B) | 4 | 2 | 1 | 3 |
| C) | 1 | 2 | 3 | 4 |
| D) | 4 | 1 | 2 | 3 |

43. How is stress different from pressure or force?

- A) Stress is a scalar quantity
- B) Stress is a vector quantity
- C) Stress is an imaginary quantity
- D) Stress is a tensor quantity

44. What are the three conditions that must be fulfilled for a mine fire to break out?

- A) Oxygen, heat, and water
- B) Combustible material, oxygen, and a source of ignition
- C) Fuel, oxygen, and ventilation
- D) Combustible material, water, and ventilation

45. Respiratory quotient (RQ) =

- A) $\frac{vol.co_2}{vol.o_2}$
- B) $\frac{vol.o_2}{vol.co_2}$
- C) $\frac{vol.co}{vol.co_2}$
- D) $\frac{vol.co_2}{vol.co}$

46. Hughes and Raybould method utilizes limit diagrams in order to construct an explosives triangle for given mixture of
- A) Air, excess nitrogen
 - B) Air, methane
 - C) Methane, hydrogen, carbon dioxide
 - D) Combustible gases, air, excess nitrogen
47. What instrument is used to measure air velocity in areas with measurable air movement?
- A) Anemometer
 - B) Thermometer
 - C) Barometer
 - D) Hygrometer
48. Colourless gas with a strong pungent smell
- A) Carbon Monoxide
 - B) Sulphur Dioxide
 - C) Nitrous Fumes
 - D) Hydrogen Sulphide
49. An alternative to stone-dust barriers for suppressing firedamp and coal-dust explosions in mines.
- A) Gas barriers
 - B) Chemical barriers
 - C) Explosion barriers
 - D) Water barriers
50. What kind of soil is best suited for the use of a scraper?
- A) Clay soil
 - B) Sandy soil
 - C) Rocky soil
 - D) Loamy soil
51. What type of rocks can be easily ripped by a ripper?
- A) Igneous rocks
 - B) Soft and medium hard rocks below hardness 5 on Moh's scale.
 - C) Metamorphic rocks
 - D) Extremely hard rocks

52. What is the frequency range suitable for a geophone to detect?

- A) 1-10 Hz
- B) 10-50 Hz
- C) 1-100 Hz
- D) 100-1000 Hz

53. What is another name for a pull shovel?

- A) Stripper shovel
- B) Dipper shovel
- C) Dragline
- D) Back hoe

54. Which type of drill is primarily used for wet drilling?

- A) Stoper
- B) Jack hammer
- C) Drifter
- D) Wagon drill

55. The advantages of quarrying are as follows.

- i) Suited to some small deposits
- ii) Relatively skilled labor required
- iii) Low capital cost
- iv) Good safety; little chance of slope failure

Codes:

- A) iii and iv only
- B) i,iii and iv only
- C) ii,iii and iv only
- D) All the above

56. Which mining method listed below is employed to recover heavy minerals from alluvial deposits by using water for excavation, transportation, and/or concentration of the mineral?
- A) Solution mining
 - B) Placer mining
 - C) Auger mining
 - D) Open pit mining
57. What term is used to describe the horizontal layers of uniform thickness in open pit mining?
- A) Floors
 - B) Levels
 - C) Benches
 - D) Ramps
58. The science of employing the changes in the patterns of vegetation growth in an area as a visual or analytical guide to mineralization.
- A) Geochemical prospecting
 - B) Geobotanical prospecting
 - C) Geozoological prospecting
 - D) Geophysical prospecting
59. What materials can be used to construct explosion-proof stoppings?
- A) Metal and plastic
 - B) Glass and steel
 - C) Brickwork, concrete, and timber
 - D) Rubber and foam
60. Which of the following activities can directly cause firedamp explosions in mines?
- A) Friction
 - B) Electric sparks
 - C) Both A and B
 - D) Neither A nor B

61. What typically causes accidents during the hoisting process in shaft sinking?
- A) Electrical failures
 - B) Bucket striking the timbers or walls
 - C) Gas leaks
 - D) Lack of ventilation
62. What is a common consequence of using an ordinary open hook in shaft sinking?
- A) Increased efficiency
 - B) Improved safety
 - C) Bucket detachment
 - D) Reduced hoisting speed
63. What is another name for the overhand cut-and-fill stoping method?
- A) Room and pillar stoping
 - B) Shrinkage stoping
 - C) Breast stoping or back stoping
 - D) Sublevel stoping
64. What is the best method of roof control for working seams liable to spontaneous combustion?
- A) Open caving
 - B) Longwall caving
 - C) Pillar extraction
 - D) Solid stowing
65. The basic production cycle consists of these unit operations:
- A) drill + blast + load + haul
 - B) haul + load + blast + drill
 - C) load + haul + drill + blast
 - D) load + drill + blast + haul

66. Which of the following minerals can be detected by remote sensing through the spectral window mentioned in the passage?
- A) Quartz and feldspar
 - B) Kaolinite and montmorillonite
 - C) Pyrite and magnetite
 - D) Hematite and goethite
67. What are the two geometric forms of basic sampling grids mentioned in the passage?
- A) Square and rectangular
 - B) Circular and elliptical
 - C) Regular and irregular
 - D) Triangular and hexagonal
68. Why is borehole logging particularly important in coal and uranium exploration?
- i) It helps in identifying the lithologic type of surrounding rocks
 - ii) It records the depth of the borehole
 - iii) It identifies the horizon and establishes its thickness and certain properties
 - iv) It replaces the need for core samples

Codes:

- A) iii only
 - B) i, ii and iv only
 - C) i only
 - D) all the above
69. Which type of mineral resource has the lowest degree of certainty?
- A) Measured mineral resource
 - B) Indicated mineral resource
 - C) Inferred mineral resource
 - D) Proved mineral resource

70. What factors increase the Specific Damping Capacity of a rock?
- A) Elasticity and density.
 - B) Porosity, permeability, joints, and water content.
 - C) Hardness and crystalline structure.
 - D) Thickness and composition.
71. What property is **NOT** used to determine the relative liability to spontaneous combustion of different coals?
- A) Critical oxidation temperature
 - B) Ignition temperature
 - C) Quantity of sorbed oxygen
 - D) Thermal conductivity.
72. When excavating long, large-section shafts or metal structures, pneumatic or hydraulic jumbos equipped with three or four booms, each with its own feed and rock drill, are used?
- A) Shaft sinking
 - B) Raise driving
 - C) Jet Piercing
 - D) Water-jet drilling
73. Which thread type is primarily used for small blastholes with drill rods of 22 to 38 mm and powerful independent rotation rock drills with air flushing?
- A) T-thread
 - B) C-thread
 - C) R-thread
 - D) GD or HL-thread
74. The holes are drilled at an angle to the face in a symmetrical formation in
- A) Wedge cut
 - B) Fan cut
 - C) Parallel cut
 - D) Pyramid cut

75. Rock of _____ is normally harder to blast than rock of _____
- A) Low density, high density
 - B) High density, low density
 - C) Low density, low density
 - D) High density, high density
76. The Compressive strength (kg/cm^2) of Granite ranges from
- A) 2900 to 4000
 - B) 1500 to 1900
 - C) 1300 to 2000
 - D) 2000 to 3600
77. The range of seismic velocity(m/s) observed in marble
- A) 4500 - 6000
 - B) 4000 - 6000
 - C) 1500 - 2000
 - D) 6000 - 7000
78. What should be avoided during drilling operations?
- A) Drilling at high speeds
 - B) Drilling near water sources
 - C) Simultaneous drilling and loading
 - D) Using hydraulic jumbos
79. What is a recommended practice when dealing with electronic detonator circuits near sensitive equipment such as radio transmitters?
- A) Increase the length of electric leads
 - B) Use non-electric or low sensitivity detonators.
 - C) Place the circuit above ground level
 - D) Use high sensitivity detonators

80. What is the most dangerous type of pneumokoniosis found in mines?
- A) Anthracosis
 - B) Asbestosis
 - C) Silicosis
 - D) Byssinosis
81. What symptom is common in both silicosis and asbestosis?
- A) Productive cough
 - B) Non-productive cough
 - C) High fever
 - D) Chest pain
82. In practice, what dust particle size is usually considered to be dangerous?
- A) Above $5\ \mu\text{m}$
 - B) $0.25\ \mu\text{m}$ to $5\ \mu\text{m}$
 - C) Below $5\ \mu\text{m}$
 - D) $2\text{-}3\ \mu\text{m}$
83. Which of the following is **NOT** a feature of the holographic system described?
- A) Uses a pulsed ruby laser.
 - B) Forms ring-like wave interference patterns
 - C) Magnifies images using a Vidicon camera tube
 - D) Suitable for particles smaller than $3\ \mu\text{m}$
84. According to Kitto and Beadle, what sampling device's performance is compared for different durations of sampling?
- A) Gravimetric sampler
 - B) Thermal precipitator
 - C) Optical particle counter
 - D) Impactor
85. What is the primary objective of the Mines Act, 1952?
- A) To promote foreign investment in the mining sector
 - B) To regulate the safety, health, and welfare of mine workers
 - C) To increase the production of minerals
 - D) To control the price of minerals
86. The device used as rapid method of estimating the number of particles of the dust in mine air
- A) Konimeter
 - B) Read water-spray dust collector
 - C) Electric dust collector
 - D) Impinger

87. Instrument using the impinger principle has been developed by
- A) Watkins Pitchford
 - B) Philip Drinker
 - C) Sir Robert Kotze
 - D) Loenard Greenburg
88. What can the Chief Inspector do with the approval of the Central Government regarding the powers of Inspectors?
- A) Assign any of his powers to an Inspector
 - B) Limit the powers of any Inspector
 - C) Both A and B
 - D) None of the above
89. Under which section are the Chief Inspector and all Inspectors deemed to be public servants?
- A) Indian Mines Act, 1952
 - B) Indian Penal Code
 - C) Indian Contract Act
 - D) Indian Labour Law
90. The National Mineral Policy was announced in the year
- A) 1983
 - B) 1991
 - C) 1995
 - D) 1993
91. Who developed a test for measuring the durability and abrasiveness of the rocks?
- A) Eimco-Secoma
 - B) Fairhurst
 - C) Mohs
 - D) Smith
92. The measuring unit of compressive rock strength is
- A) N/33
 - B) Mm
 - C) r/min
 - D) MPa

93. Match the following zones with the drilling methods

- | | |
|---------------|----------------------------------|
| i) Zone I | 1) Medium-thrust rotary drilling |
| ii) Zone II | 2) Rotary percussive drilling |
| iii) Zone III | 3) High thrust rotary drilling |
| iv) Zone IV | 4) Low-thrust rotary drilling |

Choose the correct option:

- | | i | ii | iii | iv |
|----|---|----|-----|----|
| A) | 4 | 3 | 2 | 1 |
| B) | 4 | 2 | 1 | 3 |
| C) | 1 | 2 | 3 | 4 |
| D) | 4 | 1 | 3 | 2 |

94. Pick the odd one

- A) Scalar: Force
- B) Scalar: Temperature
- C) Vector: Velocity
- D) Tensor: Stress

95. How are normal and shear stress components plotted on Mohr's circle?

- A)
- B)
- C)
- D)

96. Which of the following factors contribute to the stress state in rock formations?
- A) Weight of the rock, erosion processes, and atmospheric pressure
 - B) Current tectonic forces, erosion processes, and groundwater flow
 - C) Previous tectonic forces, weight of the rock, and current tectonic forces
 - D) Atmospheric pressure, groundwater flow, and human activities
97. The methanometer designed to measure high percentage of methane in pipe ranges used for methane drainage.
- A) Auer methanometer
 - B) Acoustic methanometer
 - C) Firedamp interferometer
 - D) Verneuil methanometer
98. Stannosis and barytosis are examples of which type of pneumokoniosis?
- A) Collagenous
 - B) Noncollagenous
 - C) Fibrogenic
 - D) Progressive massive fibrosis
99. Which two geological epochs are primarily associated with the formation of the Indian coal fields?
- A) Jurassic and Cretaceous
 - B) Cambrian and Devonian
 - C) Silurian and Carboniferous
 - D) Permian and Tertiary
100. Which Act is referred to as MM(D&R) Act?
- A) Mines and Minerals (Development and Regulation) Act, 1957
 - B) Mines and Minerals (Regulation and Development) Act, 1986
 - C) Mines Act, 1952
 - D) Mineral Conservation Act, 1985
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