COMBINED TECHNICAL SERVICES EXAMINATION

(DIPLOMA/ ITI LEVEL)

COMPUTER BASED TEST

DATE OF EXAM: 24.09.2025 FN

PAPER – II – MINING ENGINEERING

(DIPLOMA STANDARD) (CODE: 346)

1. What is the composition of Hoolamite used in a Hoolamite tube for CO detection and what is the basis of its detection mechanism?

(A) Iodine and nitric acid; colour change due to nitrogen oxide

(B) Iodine pentoxide and sulfuric acid; colour change due to liberation of iodine

(C) Copper sulfate and lime; reaction with CO to form copper carbonate

(D) Platinum catalyst and sulfuric acid; oxidation of CO to CO_2

(E) Answer not known

2. According to Boyle's law, when the temperature remains constant, the volume of given mass of gas is :

(A) Directly proportional to its pressure

(B) Inversely proportional to its pressure

(C) Directly proportional to its temperature

(D) Independent of its pressure

(E) Answer not known

3. Quantity of air to be circulated to UIG workings depends on

(A) Manpower employed in a largest shift

(B) Manpower employed in a day

(C) Total production in a day

(D) Both (A) and (C)

(E) Answer not known

4. The oxygen concentration in U/G working should not be less than

(A) 21%
(B) 20%
(C) 19%
(D) 18%
(E) Answer not known

5. Oxygen flow rate in the self contained breathing apparatus.

(A) 1 L/Min
(B) 1.5 L/Min
(C) 2 L/Min
(D) 2.5 L/Min
(E) Answer not known

6. As per DGMS guidelines, minimum width of haul road in opencast mines. For 100 - tonne dumper two - way movement is :

(A) 15 M
(B) 25 M
(C) 30 M
(D) 40 M
(E) Answer not known

7. In high wall mining, which component acts as the primary cutting tool inside the coal seam?

(A) Rammer head
(B) Continuous miner
(C) Auger head
(D) Cutter head
(E) Answer not known

8. In reclamation of mined out land, which of the following soil amendments is most effective in reducing soil acidity and enhancing revegetation in overburden dumps of lignite mines?

(A) Urea
(B) Gypsum
(C) Lime
(D) Ammonium nitrate
(E) Answer not known

9. In alluvial soil / morum / gravel / clay (Manual opencast), sides shall either be sloped at an angle of safety not exceeding

(A) 30° from horizontal
(B) 45° from horizontal
(C) 60° from horizontal
(D) 75° from horizontal
(E) Answer not known

10. While extracting coal over developed pillars by opencast method the minimum thickness of parting between quarry floor and goat should be :

(A) 3 M
(B) 5 M
(C) 7 M
(D) 10 M
(E) Answer not known

11. If the powder factor in an OB blast is 5 t/kg and the volume blasted per round is 6000 m^3 with bulk density 2.4 t/m^3 , determine the explosive consumption.

(A) 250 Kg
(B) 288 Kg
(C) 320 Kg
(D) 350 Kg
(E) Answer not known

12. Which one of the following term is not related to open cast mining?

(A) Boxcut
(B) Highwall
(C) Crest
(D) Winge
(E) Answer not known

13. For OB removal with shovel - dumper combination, the optimum size of the dumper depends on

(A) Distance of Haul
(B) Size of the Shovel
(C) Distance of the Haul and Size of the Shovel
(D) Tonnage to be handled
(E) Answer not known

14. The area of working face broken per drill hole is termed as

(A) Drillability
(B) Blasting factor
(C) Drilling factor
(D) Powder factor
(E) Answer not known

15. Which of the following factor is considered for calculation of cycle time of any excavating machine such as shovel, dragline etc?

(A) Swell factor
(B) Bucket factor
(C) Swing factor
(D) Drill factor
(E) Answer not known

16. Which one of the following is the most likely mode of slope failure. for waste dump.

(A) Circular
(B) Wedge
(C) Plane
(D) Toppling
(E) Answer not known

17. A mechanised opencast mine runs in two shifts of 7 hours each. The average production per shift is 2000 tonnes. If the mine wants to increase production by 20% without increasing the number of shifts, by how much should productivity per shift increase?

(A) 400 tonnes / shift
(B) 800 tonnes / shift
(C) 200 tonnes / shift
(D) 100 tonnes / shift
(E) Answer not known

18. A mine currently has 100 workers producing 280 tonnes/day. If the OMS is to be increased by 25%, what will be the new daily output?

(A) 250 tonnes / day
(B) 450 tonnes / day
(C) 350 tonnes / day
(D) 150 tonnes / day
(E) Answer not known

19. An excavator is used to dig soil with a bucket capacity of 2.8 m^3. The fill factor is 0.85 and swell factor is 1.3. Cycle time is 45 seconds and it works 6 hours / day with 80% job efficiency. Find the loose volume output per day.

(A) 1187.2 m^3 /day
(B) 1250.2 m^3 /day
(C) 1200.2 m^3 /day
(D) 1150.2 m^3 /day
(E) Answer not known

20. A shovel loads trucks with 6 m^3 bucket capacity. The shovel completed 4 passes to fill one truck. Each truck carrier 24 tonnes of material. The shovel has a cycle time of 50 seconds and works for 5 effective hours in a shift. How many tonnes of material can the shovel load in one shift?

(A) 2260 tonnes
(B) 2360 tonnes
(C) 2460 tonnes
(D) 2160 tonnes
(E) Answer not known

21. A truck takes 20 minutes to load,15 minutes to travel loaded, 10 minutes to dump and 12 minutes to return empty. Calculate the total cycle time and the number of cycles a truck can complete in an 8-hour shift.

(A) 10 cycles
(B) 12 cycles
(C) 11 cycles
(D) 8 cycles
(E) Answer not known

22. A mine has a fleet of 20 trucks with following parameters :

Truck speed : 45 km/hr.

Round trip distance : 30 km (to and from the processing plant)

Average loading time per truck : 45 minutes.

Average unloading time per truck : 30 minutes

What is the total time (in hours) required for one truck to complete one round trip (including loading and unloading)?

(A) 2 hours
(B) 1.92 hours
(C) 3 hours
(D) 3.92 hours
(E) Answer not known

23. In Open-Cast Mining, wedge failure occurs when

(A) There is a weak bedding plans parallel to the slope face
(B) A rock man slides along a curved surface
(C) Two intersecting discontinuities dip out of the slope face
(D) Loose rock detaches from a vertical slope
(E) Answer not known

24. If a project cannot be completed within the scheduled time, this is known as :

(A) Cost overrun
(B) Delay analysis
(C) Time overrun
(D) Project cancellation
(E) Answer not known

25. How is OMS (Output Per Manshift) determined is mining operations?

(A) Total production per week divided by number of machines used

(B) Total production in a shift divided by number of working days

(C) Total production in tonnes divided by total number of man shifts worked

(D) Total wages paid divided by total output produced.

(E) Answer not known

26. Which of the following is a key feature of a dragline excavator?

(A) It drills boreholes in hard rock

(B) It digs above its level and requires frequent repositioning

(C) It digs below the level it stands on and can cast material over a wide area

(D) It is used only for tunnel boring

(E) Answer not known

27. What is the primary function of a road grader in mining operations?

(A) Drilling into hard rock

(B) Crushing large boulders

(C) Levelling road surfaces and removing boulders

(D) Excavating overburden

(E) Answer not known

28. A belt conveyor may be used at a gradient of upto ———— for lumpy ore?

(A) 18°
(B) 28°
(C) 38°
(D) 48°
(E) Answer not known

29. If a bucket has a rated (theoretical) volume of 5 m^3, but only 4 m^3 of material is actually loaded during operation, what is the bucket fill factor?

(A) 0.6
(B) 0.75
(C) 0.8
(D) 1.25
(E) Answer not known

30. For an open pit mining the value of metal is Rs. 210/kg and recoverable grade is 1.2%. Production cost per tonne of ore inclusive of mining and processing but excluding stripping is Rs. 2,000. If the breakeven stripping ratio is 3.49 m^3/te, then the stripping cost is

(A) Rs. 149/m^3
(B) Rs. 72/m^3
(C) Rs. 60/m^3
(D) Rs. 49/m^3
(E) Answer not known

31. What is the process of obtaining a small amount or portion of ore coal or rock substances called?

(A) Drilling
(B) Sampling
(C) Blasting
(D) Excavation
(E) Answer not known

32. What is the term used to describe the proportion of overburden to coal / mineral removed in mining?

(A) Recovery factor
(B) Stripping ratio
(C) Grade
(D) Yield
(E) Answer not known

33. What does the term 'NONEL' stand in blasting technology

(A) Non-licensed explosive
(B) Non-elemental explosive
(C) Non-electric detonator
(D) Non-electric line initiator
(E) Answer not known

34. What is a "blown-out-shot" in blasting operations?

(A) A shot that has done useful work by breaking coal
(B) A shot that has ejected itself out of the shot hole without doing any useful work
(C) A shot that has failed to ignite
(D) A shot that has exploded but caused minimal damage
(E) Answer not known

35. What is 'pop shorting' in the context of blasting operations?

(A) Primary blasting method for coal seams
(B) A technique for controlled blasting in tunnels
(C) A secondary blasting method where a hole is drilled into a boulder using a Tacchometer and charged with explosive
(D) A method for testing the explosive sensitivity
(E) Answer not known

36. 'NONEL' is used for surface connection of the blast holes in order to

(A) Achieve better water resistance over detonating fuse
(B) Have a precise delay timing
(C) Provide Noiseless shock front movement
(D) Avoid Deflagration
(E) Answer not known

37. Match the following :

	Excavating/Loading machine		Transportation Scheme
(P)	Bucket wheel excavator	1.	Mine tub
(Q)	Continuous miner	2.	Armoured flexible chain conveyor
(R)	Shearer	3.	Shiftable conveyor
(S)	Load haul dumper	4.	Shuttle car

	(P)	(Q)	(R)	(S)
(A)	3	2	4	1
(B)	3	4	2	1
(C)	3	2	1	4
(D)	1	4	3	2

(E) Answer not known

38. The correct order of pavement layers for a haul road from top to bottom is

(A) Wearing course → Base → Sub base → Sub grade
(B) Wearing course → Sub base → Base → Sub grade
(C) Wearing course → Sub grade → Sub base → Base
(D) Wearing course → Base → Sub grade → Sub base
(E) Answer not known

39. As per regulation 135 of CMR 2017, storage of combustible materials near mine entrances is permitted only if they are intended for use within how many hours?

(A) 12 hours
(B) 18 hours
(C) 24 hours
(D) 48 hours
(E) Answer not known

40. In open cast mining, the primary purpose of maintaining a proper bench height is to

(A) Increase ore grade
(B) Facilitate easier transportation of ore
(C) Ensure safety and stability of pit walls
(D) Maximize explosive energy utilization
(E) Answer not known

41. A high explosive produces a shattering effect because

(A) The oxidation process is slow and spread over time
(B) The oxidation reaction is instantaneous and occurs at high velocity
(C) It requires no stock to detonate
(D) The explosion happens gradually and not violently
(E) Answer not known

42. The void ratio of an unconsolidated soil heap of volume 1000 m^3 is 1.0. If the soil heap is consolidated to a volume of 800 m^3, the corresponding void ratio is _____ (round off up to 2 decimals)

(A) 1.00
(B) 0.90
(C) 0.60
(D) 0.80
(E) Answer not known

43. NONEL is used as down-the-hole initiator to

(A) Avoid generation of air over pressure
(B) Provide precise delay
(C) Avoid deflagration of column charge
(D) Reduce ground vibration
(E) Answer not known

44. Shear strength of rock joint is NOT dependent on

(A) Applied normal stress
(B) Applied shear stress
(C) Friction angle of the joint plane
(D) Cohesion of the joint plane
(E) Answer not known

45. Match the following for a typical slurry explosive :

Chemical	Purpose
(P) Calcium nitrate	1. Cross linking agent
(Q) Potassium dichromate	2. Gelling agent
(R) TNT	3. Oxidiser
(S) Starch	4. Fuel

	(P)	(Q)	(R)	(S)
(A)	1	2	3	4
(B)	2	4	3	1
(C)	3	1	4	2
(D)	4	3	2	1

(E) Answer not known

46. Identify the initiation sequence which is NOT possible for surface blasting

(A) Detonating fuse → Novel → Electronic detonator
(B) Electronic detonator → Novel → Detonating fuse
(C) Electric detonator → Detonating fuse → Novel
(D) Electronic detonator → Detonating Fuse → Novel
(E) Answer not known

47. What is the portable apparatus called that provides the current necessary for firing electric detonators?

(A) Crimper
(B) Safety fuse
(C) Exploder
(D) Blasting cap
(E) Answer not known

48. What is slurry explosive in the context of mining?

(A) A dry mixture of ANFO and TNT
(B) A mixture of charcoal and sulphur in powdered form
(C) A jelly like water gel consisting of oxidizer fuel sensitizer thickened with gum and gelled with a cross binding agent
(D) Pure nitroglycerine absorbed on an inert material
(E) Answer not known

49. The reaction between nitric acid and benzene compounds yields

(A) Nitroglycerin
(B) Trinitrotoluene (TNT)
(C) Dynamite
(D) Ammonium Nitrate
(E) Answer not known

50. In overburden dump design, the overall slope angle is always kept lower than the bench slope angle because.

(A) To accomodate haul roads
(B) To allow wider berms for stability
(C) To comply with DGMS clearance norms
(D) All of the above
(E) Answer not known

51. While slake durability index, we use rock samples in the form of

(A) Drill cores
(B) Uneven rock pieces
(C) Cubes
(D) Square
(E) Answer not known

52. Which process of deformation indicates sudden loss of strength across a plane following little or no permanent deformation?

(A) Ductile deformation
(B) Effective stress
(C) Brittle fracture
(D) Residual strength
(E) Answer not known

53. Match the following mechanical properties with the formulae :

Mechanical property		Formula
(P) Modulus of elasticity	1.	$C + \sigma_n \tan\phi$
(Q) Compressive strength	2.	$\varepsilon_{Lateral} / \varepsilon_{Longitudinal}$
(R) Shear strength	3.	σ / ε
(S) Poisson's ratio	4.	$F_n / \pi r^2$

	(P)	(Q)	(R)	(S)
(A)	1	2	3	4
(B)	1	4	3	2
(C)	3	4	1	2
(D)	3	2	1	4

(E) Answer not known

54. Given K is the thermal conductivity, P is density and C is specific heat of a rock sample, the thermal diffusivity of the rock sample is

(A) Kp/C
(B) Pc/K
(C) Kc/P
(D) K/Pc
(E) Answer not known

55. When mineral is extracted from an underground mine, the void (goat) is packed with sand or other packing material. This process is known as

(A) Root bolting
(B) Subsidence control
(C) Stowing
(D) Grouting
(E) Answer not known

56. What is the angle of draw in subsidence studies?

(A) The angle at which coal seams dip underground
(B) The angle between the horizontal and the fault line
(C) The angle between the vertical and the final line of break
(D) The angle of inclination of mine roadways
(E) Answer not known

57. As per "Pressure Arch Theory", the magnitude of bending forces increases with?

(A) Depth of the excavation
(B) Height of the root
(C) Width of the excavation
(D) Density of the rock
(E) Answer not known

58. If Poisson's ratio of a rock sample is 0.25, then the relationship among the modulus of elasticity (E), modulus of rigidity (G) and bulk modulus (K) is

(A) $E = K = G$
(B) $E > G > K$
(C) $E = G > K$
(D) $E > K > G$
(E) Answer not known

59. The major and minor principal stresses at a point are 25 MPa and –5 MPa respectively. The maximum shear stress in MPa at that point is

(A) 20
(B) 15
(C) 10
(D) 5
(E) Answer not known

60. Darcy's law refer to the property of rock related to

(A) Moisture content
(B) Degree of saturation
(C) Permeability
(D) Density
(E) Answer not known

61. In mine survey data processing, surface is mainly used for

(A) Electrical load calculation
(B) Geological modelling and survey data analysis
(C) Ventilation simulation
(D) Explosive inventory
(E) Answer not known

62. Which type of data is most associated with remote sensing in mining?

(A) Ground vibration levels
(B) Satellite imagery
(C) Drill core logs
(D) Haul truck speed
(E) Answer not known

63. In modern mining operation, Enterprise Resource Planning (ERP) systems are mainly used for

(A) Geological modelling
(B) Integrated management of resources, finance and operations
(C) Ventilation design
(D) Blast pattern simulation
(E) Answer not known

64. Which root bolt type provides immediate full-column bonding and is preferred in highly jointed strata?

(A) Mechanical shell anchor bolt
(B) Resin capsule bolt
(C) Spilit set friction bolt
(D) Tensioned cable bolt
(E) Answer not known

65. In Indian coal mines, the statutory minimum factor of safety for pillar design in depillaring districts is

(A) 1.3
(B) 1.5
(C) 1.6
(D) 2.0
(E) Answer not known

66. Indian railways recommends the gradient at a mine's railway siding (loading point) should generally not exceed

(A) 1 in 200
(B) 1 in 400
(C) 1 in 100
(D) 1 in 300
(E) Answer not known

67. In SURPAC, the "DTM boundary" is used to

(A) Restrict triangulation to a defined project area
(B) Identify geological contacts within the ore body
(C) Fix co-ordinates for blast hole patterns
(D) Separate ore from waste in block model estimation
(E) Answer not known

68. In Geological Report preparation, the "mineable reserve" is different from "proved reserve" became it

(A) Excludes ore lost in mining and processing losses

(B) Includes all resources within lease area irrespective of mining feasibility

(C) Considers only resources identified during reconnaissance

(D) Is always greater than the geological reserve

(E) Answer not known

69. In MINEX scheduling, "Precedence constraints" are used to

(A) Maintain correct sequence of mining operations in time

(B) Estimate geological loss during production

(C) Control ventilation airflow in underground layouts

(D) Fix design parameters for haul roads and benches

(E) Answer not known

70. Which statement is correct regarding Forest clearance stage – II (Final Clearance)?

(A) Granted before stage I clearance is issued to the project proponent

(B) Granted after stage I compliance, NPV payment and afforestations completion

(C) Granted after a separate environmental impact assessment study is prepared

(D) Granted only for mining leaser in Metallic mineral deposits

(E) Answer not known

71. In SURPAC, "DTM" stands for

(A) Digital Terrain Model
(B) Drilling Test Method
(C) Data Transfer Module
(D) Dynamic Tracking Map
(E) Answer not known

72. In SURPAC, the "String File" format is primarily used to

(A) Store borehole lithology data
(B) Save triangulated pit surfaces
(C) Represent 2 D and 3 D coordinate data for mine design
(D) Export scheduling reports
(E) Answer not known

73. Under Indian mining Legislation, before submitting a Mining Plan for approval, the lessee must first obtain

(A) Forest clearance (Stage - I)
(B) Environmental clearance
(C) Letter of Intent/Grant of Mining Lease
(D) Consent to operate from state pollution control board
(E) Answer not known

74. An ore block of 1200 m^3 has a specific gravity of 3.0 and grade of 55 % Fe. Calculate contained Fe tonnage.

(A) 1980 tonnes
(B) 2200 tonnes
(C) 1650 tonnes
(D) 2000 tonnes
(E) Answer not known

75. In Mine ventilation, the booster fan is installed

(A) At the surface to increase main fan capacity

(B) Underground in intake airway to supplement pressure

(C) Underground in return airway to assist in air circulation in a district

(D) At shaft bottom to increase natural ventilation

(E) Answer not known

76. In ore reserve estimation, the tonnage factor (m^3 per tonne) is inversely proportional to

(A) Ore grade

(B) Specific gravity of ore

(C) Ore thickness

(D) Borehole depth

(E) Answer not known

77. An inclined shaft has a finished diameter of 5.0 m and is driven at 30 ° from horizontal. If the lining thickness is 0.4 m, calculate the excavation cross-sectional area.

(A) 23.56 m^2

(B) 26.43 m^2

(C) 27.50 m^2

(D) 29.20 m^2

(E) Answer not known

78. A haul truck fleet consists of 8 trucks, each carrying 25 tonnes of ore per trip. The average cycle time per truck is 40 minutes. If the mine operates for 12 hours per shift, how much ore is transported per shift?

(A) 2400 tonnes
(B) 3600 tonnes
(C) 4500 tonnes
(D) 6000 tonnes
(E) Answer not known

79. A mine operates a fleet of 6 trucks each carrying 20 tonnes of ore per trip. The average cycle time per truck is 30 minutes. If the mine operates for 10 hours per shift, how much ore is transported per shift?

(A) 1200 tonnes
(B) 1800 tonnes
(C) 2400 tonnes
(D) 3600 tonnes
(E) Answer not known

80. A group of 6 miners can extract 180 tons of ore in 10 days. How many days will 10 miners take to extract 300 tons of ore, assuming the same efficiency?

(A) 10 days
(B) 12 days
(C) 9 days
(D) 8 days
(E) Answer not known

81. A 10 m thick coal block is excavated by a contractor at a cost of Rs. 10 per m^3. The excavated area measured in the mine plan, is found to be 50 cm^2 . If the mine plan has been drawn to a scale of 1 : 1000, the payment to be made to the contractor, in lakhs of Rs. ———— is.

(A) 10
(B) 15
(C) 20
(D) 25
(E) Answer not known

82. A drill rig operates for a 9 hours shift, but due to delays, 90 minutes are lost. If the expected drilling rate is 5 meters per hour, how much drilling is lost due to delays?

(A) 5 meters
(B) 7.5 meters
(C) 10 meters
(D) 12.5 meters
(E) Answer not known

83. The total mineable reserve is 5 million tonnes and the planned annual production is 625000 tonnes, what is the estimated mine life?

(A) 6 years
(B) 8 years
(C) 10 years
(D) 12 years
(E) Answer not known

84. If a mine produces 2000 tonnes/day and operates. 300 days per year, what will be the annual production?

(A) 500,000 tonnes
(B) 600,000 tonnes
(C) 700,000 tonnes
(D) 800,000 tonnes
(E) Answer not known

85. A dragline has a bucket capacity of 50 m^3 and completer 4 cycles per hour. How much material will it move in a 10-hour shift?

(A) 2000 m^3 (B) 1500 m^3

(C) 1800 m^3 (D) 2500 m^3

(E) Answer not known

86. As per regulation 64, of CMR 2017, the plans and sections required by these regulations shall be maintained corrected up to date which is not earlier than

(A) 3 months (B) 6 months

(C) 4 months (D) 5 months

(E) Answer not known

87. As per regulation 70 of CMR 2017, which deals with

(A) Change of safety officer, agent Ad manager

(B) Change of safety officer

(C) Change of agent or manager

(D) During change of ownership or an reopening etc. the plans to be checked

(E) Answer not known

88. What happen if more than one auxiliary fan is in one ventilating district?

(A) It recirculates air having dust and noxious gases

(B) It deposits of dust on the fan moving pasts

(C) The chance of electrostatic sparking

(D) It affects the air quality being circulated

(E) Answer not known

89. Which of the following bolting practice do not require any quick setting cement capsule in the drill hole?

(A) Recoverable type of bolt
(B) Non recoverable type of hole
(C) Bamboo bolt
(D) Side stitching
(E) Answer not known

90. In sublevel stopping operation the draw system is generally

(A) Draw point
(B) Cross drift
(C) Finger raise and chute
(D) None of the above
(E) Answer not known

91. Match the following :

	Instrument	Principle features	Application
(P)	Tilting level	(1) Micrometer	(i) Levelling
(Q)	Microptic Theodolite	(2) Magnetic Needle	(ii) Traversing
(R)	Telescopic alidade	(3) U-Tube	(iii) Azimuth (Bearing)
(S)	Compass	(4) Plane table surveying	(iv) Contouring

	(P)	(Q)	(R)	(S)
(A)	(1)-(ii)	(2)-(iii)	(4)-(i)	(3)-(iv)
(B)	(4)-(ii)	(3)-(i)	(1)-(iii)	(2)-(iv)
(C)	(2)-(iii)	(3)-(ii)	(4)-(i)	(1)-(iv)
(D)	(3)-(i)	(1)-(ii)	(4)-(iv)	(2)-(iii)

(E) Answer not known

92. It is the method of leveling in which the heights of mountain are found by observing the temperature at which water boils. The method is called

(A) Profile leveling
(B) Check leveling
(C) Hypsometry
(D) Techeometry
(E) Answer not known

93. Match the devices with their intended applications.

(P) Ground penetrating Radar	1. Spatial positioning of a point
(Q) Tactile sensor	2. Measurement of borehole deviation
(R) GNSS	3. Robatic arm
(S) Digital Inclinometer	4. Locating subsurface features

	(P)	(Q)	(R)	(S)
(A)	1	2	3	4
(B)	4	3	1	2
(C)	3	4	2	1
(D)	4	3	2	1

(E) Answer not known

94. The three segments, whose synchronous functioning is essential for GPS operations are

(A) Space, control and user
(B) Signal, control and user
(C) Space, control and geo-registration
(D) Signal, control and geo-registration
(E) Answer not known

95. The EDM (Electronic Distance Measurement) method is based on

(A) Manual chaining and taping techniques
(B) Theodolite readings and angular measurements
(C) Generation, propagation, reflection and reception of electromagnetic waves
(D) Photo graphic triangulation methods
(E) Answer not known

96. When a double ended ranging drum shearer cuts coal in a Longwall face?

(A) Both the drum rotate in the same direction keeping the front drum up and the rear drum down.

(B) Both the drum rotate in the opposite direction keeping the front drum up and the rear drum down.

(C) Both the drum rotate in the opposite direction keeping the front drum down and the rear drum up.

(D) Both the drum rotate in the same direction keeping the front drum down and the rear drum up.

(E) Answer not known

97. Which stopping method is used in working thin steeply dipping veins enclosed in strong wall rocks?

(A) Underhand stoping

(B) Open Stoping

(C) Cut and Fill Stoping

(D) Rill Stoping

(E) Answer not known

98. Which stoping method is a low cost, simple method much preferred for low grade ore deposits where supporting ore pillars may be left and best suited to deposits of horizontal or mild dip and of thickness of upto 5 m, using at moderate depths?

(A) Underground stoping

(B) Open stoping

(C) Breast stoping

(D) Rill stoping

(E) Answer not known

99. "Cross measure borehole method" is used for

(A) Rock slope monitoring
(B) Methane drainage
(C) Connecting two drifts
(D) Subsidence monitoring
(E) Answer not known

100. Match the following

Haulage unit		Safety device
(P)	Friction winder	1. Run away switch
(Q)	Drum winder	2. Lilly controller
(R)	Direct rope haulage	3. Regenerative braking
(S)	Endless rope haulage	4. Monkey /back catch

	(P)	(Q)	(R)	(S)
(A)	1	2	3	4
(B)	3	2	1	4
(C)	1	3	4	2
(D)	2	3	1	4

(E) Answer not known

101. The stoping method, where a Large part of blasted ore is allowed to accumulate in the stope to serve the purpose of providing working platform for stoping as well as to support the wall-rock is known as

(A) Shrinkage stoping
(B) Cut and fill stoping
(C) Square set stoping
(D) Sublevel stoping
(E) Answer not known

102. The method of Regulating the withdrawal of ore in the sublevel crosscuts so as to optimise the Economics of the draw is called ———— control.

(A) ore
(B) draw
(C) flow
(D) ore flow
(E) Answer not known

103. The supported methods are basically classified as

(A) Cut and fill, stull and square set
(B) Cut and Fill, stull
(C) Stull, square set
(D) Cut and Fill, square set
(E) Answer not known

104. All stope and pillar mines using conventional mining practice have the production cycle involving.

(A) Blast, Load and Haul
(B) Cut, Drill, Blast, Load and Haul
(C) Drill, Blast, Load and Haul
(D) Drill, Load and Haul
(E) Answer not known

105. Stope and pillar mining comes under the classification of ———— method of mining.

(A) Unsupported
(B) Supported
(C) Caving
(D) Stoping
(E) Answer not known

106. V.C.R. is a modified version of

(A) Sub Level
(B) Cut and fill
(C) Block caving
(D) Stope and pillar
(E) Answer not known

107. The weight of the overlying rock plus any tectonic forces is Generally called ———— Load.

(A) Rock
(B) Strata
(C) Incumbent
(D) Super incumbent
(E) Answer not known

108. In a room and pillar operation, all openings are 6 meters in width and the mining height is regular, rooms are driven on 18 meter centers and crosscuts on 24 meter centers. The percentage of recovery in the panel without removal of pillars is ————%.

(A) 75
(B) 50
(C) 25
(D) 100
(E) Answer not known

109. A Mining method that uses prismatic framework of timber sets for support is ———— Stopping method.

(A) Overhand
(B) Square set
(C) Stull
(D) Cut and Fill
(E) Answer not known

110. In Bord and pillar panels worked in conjunction with hydraulic stowing, Extraction line preferred is

(A) Step Diagonal
(B) Diagonal
(C) Steep Diagonal
(D) Straight line
(E) Answer not known

111. As per mines rescue rules 1985, if there is an below Ground working Employing more than 100 people, a rescue room should exist if there is no rescue station within a radius of ———— k.m.

(A) 25
(B) 35
(C) 45
(D) 15
(E) Answer not known

112. In the second schedule of mines vocational training rules 1966, Training in mine gases does not include the ———— gas.

(A) H_2S
(B) CO
(C) CO_2
(D) CH_4
(E) Answer not known

113. As per Indian Electricity rules 1956, the length of flexible cable for any portable /transportable apparatus shall not exceed ———— meters.

(A) 60
(B) 180
(C) 90
(D) 45
(E) Answer not known

114. As per Indian electricity rules 1956, Earthing shall be provided for a A.C. system, when the voltage shall exceed ———— volts.

(A) 60
(B) 90
(C) 30
(D) 220
(E) Answer not known

115. As per Indian Electricity rules, for an open cast mine, the maximum fault current. In a 3.3 kv/6.6 kv system shall be ———— amps.

(A) 10
(B) 50
(C) 100
(D) 25
(E) Answer not known

116. As per DGMS circulars, for the safe working of a mine, a short firer must be

(A) Appointed and paid by DDMS
(B) Appointed and paid by contractor
(C) Appointed by mine management and paid by contractor
(D) Appointed and paid by mine management
(E) Answer not known

117. As per coal mines regulations all surface structures and supports within a horizontal distance of ———— meters from a mine shall be of fire proof material.

(A) 10
(B) 25
(C) 15
(D) 5
(E) Answer not known

118. As per metalliferrous mines regulations 1961, when a person is moving a tub by walking before it down a Gradient, that particular gradient shall be less than

(A) 1 in 10
(B) 1 in 20
(C) 1 in 30
(D) 1 in 5
(E) Answer not known

119. As per metalliferrous mines regulations 1961, the suspension gear shall be tested for wear and tear atmost once in every

(A) 1 month
(B) 6 months
(C) 8 months
(D) 1 year
(E) Answer not known

120. As per metalliferrous mines regulations 1961, any rope, Bar, link or chain shall be deemed unusable as per the authority of

(A) Chief inspector of mines
(B) Regional inspector of mines
(C) Agent
(D) Mine manager
(E) Answer not known

121. As per metalliferrous mines regulations 1961, A shaft/ Winze shall be provided with a automatic recording speed indicator when its depth exceeds

(A) 50 meters
(B) 100 meters
(C) 150 meters
(D) 200 meters
(E) Answer not known

122. As per Metalliferrous Mines Regulations 1961, a mica mine which is below ground shall be on a scale

(A) 200 : 1
(B) 300 : 1
(C) 400 : 1
(D) 100 : 1
(E) Answer not known

123. As per Mines Rules 1955, a canteen shall be provided in a mine when the number of persons exceed

(A) 100
(B) 300
(C) 250
(D) 150
(E) Answer not known

124. A safety committee shall be constituted when the number of people employed exceeds (mines rules 1955)

(A) 50
(B) 100
(C) 150
(D) 200
(E) Answer not known

125. If a person is absent for a medical examination without proper reason he is likely to be discharged as per rule (As per Mines Rules 1955)

(A) 29 A
(B) 29 B
(C) 29 E
(D) 29 D
(E) Answer not known

126. As per Mines Act 1952, No woman shall be employed except for

(A) Above Ground (6. A.M – 7. P.M)
(B) Above ground (All Hours)
(C) Below Ground (6. A.M. – 7 P.M)
(D) Below Ground (All hours)
(E) Answer not known

127. The Maximum hours a person can work continuously is (As per Mines Act 1952).

(A) 12
(B) 8
(C) 10
(D) 16
(E) Answer not known

128. A person is Entitled for a Half hour Rest, (As per Mines Act 1952) after working continuously for a period of

(A) 3 Hours
(B) 5 Hours
(C) 4 Hours
(D) 1 Hour
(E) Answer not known

129. As per Mines Act 1952, drinking water location shall be ———— meters more from any urinal, latrine or washing place.

(A) 6 meters
(B) 12 meters
(C) 24 meters
(D) 18 meters
(E) Answer not known

130. A Reportable injury means, the enforced absence of a person from work atleast for a period of

(A) 24 hours
(B) 72 hours
(C) 48 hours
(D) 120 hours
(E) Answer not known

131. As per mines vocational training rules 1966, for a person working above ground, the number of safety lectures to be attended is

(A) 1
(B) 2
(C) 3
(D) 4
(E) Answer not known

132. As per Mines Vocational Training Rules 1966, supporting of underground workings is dealt in ———— schedule.

(A) 3rd
(B) 4th
(C) 5th
(D) 6th
(E) Answer not known

133. As per DGMS circular a person appointed as engineer as per coal mines regulations, shall perform

(A) Duties of a mining engineer and other engineering works
(B) Duties of a mining and electrical engineer
(C) Duties of a electrical supervisor
(D) Duties of a mining engineer only
(E) Answer not known

134. As per Mines Rescue Rules 1985, a rescue room incharge should have _____ years of experience in below ground in mines.

(A) 2
(B) 3
(C) 4
(D) 1
(E) Answer not known

135. As per Mine Rescue Rules 1985, the list of equipments to be present in rescue room are available in schedule

(A) 1 and 2
(B) 2 and 3
(C) 1
(D) 2
(E) Answer not known

136. As per Mines Rescue Rules 1985, the age limit for a person to be trained for rescue work in mines is to be between _____ years.

(A) 18-25
(B) 21-25
(C) 25-30
(D) 21-30
(E) Answer not known

137. Notice of commencement and end of work is maintained in the

(A) Form A
(B) Form B
(C) Form C
(D) Form D
(E) Answer not known

138. Which of the following is inversely proportional to environment temperature?

(A) Barometric pressure
(B) Miners health
(C) Design appliances
(D) Workload
(E) Answer not known

139. The over time wages are _____ of ordinary wage rate.

(A) Equal
(B) Twice
(C) Thrice
(D) Half
(E) Answer not known

140. Section 40 of the Mine Act 1952 prohibits the employment of persons in mines below which age?

(A) Below 18 years
(B) Below 20 years
(C) Below 22 years
(D) Below 23 years
(E) Answer not known

141. As per G.S.R. 982 (E) dt 01.10.2018 (conditions for transport of Explosives in bulk), who shall frame a suitable code of practice for handling and transportation of explosives in bulk in mines?

(A) Owner
(B) Agent
(C) Mine manager
(D) District Magistrate
(E) Answer not known

142. A mine (as per Mines Act 1952) does not include

(A) Shafts
(B) Bore Holes
(C) Conveyors
(D) Oil and Gas installations
(E) Answer not known

143. As per 10th national conference on safety in mines, what is the periodicity of conducting eye refraction test for employees engaged in driving/HEMM operation jobs in mines?

(A) Once in six months
(B) Once in a year
(C) Once in two years
(D) Once in three years
(E) Answer not known

144. Exposure to loud impulsive noise may lead to

(A) Nystagmus
(B) Siderosis
(C) Tinnitus
(D) Stannosis
(E) Answer not known

145. An underground coal mine experienced 5 serious injuries, 15 reportable injuries and 25 minor injuries during 2020. If the average employment in the mine is 1200, then the total injury rate per 1000 persons employed is?

(A) 54.0
(B) 20.83
(C) 37.5
(D) 60.0
(E) Answer not known

146. A system of two identical components connected in series has reliability of 0.25. The reliability of each component is

(A) 1.0
(B) 0.8
(C) 0.6
(D) 0.5
(E) Answer not known

147. In a PERT network, the activities on the critical path are a, b and c. The standard deviations of the durations of these activities are 2, 2 and 1 respectively. The variance of the project duration is

(A) 3
(B) 5
(C) 9
(D) 12
(E) Answer not known

148. What is the minimum age for a person to be appointed as a Mine Manager?

(A) 23 years
(B) 24 years
(C) 25 years
(D) 26 years
(E) Answer not known

149. As per Mines Rules 29 P of 1955, on or before 20th day of February every year, the manager of every mine shall submit to the Chief Inspector annual returns in respect of the preceding calendar year in which form?

(A) Form T
(B) Form K
(C) Form J
(D) Form U
(E) Answer not known

150. A first-aid room is required at a mine when the number of persons employed on any given day in the previous calendar year is more than?

(A) 150
(B) 200
(C) 250
(D) 300
(E) Answer not known

151. A metalliferous mine has a single 760 m haulage roadway at a steady gradient of 1 in 5 with rope haulage in motion. How many manholes are required at most along the length, if spacing must not exceed the statutory limit?

(A) 75
(B) 76
(C) 77
(D) 78
(E) Answer not known

152. If a 1000 m long belt conveyor operates at 3 m/s and has a load capacity of 1.8 t per metre, what is its hourly capacity?

(A) 18000 t/hr
(B) 19,440 t/hr
(C) 19,800 t/hr
(D) 20,000 t/hr
(E) Answer not known

153. What is the primary safety principle of flame-proof enclosures in coal mines?

(A) To prevent entry of explosive gas
(B) To extinguish sparks before they exit the enclosure
(C) To dilute explosive gases inside the equipment
(D) To reduce the temperature of the enclosure
(E) Answer not known

154. As per CMR 2017, overwind prevention devices are not mandatory if the winding depth is less than

(A) 20 m
(B) 30 m
(C) 45 m
(D) 60 m
(E) Answer not known

155. CMR 2017, specifies that every winding drum shall be provided with Flanger of height not less than

(A) 5 cm
(B) 10 cm
(C) 15 cm
(D) 20 cm
(E) Answer not known

156. In Armoured Face Conveyors (AFC) Flight bars are usually made of

(A) Mild steel
(B) High tensile steel
(C) Cast iron
(D) Aluminium alloy
(E) Answer not known

157. Which of the following correctly states the relationship for the total head (H) developed by a centrifugal pump?

(A) H = Delivery head – Suction head
(B) H = Static head + Velocity head + Friction head
(C) H = Delivery head + Suction head – Friction head
(D) H = Static head – Velocity head + Friction head
(E) Answer not known

158. The winding engineman's depth-indicator must be accompanied by an automatic device that rings a bell when the ascending conveyance is atleast how far from the top?

(A) One revolution of the drum
(B) Two revolutions of the drum
(C) 5 m from bank
(D) 10 m from bank
(E) Answer not known

159. Rope used for winding purpose is

(A) Lang's lay type
(B) Ordinary lay type
(C) Full locked coil type
(D) Half locked coil type
(E) Answer not known

160. In Koepe winding the over wind is prevented by

(A) Safety hook
(B) Breakage of rope
(C) Convergence of guides
(D) Thickening of guides
(E) Answer not known

161. Find the brake power of an engine from the readings below

Load M = 100 kg F;

balance reading m = 15 kg F;

Speed = 1200 rpm

Brake dia = 30 cm

(A) 15.7 kw
(B) 20.5 kw
(C) 30.5 kw
(D) 25.5 kw
(E) Answer not known

162. In which of the following underground haulage systems does the rope move in a uni-directional manner?

(A) Direct rope haulage
(B) Main and tail rope haulage
(C) Endless rope haulage
(D) Gravity haulage
(E) Answer not known

163. As per CMR 2017, the diameter of the head gear pulley used in winding systems in underground mine should be atleast how many times the rope diameter?

(A) 100 times
(B) 50 times
(C) 150 times
(D) 200 times
(E) Answer not known

164. Given impeller diameter D, speed of rotation n and air density P, for geometrically similar fans, the fan pressure is proportional to

(A) $n\,D^2\,P$
(B) $n^2\,D^2\,P$
(C) $n^2\,D^5\,P^2$
(D) $n^3\,D^5\,P$
(E) Answer not known

165. Ward-Leonard system is provided in the winding system in order to restrict

(A) Over-winding of the cage
(B) Deceleration of the cage
(C) Acceleration of the cage
(D) Over-speeding of the cage
(E) Answer not known

166. Two meshing spur gear wheels of module 6 have 24 and 42 teeth. The distance in mm between the centres of the gear wheels is

(A) 1000
(B) 198
(C) 126
(D) 72
(E) Answer not known

167. Match the following :

	Equipment		Component
P	Scraper	1.	Dribble belt
Q	Dragline	2.	Dipper Stick
R	Bucket wheel excavator	3.	Fair lead
S	Rope shovel	4.	Bowl

(A) P – 2, Q – 4, R – 3, S – 1
(B) P – 4, Q – 2, R – 1, S – 3
(C) P – 4, Q – 3, R – 1, S – 2
(D) P – 2, Q – 4, R – 1, S – 3
(E) Answer not known

168. The equipment that is not used in hard rock metal mining drivage is

(A) Road header
(B) Drill Jumbo
(C) Jack hammer
(D) Dint header
(E) Answer not known

169. Maximum damage to a haulage rope is caused by

(A) Fatigue
(B) Wear and Tear
(C) Corrosion
(D) Mine climate
(E) Answer not known

170. This pump is used as main pump at the pit bottom sump

(A) Face pump
(B) Submersible pump
(C) Multi stage turbine pump
(D) Vertical drill pump
(E) Answer not known

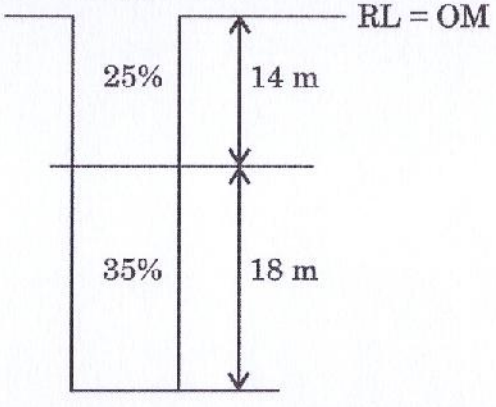
171. The amount of dip is maximum in a direction at ———— angles to the strike of the bedding planes.

(A) 0°
(B) 90°
(C) 45°
(D) 180°
(E) Answer not known

172. If the fold closes downward, it is known as

(A) synform
(B) syncline
(C) synclinorium
(D) synformal anticlinal
(E) Answer not known

173. The composited grade value, in % between the RLs 10 m to 20 m for the following borehole configuration is ————.



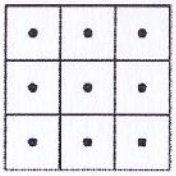
(A) 31
(B) 32
(C) 33
(D) 34
(E) Answer not known

174. A piece of coal sample weighs 10 kg in air and 2 kg when immersed in water. The specific gravity of the coal sample is ————————.

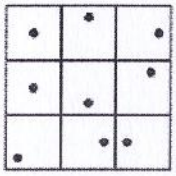
(A) 1.25
(B) 1.50
(C) 1.75
(D) 2.00
(E) Answer not known

175. Match the following sampling pattern with the corresponding sampling types

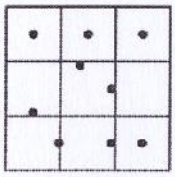
Sampling pattern



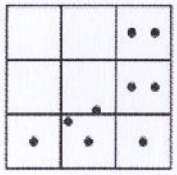
P



Q



R



S

Sampling type

1. Regular
2. Biased
3. Stratified random
4. Random

(A) P – 1, Q – 3, R – 2, S – 4
(B) P – 1, Q – 3, R – 4, S – 2
(C) P – 1, Q – 2, R – 3, S – 4
(D) P – 4, Q – 2, R – 1, S – 3
(E) Answer not known

176. Permitted explosives are safe to use because

(A) They have less strength

(B) They have low velocity of Detonation

(C) They do not produce much noise during blasting

(D) Special chemicals are use to extinguish flame

(E) Answer not known

177. A cross cut (4.0 m × 3.0 m) is driven for 48 m. Timber sets are at 1.5 m spacing. Each set requires 2 caps and 2 legs. What is the total number of legs required?

(A) 120

(B) 128

(C) 132

(D) 140

(E) Answer not known

178. A road header is used to drive a tunner of 5.2 m width and 4.8 m height. If the cutting rate is 18 m^3/hr and it operates for 7 hours/day. How many days will take to complete a drivage of 120 m length?

(A) 38.19 days

(B) 23.77 days

(C) 39.00 days

(D) 45.00 days

(E) Answer not known

179. A shaft sinking crew drills 40 blast holes each of 3 m depth. Burden = 0.75 m, Spacing = 0.9 m. If 90% of the blasted rock is removed in the first pass and rock density is 2.6 t/m^3, Calculate the total tonnage of muck removed

(A) 190 t

(B) 200 t

(C) 210 t

(D) 220 t

(E) Answer not known

180. Which factor increases bit wear in rotary drilling?

(A) Low RPM
(B) Low weight on Bit
(C) High RPM in hard rock
(D) Low flushing pressure
(E) Answer not known

181. In rotary drilling, the main flushing medium is

(A) Compressed Air
(B) Water
(C) Mud
(D) Steam
(E) Answer not known

182. In underground mine development the main objective of driving a cross-cut is to

(A) Provide direct access to the ore body from the shaft
(B) Connect two adjacent stopper for ventilation
(C) Facilitate drainage of mine water to the sump
(D) Serve as a haulage level to surface
(E) Answer not known

183. In a development gallery, coal can be blasted without giving an undercut by using explosives of which type?

(A) P1 type
(B) P3 type
(C) P5 type
(D) P2 type
(E) Answer not known

184. What is the function of a crimper in blasting operations?

(A) To attach the detonator to the blasting cap

(B) To press the end of a detonator tube into a safety fuse to prevent it from coming out of the detonator

(C) To ignite the explosive charge remotely

(D) To seal the blasting hole to prevent air leakage

(E) Answer not known

185. Which of the following statements is true about permitted explosives used in underground coal mines?

(A) They are only used for surface blasting

(B) They are non-cap-sensitive to prevent accident detonation

(C) They must be approved by Dams and are always cap-sensitive

(D) They do not require detonators for initiation

(E) Answer not known

186. What is the unique feature of an emulsion explosive?

(A) It contains solid oxidizers and solid fuels

(B) It consists of powered metal fuel and water

(C) Both the oxidizer and fuel are in liquid form

(D) None of the above

(E) Answer not known

187. What method is conveniently adopted for rates of moderate lengths (upto 8 m) and an inclination of 40° to 60° with the horizontal, if the strata and wall rocks are strong enough to support themselves, eliminating the need for artificial supports?

(A) Pneumatic raising method
(B) Vertical shaft sinking method
(C) Raising with 2-compartment method
(D) Open raising method
(E) Answer not known

188. Which stoping method is used in working thin steeply dipping veins enclosed in strong wall rocks?

(A) Underground stoping
(B) Open stoping
(C) Cut and fill stoping
(D) Rill stoping
(E) Answer not known

189. When a low explosive is blasted the process of oxidation is propagated by?

(A) Instantaneous detonation across the entire mass
(B) Rapid combustion from particle to particle through the mass
(C) Slow thermal expansion without combustion
(D) Absence of any shockwave
(E) Answer not known

190. The blasting technique used for controlled throw of overburden is known as

(A) Cast blasting
(B) Coyote blasting
(C) Plaster blasting
(D) Pop blasting
(E) Answer not known

191. In Indian underground mines, which mode of entry is most appropriate for steeply dipping, hard rock deposits such as chromite or gold?

(A) Incline
(B) Shaft
(C) Adit
(D) Box cut
(E) Answer not known

192. Which method is predominantly used in Indian open cast coal mines for production drilling?

(A) Diamond drilling
(B) Auger drilling
(C) Down-the-hole (DTH) drilling
(D) Cable tool drilling
(E) Answer not known

193. Which Indian mineral belt contributes the highest share of iron ore, bauxite and coal production?

(A) Himalayan Belt
(B) North–Western Belt
(C) Central Indian Belt (Chota Nagpur Plateau)
(D) Southern Belt
(E) Answer not known

194. Long-hole drilling with crater blasting is used for the construction of

(A) Winze
(B) Shaft
(C) Raise
(D) Decline
(E) Answer not known

195. Continuous miner and shuttle car combination is NOT applicable in mining with

(A) rib pillar extraction technique
(B) Wangawilli system
(C) room and pillar mining method
(D) Longwall method
(E) Answer not known

196. Which stoping method is a low cost, simple method much preferred for low grade ore deposits where supporting ore pillars may be left and best suited to deposits of horizontal or mild dip and of thickness of upto 5 m, lying at moderate depths?

(A) underhand stoping
(B) open stoping
(C) breast stoping
(D) rill stoping
(E) Answer not known

197. Which of the following statements is true about efficient blasting in mining?

(A) Efficient blasting should result in excessive fragmentation, requiring secondary blasting
(B) Efficient blasting should give rock fragmentation that eliminates the need for secondary blasting
(C) Efficient blasting always requires secondary blasting for better results
(D) Efficient blasting has no impact on the need for secondary blasting
(E) Answer not known

198. Which coatfield in India is the largest producer of coking coal?

(A) Singrauli
(B) Jharia
(C) Talcher
(D) Korba
(E) Answer not known

199. The largest lignite producing state in India is

(A) Jharkhand
(B) Tamil Nadu
(C) Rajasthan
(D) Gujarat
(E) Answer not known

200. According to the Indian minerals year book 2020, which state has the highest production of manganese in India?

(A) Karnataka
(B) Madhya Pradesh
(C) Odisha
(D) Maharashtra
(E) Answer not known