COMBINED TECHNICAL SERVICES EXAMINATION

(NON INTERVIEW POST)

COMPUTER BASED TEST

DATE OF EXAM: 05.08.2025 AN

PAPER – II

MINING ENGINEERING

(DEGREE STANDARD) (CODE: 347)

1. Which is not Variogram Terminology?

(A) Sill
(B) Nugget
(C) Range
(D) Average
(E) Answer not known

2. In the Lerch-Grossmann algorithm for pit optimization, what is the primary mathematical basis for determining the ultimate pit limit?

(A) Linear regression
(B) Network flow analysis
(C) Dynamic programming
(D) Integer programming
(E) Answer not known

3. In floating cone method, the final pit slope is influenced by

(A) Grade-tonnage curve
(B) Slope stability criteria
(C) Discount rate
(D) Crusher location
(E) Answer not known

4. At the pit limits, the state of economy of a surface mine

(A) Cut off grade
(B) Less profit
(C) More profit
(D) Breakeven
(E) Answer not known

5. When a floating cone is moved over a block model, the ultimate pit will have the summation of NPV's as

(A) 0
(B) Maximum
(C) Minimum
(D) Undefined
(E) Answer not known

6. An iron ore mine recorded an average of 3 accidents per month. The number of accidents is distributed according to poisson distribution. The probability that there will be exactly 2 accidents per month is

(A) 0.22
(B) 0.30
(C) 0.43
(D) 0.67
(E) Answer not known

7. In mine planning, what does the term "Cut off Grade" refer to

(A) The minimum grade at which a unit of ore will be mined to achieve a specified level of profitability
(B) The maximum allowable grade of ore that can be processed
(C) The average grade of ore in a deposit
(D) The grade of ore at the surface of an open pit mine
(E) Answer not known

8. Net present value of mining project should be

(A) Maximum
(B) Minimum
(C) Average
(D) Constant
(E) Answer not known

9. In Taylor's mine life rule, life of a mine in years is given by

(A) $0.2 \times \sqrt[4]{\text{Expected ore Tonnage}}$
(B) $0.2 \times \sqrt[3]{\text{Expected ore Tonnage}}$
(C) $0.2 \times \sqrt[2]{\text{Expected ore Tonnage}}$
(D) $0.2 \times \sqrt[5]{\text{Expected ore Tonnage}}$
(E) Answer not known

10. Which cost component includes expenses for diesel, explosives and lubricants?

(A) Capital cost
(B) Depreciation
(C) Operating cost
(D) Closure cost
(E) Answer not known

11. What is the primary reason for including operator efficiency in output estimation?

(A) To assess need for training programs
(B) To estimate wage bonuses
(C) To adjust theoretical productivity to practical levels
(D) To calculate shift wages
(E) Answer not known

12. In a mine operating 3 shifts per day with a 6 day week how many workers are required per position ensure continuous coverage including rest days, assuming a 5-day work week per worker?

(A) 2.0
(B) 2.5
(C) 3.6
(D) 4.2
(E) Answer not known

13. In pushback sequencing, which factor most significantly affects equipment fleet size requirement?

(A) Bench angle
(B) Inter-ramp distance
(C) Annual tonnage target
(D) Blast hole diameter
(E) Answer not known

14. During phase scheduling, simultaneous development of multiple phases ensures

(A) Higher dilution
(B) Smoother ore production profile
(C) Lesser equipment usage
(D) Steeper ramp gradients
(E) Answer not known

15. Which of the following is commonly used in diamond drilling bits?

(A) Aluminium studs
(B) Tungsten rods
(C) Steel balls
(D) Black diamonds
(E) Answer not known

16. The basic impact area, associated with predicting and assessing impacts on the Socio-Economic Environment is called

(A) Region of influence
(B) Triple bottom line
(C) Communication on progress
(D) Socio-cultural impact
(E) Answer not known

17. What financial metric measures the rate of return on capital employed in mining projects

(A) NPV
(B) Cash flow Ratio
(C) IRR
(D) Payback period
(E) Answer not known

18. What is the primary financial tool used to assess project profitability in a feasibility report.

(A) Cost per ton analysis
(B) Break-even analysis
(C) Net Present Value (NPV)
(D) Shipping ratio
(E) Answer not known

19. Which stage of a mining study is aimed at justifying a detailed feasibility study?

(A) Conceptual study
(B) Feasible study
(C) Preliminary study
(D) Valuation report
(E) Answer not known

20. O' HARA cost estimator is based upon

(A) Mine/Mill capital costs to daily milling rate
(B) Mine cost to daily milling rate
(C) Mill cost to daily milling rate
(D) Production cost to daily milling rate
(E) Answer not known

21. In ventilation network analysis the correction factor for each mesh is given by

(A) $2RQ/RQ^2$
(B) $RQ^2/2RQ$
(C) $-RQ^2/2RQ$
(D) $[-RQ^2/2 \Sigma|R||Q|]$
(E) Answer not known

22. In SCADA, the central system responsible for data visualization is called

(A) PLC
(B) RTU
(C) MTU
(D) I/O Box
(E) Answer not known

23. ERP in mining is mainly used for

(A) Equipment health checks
(B) Geological modeling
(C) Integrated resource management
(D) CAD-based design
(E) Answer not known

24. A Digital Elevation Model (DEM) is typically used in

(A) Safety assessments
(B) Personnel planning
(C) Surface topography modelling
(D) Time logging
(E) Answer not known

25. CAD software is mainly used in mining for

(A) Personal management
(B) Drawing engineering layouts
(C) Sensor-based monitoring
(D) Statistical modelling
(E) Answer not known

26. Which type of mining operation benefits the most from GPS - based fleet tracking?

(A) underground coal mining
(B) deep shaft metal mining
(C) surface mining
(D) oil drilling
(E) Answer not known

27. One of the common limitations of Auto CAD in mining is

(A) Lack of 3D modeling
(B) Poor compatibility with GPS
(C) No spatial database support
(D) Cannot plot contours
(E) Answer not known

28. A key advantage of using simulation software like Arena is

(A) Real - time GPS tracking
(B) Drawing vector - based maps
(C) Predicting outcomes of mining operation
(D) Performing surface scans
(E) Answer not known

29. Auto CAD files used in mine planning are typically saved with the extension

(A) .doe
(B) .dwg
(C) .gis
(D) .tif
(E) Answer not known

30. A raster image used in GIS represents

(A) Vector data
(B) Textual data
(C) Pixel based imagery
(D) 3D Model
(E) Answer not known

31. The output of CAD-based mine design is typically

(A) Spread sheet reports
(B) Vector drawings
(C) Tabular GIS data
(D) HTML files
(E) Answer not known

32. Which of the following supports blast design information management?

(A) AUTO CAD
(B) SCADA
(C) GIS
(D) Blast information system
(E) Answer not known

33. What is the primary use of AUTO CAD in mining industry?

(A) Survey analysis
(B) Production reporting
(C) Mine layout drawing
(D) Data Acquisition
(E) Answer not known

34. Which is not example of linear programming?

(A) Production planning
(B) Inventory control
(C) Simulation
(D) Workforce planning
(E) Answer not known

35. Which is not reserve estimation technique?

(A) Inverse Distance Method
(B) Nearest Neighbourwood Method
(C) Interpolation Method
(D) Kriging
(E) Answer not known

36. Which is not related to ventilation network analysis?

(A) Junction
(B) Branch
(C) Burden
(D) Direction
(E) Answer not known

37. Which is not application of computer in Mining?

(A) Blast Design
(B) Ore pass
(C) Reserve Estimation
(D) Mine Schedule
(E) Answer not known

38. Which is not example of operating system?

(A) Windows
(B) Linux
(C) Python
(D) Unix
(E) Answer not known

39. The logic of organising does not include

(A) Establishing enterprise objectives
(B) Formulating supporting objectives
(C) Not giving importance to material resources but to human resources
(D) Tying the groups both vertically and horizontally
(E) Answer not known

40. Management by objective principle does not include

(A) Quality
(B) Quantity
(C) Time
(D) Losses
(E) Answer not known

41. 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

42. 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

43. In a PERT network, the activities on the critical path are A, B and C. The standard deviations of the duration 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

44. Activity durations in PERT and CPM are decided on the following consideration

(A) PERT – Stochastic CPM – Deterministic
(B) PERT – Stochastic CPM – Stochastic
(C) PERT – Deterministic CPM – Deterministic
(D) PERT – Deterministic CPM – Stochastic
(E) Answer not known

45. Which is not component of SWOT?

(A) Strength
(B) Weakness
(C) Optimum
(D) Threat
(E) Answer not known

46. Which is not Float?

(A) Total Float
(B) Free Float
(C) Independent Float
(D) Subcritical Float
(E) Answer not known

47. Which is the Assignment MetOp?

(A) Hungarian method
(B) Linear method
(C) Modi method
(D) Least Cost method
(E) Answer not known

48. In Linear programming, which is not assumptions?

(A) Finite choices
(B) Discontinuity
(C) Certainty
(D) Additivity
(E) Answer not known

49. Which is not characteristics of operations research?

(A) Application of scientific method
(B) Improvement in the quality of decisions
(C) Quantitative solution
(D) Astrology
(E) Answer not known

50. What is the minimum stipulated quantity of drinking water to be provide in a mine or any part for every person employed at any one time?

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

51. What does the term "Roof Bolting" refer to in underground mining?

(A) Installing steel arches to support the roof
(B) Placing wooden props under weak roof sections
(C) Drilling holes in the roof and fixing steel bolts to grip and support the strata
(D) Applying a layer of shotcrete to the roof surface
(E) Answer not known

52. While determining coefficient of permeability of a rock sample, discharge collected in 3 hours was 5 cubic centimeter. The cross sectional area of the sample was 50 cm^2 and it was 10 cm long. The discharge took place at a head of 300 cm. The coefficient of permeability of the rock sample is

(A) 3×10^{-8}
(B) 3×10^{-7}
(C) 3×10^{-5}
(D) 3×10^{-9}
(E) Answer not known

53. E is for modulus of elasticity, G for shear modulus and υ for Poisson's ratio. Then

(A) $G=\frac{2E}{\upsilon+1}$
(B) $G=\frac{2E}{\upsilon-1}$
(C) $G=\frac{E}{2(\upsilon+1)}$
(D) $G=\frac{E}{2\upsilon+1}$
(E) Answer not known

54. In Moh's circle the maximum shear stress is given by

(A) Radius of circle
(B) Diameter of circle
(C) Circumference of circle
(D) Sector of 90° arc length
(E) Answer not known

55. The Brazilian test is applicable for (Rock sample)

(A) Tensile strength
(B) Tensile and compressive strengths
(C) Compressive strength
(D) Triaxial strength
(E) Answer not known

56. The span of a pressure arch increases with

(A) Decreased depth
(B) Stronger root
(C) Width of excavation
(D) Wet floor
(E) Answer not known

57. Which tool is used for safe prop withdrawal?

(A) Hammer
(B) Sylvester prop with drawer
(C) Jack
(D) Spanner
(E) Answer not known

58. What happens if load is applied before resin gel time completes?

(A) Better support
(B) Faster setting
(C) Bolt failure
(D) Weak bonding
(E) Answer not known

59. What is the inclination of an under-set prop to the vertical?

(A) 0° (B) 15°

(C) 30° (D) 45°

(E) Answer not known

60. Which attachment can monitor the axial deformation of a cylinder specimen?

(A) Polar stereonet circle

(B) Linear Variable Differential Transformer (LVDT)

(C) Brittle ductile transition stress recorder

(D) Triaxial extensometer

(E) Answer not known

61. A decline in a metal mine is used to connect

(A) Connect two levels

(B) Connect two levels in the downward direction

(C) Connect two inclines upward

(D) Connect two inclines downward

(E) Answer not known

62. What is the unique feature of an "Emulsion explosive".

(A) It contains solid oxidizers and solid fuels

(B) It consists of powdered metal fuel and water

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

(D) None of the above

(E) Answer not known

63. The slurry explosive in the context of meaning is

(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 oxidiser, fuel sanitizer thickened with gum and gel with a cross linked agent

(D) Pure nitroglycerine absorbed in an inert material

(E) Answer not known

64. The reaction between Nitric acid and benzene compounds yields.

(A) Nitroglycerin

(B) Trinitrotoluene (TNT)

(C) Dynamite

(D) Ammonium Nitrate

(E) Answer not known

65. 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 of high velocity

(C) It requires no shock to deteriorate

(D) The explosion happens gradually and not violently

(E) Answer not known

66. The percentage of FE in 8 drill Holes are 58, 61, 59, 58, 54, 54,52 and 50. The Hole depth is 5 m. The average grade of the deposit is

(A) 53.4%

(B) 55.9%

(C) 56. 9%

(D) 55.8%

(E) Answer not known

67. In explosives the most common used fuels are

(A) Ammonium nitrate, sodium nitrate and calcium carbonate
(B) Ammonium nitrate, sodium nitrate and fuel oil
(C) Fuel oil, carbon, aluminum and TNT
(D) Fuel oil, carbon, aluminum and fuel oil
(E) Answer not known

68. The optimum level interval in a metal mine depends upon

(A) Level interval
(B) Mining costs
(C) Level interval and mining costs
(D) Level interval and depth of shaft
(E) Answer not known

69. Which parameter has a major effect on the number and layout of shot holes?

(A) Diameter of Cartridge
(B) Stemming material
(C) Hardness of coal
(D) Fuse length
(E) Answer not known

70. What is the typical depth range for Churn drilling?

(A) 75 to 600 m
(B) 250 to 500 m
(C) 10 to 30 m
(D) 50 to 75 m
(E) Answer not known

71. Which part of the rotary drilling system supports the drill rods vertically?

(A) Derrick
(B) Tripod
(C) Pulley
(D) Clamp
(E) Answer not known

72. What is the function of a pressure gauge in the drilling system?

(A) To align the caring
(B) To measure water flow
(C) To record pressure on bit
(D) To rotate the drill rod
(E) Answer not known

73. Which standard size is followed for BX series drill rods?

(A) 45 mm
(B) 60 mm
(C) 25 mm
(D) 75 mm
(E) Answer not known

74. Which drilling method uses a tricone rock roller bit?

(A) Cable drilling
(B) Manual drilling
(C) Diamond drilling
(D) Rotary drilling
(E) Answer not known

75. What is another name for cable drilling?

(A) Core drilling
(B) Churn drilling
(C) Rotary drilling
(D) Diamond drilling
(E) Answer not known

76. The reverse fault is usually caused by

(A) Vertical loads
(B) Horizontal thrust
(C) Both vertical and horizontal thrust
(D) None of them
(E) Answer not known

77. The grain size distribution of soil is known as

(A) Permeability
(B) Structure
(C) Porosity
(D) Texture
(E) Answer not known

78. Which of the following is a metamorphic rock derived from sandstone?

(A) Marble
(B) Quartzite
(C) Granite
(D) Basalt
(E) Answer not known

79. Which rock is formed by consolidation of loose sediments?

(A) Sedimentary rock
(B) Metamorphic rock
(C) Volcanic rock
(D) Igneous rock
(E) Answer not known

80. What is the chemical composition of dolomite?

(A) $CaCO_3$
(B) $MgCO_3$
(C) $FeCO_3$
(D) $CaMg\ (CO_3)_2$
(E) Answer not known

81. Which of the following is not a sedimentary rock?

(A) Limestone
(B) Stand stone
(C) Gneiss
(D) Shale
(E) Answer not known

82. The key difference in the physical state and critical use limitation between ANFO and SLURRY explosives in wet conditions are

(A) ANFO is denser and better suited for wet holes
(B) SLURRY explosives can be pumped and resist water ANFO lacks water resistance
(C) ANFO can be used in all weather. But slurry cannot
(D) Both can be used in wet holes, but slurry is cheaper
(E) Answer not known

83. What is free moisture?

(A) Moisture within pore
(B) Moisture chemically bended
(C) Moisture visible on coal surface
(D) None
(E) Answer not known

84. What is the Geological age of Permian Period?

(A) 60 million years
(B) 150 million years
(C) 215 million years
(D) 325 million years
(E) Answer not known

85. Which band of coal is most impure?

(A) FUSAIN
(B) CLARAIN
(C) VITRAIN
(D) DURAIN
(E) Answer not known

86. Ash percentage of coal is determined by heating in

(A) muffle furnace of 815°C
(B) sun drying
(C) kiln furnace
(D) air oven at 110°C
(E) Answer not known

87. Which test determines the volatile matter?

(A) crushing and sieving
(B) air drying
(C) heating in muffle furnace without air
(D) drying in sun
(E) Answer not known

88. Which coal type has the lowest carbon content?

(A) peat
(B) lignite
(C) anthracite
(D) bituminous
(E) Answer not known

89. An oblique fault is

(A) parallel to dip
(B) perpendicular to dip
(C) parallel to strike
(D) a fault inclined to both strike and dip
(E) Answer not known

90. Which fault shows older rocks overlain by younger due to compression.

(A) dip fault
(B) strike fault
(C) normal fault
(D) reverse fault
(E) Answer not known

91. How much times move susceptible are Indian Munia Birds to carbon monoxide compared to humans?

(A) 2 times
(B) 5 times
(C) 10 times
(D) 50 times
(E) Answer not known

92. The ignition temperature of coal dust is

(A) (600-1000) degree centigrade
(B) (600-900) degree centigrade
(C) (600-800) degree centigrade
(D) (500-900) degree centigrade
(E) Answer not known

93. The relation between pressure (P) quantity (Q) and resistance (R) of air way is expressed like

(A) $P = \frac{R}{Q^2}$
(B) $R = \frac{Q^2}{P}$
(C) $PRQ = 1$
(D) $P = RQ^2$
(E) Answer not known

94. The instrument used to measure air velocity in mines is

(A) Hygrometer
(B) Manometer
(C) Anemometer
(D) Psychrometer
(E) Answer not known

95. What is the unit of ground vibration measurement commonly used in mine blasting operations?

(A) Newton per second (N/s)
(B) Meter per second (m/s)
(C) Millimeter per second (mm/s)
(D) Meter per second squared (m/s^2)
(E) Answer not known

96. How the coal seam is classified if methane percentage in the general body of air does not exceed 0.1 % and emission rate of methane does not exceed 1 m^3 /tonne of coal produced?

(A) First degree
(B) Second degree
(C) Third degree
(D) None of the above
(E) Answer not known

97. A self contained breathing apparatus has a 2 liter capacity tank for oxygen at a pressure of 200 atmospheres. The quantity of oxygen contained is

(A) 2 liters
(B) 100 liters
(C) 200 liters
(D) 400 liters
(E) Answer not known

98. When the airways are joined in parallel the pressure drop across all of them will be

(A) Different for each way

(B) Equal across all airways

(C) Proportional to their lengths

(D) Zero if the airflow is balanced

(E) Answer not known

99. Two vertical shafts each 6 mt in diameter and 300 mtr in deep are connected at the bottom by a level 2 × 2 mtr in cross section and 800 mtr long. The average barometric pressure in the shaft 101.325 kPa. Calculate the Natural ventilation pressure NVP and the parameters are as

Downcast shaft top = 293 k

Down cast shaft bottom = 296 k

Upcast shaft top = 303 k

Upcast shaft bottom = 303.5. The co-efficient of friction in 0.004 N^2sm^4

(A) 101.7 Pa

(B) 105.0 Pa

(C) 110.0 Pa

(D) 107.0 Pa

(E) Answer not known

100. Diffusers and Evasees are refer to a gradually expanding dust meant for converting a part of the kinetic energy in the air leaving the fan to useful pressure energy. Evasees are attached to which type of fans.

(A) forcing fans

(B) exhaust fans

(C) pedestal fans

(D) none of the above

(E) Answer not known

101. A main mine fan generates pressure of 1.2 kpa of which 0.8 kpa is consumed in the shafts and trunk airways so that only 0.4 kPa is available to ventilate two splits A and B, A passing 15 m^3/s and B passing 10m^3/s It is desired to increase the quantity flowing through B by installing Booster fan in it. What is the size of the Booster fan which will cause the stoppage of air flow through split A.

(A) 5.50 kPa
(B) 3.75 kPa
(C) 4.50 kPa
(D) 4.75 kPa
(E) Answer not known

102. What are the two kinds of tests performed with a flame safety lamp to detect and estimate the presence of fire damp (methane)?

(A) Flash test and cap burn test
(B) Flame colour test and gas density test
(C) Accumulation test and percentage test
(D) Heat rise test and spark test
(E) Answer not known

103. In Flame safety lamp, For each 1% oxygen deficiency from the normal concentration (i.e. 20.93%), the light output diminishes by

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

104. Hydrogen sulphide can be detected at very low concentrations due to its?

(A) Blue colour
(B) High flammability
(C) Typical rotten egg odour
(D) Sweet taste
(E) Answer not known

105. Geothermic gradient is

(A) Same across the world

(B) Same over an area of 1000 square kilometers

(C) Varies with the rock type

(D) Does not vary with the rock type

(E) Answer not known

106. A backward bladed centrifugal fan has a diameter of 2.5 meter and a speed of 280 revolutions per minute. The tangential outer velocity is

(A) 0.3667 meters/second

(B) 366.67 meters/second

(C) 3.667 meters/second

(D) 36.67 meters/second

(E) Answer not known

107. When a mine water is disposed off in a river, the rate of depletion of dissolved oxygen of the river mainly depends on

(A) BOD of the mine water

(B) COD of the mine water

(C) Total organic carbon present in the mine water

(D) Dissolved oxygen present in the mine water

(E) Answer not known

108. In an area within a surface mine, under static condition the following gases are found : NO_2, CO_2, O_3 and SO_2. Assuming no diffusion reaction and bonding of the gases, the concentration of the gases from bottom to upwards will be in the order of

(A) NO_2, CO_2, O_3 and SO_2

(B) SO_2, NO_2, CO_2 and O_3

(C) SO_2, O_3, NO_2 and CO_2

(D) NO_2, CO_2, SO_2 and O_3

(E) Answer not known

109. A mine worker inhales normal air, whereas, the exhaled air contains 16.65% O_2 and 3.83% CO_2. The respiratory quotient of breathing for the worker is

(A) 0.23
(B) 0.89
(C) 0.99
(D) 1.13
(E) Answer not known

110. Which diagram explain the limits of CH_4?

(A) Coward
(B) Le Chetelier
(C) Grahams
(D) Palvalov
(E) Answer not known

111. A company invested Rs. 4 lakh in a machine. The net income expected from the operation of the machine is Rs. 80,000 per annum. The Payback period of the machine in year is

(A) 5
(B) 6
(C) 7
(D) 8
(E) Answer not known

112. Which of the following factors can significantly affect the NPV of a mining project?

(A) Metal price fluctuations
(B) Capital investment changes
(C) Operating cost variation
(D) All of the above
(E) Answer not known

113. If two mining projects have positive NPVs, how should they be ranked?

(A) The project with the lower NPV should be selected
(B) The project with the higher NPV should be selected
(C) The project with the higher discount rate should be selected
(D) NPV should not be used for ranking projects
(E) Answer not known

114. A mining project has a Profitability Index (PI) of 0.95. What should the company do?

(A) Accept the project
(B) Reject the project
(C) Reduce investment and re-evaluate
(D) Increase cash flow expectations
(E) Answer not known

115. Dead rent is the

(A) Rent for mineral deposit
(B) Minimum Royality to be paid
(C) Based on profit obtained
(D) Not charged based on the size of mining lease
(E) Answer not known

116. Tax concession for minerals mined is

(A) Allowed in national mineral policy
(B) Not allowed in national mineral policy
(C) Proposed for national mineral policy
(D) Removed from national mineral policy
(E) Answer not known

117. The cash flow for a mining project from years 0 to 6 are – 200, –100, +100, +110, +120, +130 and +140 (in crores of rupees). The discounted cash flow is (in crores of rupees)

(A) 55.75
(B) 55.00
(C) 55.10
(D) 54.75
(E) Answer not known

118. Net Present Value (NPV) is used in mine project evaluation because

(A) It accounts for the time value of money
(B) It ignores cash flow fluctuations
(C) It always results in positive values
(D) It is independent of the discount rate
(E) Answer not known

119. A mining project requires and initial investment of $ 50 million and generates a cash inflow of $ 12 million per year. What is the payback period.

(A) 3.5 years
(B) 4.2 years
(C) 5 years
(D) 6 years
(E) Answer not known

120. What are the Non-discounting techniques to judge the profitability of new investments in assets?

(A) Payback Period and Average Rate of Return (ARR)
(B) Net Present Value (NPV) and Profitability Index (PI)
(C) Net Terminal Value and Internal Rate of Return (IRR)
(D) Net Present Value (NPV) and Internal Rate of Return (IRR)
(E) Answer not known

121. As per IER, the length of flexible cable used in portable and transportable apparatus shall not be more than

(A) 50 M
(B) 100 M
(C) 200 M
(D) 300 M
(E) Answer not known

122. In which form the Manager of the mine concerned shall give notice to the person to be examined?

(A) Form I
(B) Form II
(C) Form M
(D) Form D
(E) Answer not known

123. In order to avoid dislodgment of support during blasting, DGMS circular 9/1977 speaks on

(A) Tightening of roof support
(B) Maximum possible contact at roof
(C) Strategically placed cogs
(D) Pair of cross bar supports
(E) Answer not known

124. Under which Section of the Mines Act 1952, can Inspectors halt operations in affected areas in a Mine until the danger is resolved?

(A) Section 20
(B) Section 21
(C) Section 22
(D) Section 23
(E) Answer not known

125. As per G.S.R. 982(E) dt 01.10.2018 (Conditions for Transport of explosives in bulk), the vehicle transporting the explosives in Bulk shall not be driven at a speed exceeding?

(A) 20 KM/hour
(B) 30 KM/hour
(C) 25 KM/hour
(D) 35 KM/hour
(E) Answer not known

126. As per Coal Mines Regulations 2017, what is meant by SCAMP?

(A) Strata Control and Monitoring Plan
(B) Safety Control and Management Plan
(C) Safety Control and Monitoring Plan
(D) Structure Control and Management Plan
(E) Answer not known

127. Refresher Training for personnel engaged in the operation and maintenance of electrical installations of Mines shall be imparted at a periodicity of intervals not more than?

(A) Two years
(B) Three years
(C) Four years
(D) Five years
(E) Answer not known

128. A haul truck in a mine is experiencing frequent electrical failures due to cable damage. According to CEAR 2023, what is the correct action to take.

(A) Continue operation and report it at the end of the shift
(B) Immediately replace the damaged cable
(C) Tape the cable and continue operation
(D) Increase the voltage to compensate the Losses
(E) Answer not known

129. As per CMR 2017, the toe of a spoil bank shall not be extended to any point within how many metres of a mine opening, railway or other public works, public road or building of other permanent structure not belonging to the owner?

(A) 100 metres
(B) 200 metres
(C) 300 metres
(D) 500 metres
(E) Answer not known

130. As per mines rescue rules, there shall be in every rescue station

(A) 1 Superintendent and atleast 2 Instructors
(B) 2 Superintendents and atleast 2 Instructors
(C) 1 Superintendent and atleast 3 Instructors
(D) 1 Superintendent and maximum of 2 Instructors
(E) Answer not known

131. A Haulage engine in an underground mine shall be inspected by a competent person once in (As per Coal Mines Regulations)

(A) 2 days
(B) 12 hours
(C) 48 hours
(D) 24 hours
(E) Answer not known

132. An underground Coal Mine produces 10,000 Tonnes of coal per day. As per Coal Mines Regulation. The minimum ventilation required is

(A) 25,000 cubic meter/hour
(B) 25,000 meter cube/minute
(C) 60,000 meter cube/minute
(D) 60,000 meter cube/hour
(E) Answer not known

133. As per Coal Mines regulations, for a third degree gassy mine every person should carry a

(A) Self rescuer (Filter type)
(B) Self contained breathing apparatus
(C) Gas mask
(D) Chemical oxygen Self rescuer
(E) Answer not known

134. As per Regulations 4 of CMR 2017 on or before _____ in every year, the owner, agent or Manager shall submit to Chief Inspector, the Regional Inspector and to the District Magistrate Annual Returns in respect of the preceding year.

(A) 1st day of January
(B) 1st day of April
(C) 1st day of February
(D) 15th day of February
(E) Answer not known

135. As per 12th National Conference on Safety in Mines what is the permissible repairable dust levels in Mines in case percentage of free silica in mines is more than 5%

(A) 15 divided by % of free Silica in Dust (in Mg/m^3)
(B) 10 divided by % of free Silica in Dust (in Mg/m^3)
(C) 20 divided by % of free Silica in Dust (in Mg/m^3)
(D) 5 divided by % of free Silica in Dust (in Mg/m^3)
(E) Answer not known

136. The latest National Conference on Safety in Mines conducted in India is

(A) 10th National Conference
(B) 11th National Conference
(C) 12th National Conference
(D) 13th National Conference
(E) Answer not known

137. Section 40 of Mines Act 1952 prohibits the employment of person 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

138. How often must the safety committee meet as per Mines Rule 1955?

(A) Once in every 60 days
(B) Once in every 30 days
(C) Once in every 90 days
(D) Once in every 120 days
(E) Answer not known

139. Which one of the following does NOT belong to the direct operating cost of mine?

(A) Administrative cost
(B) Royalty
(C) Fuel cost
(D) Explosive cost
(E) Answer not known

140. What is the maximum voltage allowed for handheld portable apparatus in below ground mines?

(A) 250 V
(B) 125 V
(C) 30 V
(D) 660 V
(E) Answer not known

141. What is the key difference between a rod mill and a ball mill in tumbling mill operations?

(A) Rod mills use ceramic beads while ball mill use water jets

(B) Rod mills use steel rods and ball mills use steel balls as grinding media

(C) Rod mills are used only for polishing ores, while ball mills are used for drying

(D) Both use air pressure instead of grinding media

(E) Answer not known

142. What is a distinguishing feature of the universal jaw crusher?

(A) The jaw is pivoted at the top, giving a fixed area and variable discharge

(B) The jaw is pivoted at the bottom, giving a variable feed area and fixed discharge

(C) Both jaws are fixed and crushing occurs by vibration

(D) The jaw is pivoted at the middle, giving a variable feed and variable discharge

(E) Answer not known

143. What is the main structural feature of a gyratory crusher?

(A) A long spindle carrying a conical grinding head seated in an ecentric sleeve

(B) A rotating drum with steel balls for grinding

(C) A horizontal shaft with hammers attached for impact crushing

(D) A flat plate vibrating at high frequency to crush materials

(E) Answer not known

144. What is an autogenous mill in mineral processing?

(A) A mill that uses steel balls as the only grinding media
(B) A mill that uses water pressure to grind ore
(C) A tumbling mill that uses the ore itself as the grinding media
(D) A type of high-speed hammer mill used for fine grinding
(E) Answer not known

145. The following of the ore combination that cannot be processed by floatation for

(A) Gold pyrite ores
(B) Copper, arsenic and lead sulphide ores
(C) Palladium – platinum ores
(D) Silver – sulphide ores
(E) Answer not known

146. Dry cleaning of coal includes the following method

(A) Jig washing
(B) Pneumatic method
(C) Heavy media separation
(D) Froth floatation
(E) Answer not known

147. Stokes law is only derived for

(A) Spherical particles
(B) Resistance to motion
(C) Fluid density
(D) Grinding speed
(E) Answer not known

148. A coal seam is intercepted by three boreholes

Borehole	Depth
A	245 meter
B	350 meter
C	300 meter

B is 400 meter from A in the direction of N 10° E and C is 300 meter from A in the direction of N 50 N. The direction of DIP of the coal seam is

(A) N 7° W
(B) N 7° E
(C) S 7° W
(D) S 7° E
(E) Answer not known

149. In an under ground mine, the following are the bearing's of roadways

Roadways	Bearing	Distance
AB	S 60 W	200 meters
BC	N 45 W	100 meters
CD	N 30 E	150 meters

The bearing of AD is

(A) S 59° 13′ 18″ E
(B) N 59° 13′ 18″ E
(C) N 59° 13′ 18″ W
(D) S 59° 13′ 18″ W
(E) Answer not known

150. The method of leveling adopted to determine the difference of level between two points at a considerable distance apart with great precision is known as

(A) Reciprocal leveling
(B) Cross sectioning
(C) Check leveling
(D) Differential leveling
(E) Answer not known

151. Orbital altitude of GPS satellite from earth surface

(A) 15000 KM
(B) 20000 KM
(C) 25000 KM
(D) 30000 KM
(E) Answer not known

152. Modern aerial cameras are usually equipped with

(A) Data recorder
(B) Data sensor
(C) Spider
(D) Cocking shutter
(E) Answer not known

153. The most commonly method for determining correctly the relative positions of a number of survey point is

(A) Chain survey
(B) Dial traverse
(C) Plane table survey
(D) Theodolite traverse
(E) Answer not known

154. The magnetic bearing of a line as observed by a prismatic compass is 272°0′. If the local attraction at the station is 5° East and the declination is 15° West, what is the true bearing of the line?

(A) 252°00′
(B) 262° 00′
(C) 282° 00′
(D) 292° 00′
(E) Answer not known

155. The bearing of a line that is measured eastward or westward from the North or South termed is

(A) Whole circle bearing
(B) True bearing
(C) Reduced bearing
(D) Magnetic bearing
(E) Answer not known

156. The magnetic bearing of a line AB is S 28°30'E of the magnetic declaration is 7°30′ W. What is the True bearing?

(A) S 21° 00′ E
(B) S 36° 00′ E
(C) S 28° 30′ W
(D) S 35° 00′ E
(E) Answer not known

157. The area of the plan of an old survey plotted to a scale of 10m to 1 cm measures how as 100.2 sq.cm the plan is found to have strunk so that a line originally 10 cm long no measures 9.7 cm only. There was also a note on the plan that the 20 m chain used was 8 cm too short. Find the True area of the survey.

(A) 10564.0 sq. m
(B) 10200.0 sq. m
(C) 10364.0 sq. m
(D) 10373.0 sq. m
(E) Answer not known

158. A 20 m chain was found to be 10 cm too long after chaining a distance of 1500 m. If was found to be 18 cm too long at the end of days work after chaining a total distance of 2900 m. Find the true distance if the chain was correct before the commencement of the work

(A) 2913. 55 m
(B) 2915. 55 m
(C) 2919. 55 m
(D) 2920. 55 m
(E) Answer not known

159. Indirect or Reciprocal ranging is used for

(A) Both the ends of the line one clearly visible
(B) The survey line lies in a flat Terrain
(C) Both ends of the survey line are not intervisible due to obstacles or distance
(D) The ranging is done by a single person only
(E) Answer not known

160. DGPS stand for

(A) Different global positioning system
(B) Differential global positioning system
(C) Direct global positioning system
(D) Dynamic global positioning system
(E) Answer not known

161. What is the key disadvantage of Shrinkage stopping in terms of ore recovery.

(A) High Dilution
(B) Need for Timber
(C) Poor fragmentation
(D) Large quantity of ore locked during operation
(E) Answer not known

162. Which method is prefered for steep ore bodies with strong walls

(A) Square - set stopping
(B) Top slicing
(C) Shrinkage stopping
(D) Room and Pillar
(E) Answer not known

163. Cross - cuts in underground mines are driven to

(A) Store explosives
(B) Improve ventilation
(C) Connect two parallel roadways
(D) Access surface
(E) Answer not known

164. The major hazard during underground drivage is

(A) Blasting fumes
(B) Dust generation
(C) Flooding
(D) Roof fall
(E) Answer not known

165. A contiguous seams means the parting between two seams is within

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

166. Match the following

Mine car type		Mode of Unloading
(P) Granby	1.	Bottom opening
(Q) Gable Bottom	2.	Both side tilting
(R) Drop Bottom	3.	Single side opening
(S) Rocker Dump	4.	Both side opening

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

(E) Answer not known

167. Maximum permissible gradient for high angle conveyor transportation is

(A) 50°
(B) 60°
(C) 70°
(D) 65°
(E) Answer not known

168. A rope is said to be Lang's Lay of Construction if

(A) The wires in the strand and the strands in the rope are laid in opposite direction

(B) The wires in the strand are laid perpendicular to the rope axis

(C) The wires is the strand are laid in the same direction as the strands in the rope

(D) The rope is not twisted at all

(E) Answer not known

169. What is the gradual plastic deformation of a metal over a long period of time, when subjected to stress below the yield point, called as

(A) Fatigue

(B) Creep

(C) Strain hardening

(D) Resilience

(E) Answer not known

170. A screw jack working with an efficiency of 25% has a velocity ratio of 60. What effort is needed to lift a load of 1 Tef with the jack in Newton?

(A) 600 N

(B) 654 N

(C) 700 N

(D) 720 N

(E) Answer not known

171. A mine produced 1200 tonnes of Coal in a day and 300 man shifts were worked. What is the OMS?

(A) 2.5

(B) 3.0

(C) 4.0

(D) 3.5

(E) Answer not known

172. A fleet consists of 6 trucks, each with a capacity of 85 tonnes. Each truck completes 4 trips per shift. If the availability and utilization factors are 0.9 and 0.85 respectively. Calculate the effective material transported per shift.

(A) 1561 tonnes
(B) 1661 tonnes
(C) 1461 tonnes
(D) 1361 tonnes
(E) Answer not known

173. How is OMS (Output per Man Shift) determined in 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

174. The sale value of Chromite ORE from an open PIT mine is Rs.6,500 per tonne. Cost of mining excluding stripping cost is Rs.2,450 per tonne. If the cost of stripping is Rs.1,150 per cubic meter. The breakeven stripping ratio in m^3/tonne is

(A) 2.18
(B) 3.52
(C) 3.65
(D) 4.25
(E) Answer not known

175. A stripping ratio of 6:1 indicates

(A) 6 metre cube of overburden/1 metre cube of ore
(B) 6 metre cube of overburden/1 tonne of ore
(C) 6 tonne of overburden/1 tonne of ore
(D) 6 tonne of overburden/1 metre cube of ore
(E) Answer not known

176. In Hydraulic mining, the pipe used has a diameter of 10 centimeters with a nozzle diameter of one centimeter if water velocity in the pipe is 10 meters per second, the velocity in the nozzle is

(A) 10 meters/second
(B) 100 meters/second
(C) 1000 meters/second
(D) 1 meter/second
(E) Answer not known

177. Utilization of Shovel mainly depend on

(A) Dumper Availability
(B) Breakdown of Shovel
(C) Maintenance of Shovel
(D) Repair time of Shovel
(E) Answer not known

178. What condition in-pit Crushing is generally adopted?

(A) Flat Deposit
(B) Incline Deposit
(C) Less overburden
(D) Less stripping Ratio
(E) Answer not known

179. Slope stability is not depend on

(A) Pore water pressure
(B) Overall slope angle
(C) Machinery movement
(D) Discontinuous
(E) Answer not known

180. Which is not stabilization method?

(A) Rock Bolt
(B) Anchor
(C) Reinforcement
(D) Excavation
(E) Answer not known

181. What is limiting factor of surface mine to underground?

(A) Break-even Striping Ratio
(B) Depth
(C) Pit Area
(D) Dip of the deposit
(E) Answer not known

182. Which of the following correctly represents the classification of mineral reserves based on the level of geological confidence (from highest to lowest)?

(A) Inferred reserves - Indicated reserves - Proved reserves
(B) Indicated reserves - Inferred reserves - Proved reserves
(C) Proved reserves - Indicated reserves - Inferred reserves
(D) Proved reserves - Inferred reserves - Indicated reserves
(E) Answer not known

183. The location of a box cut in surface mining depends upon which of the following factors?

(A) Type of mineral, fuel cost and manpower availability
(B) Depth of water table, wind direction and proximity to roadways
(C) Topography, dip of the deposit and thickness of overburden
(D) Weather condition, vegetation type and soil colour
(E) Answer not known

184. What does the Bucket Fill Factor (BFF) represent in shovel of loader operations?

(A) Ratio of the bucket's rated capacity to the weight of the material loaded

(B) Ratio of the actual volume of material inside the bucket to the bucket's rated volume

(C) Ratio of cycle time to shovel capacity

(D) Ratio of rock looseness factor to swell factor

(E) Answer not known

185. A dragline excavator is best suited for which type of material

(A) Hard, compact rock

(B) Medium – hard fractured rock

(C) Soft, unconsolidated material

(D) Reinforced concrete

(E) Answer not known

186. What is a dipper shovel commonly used for in mining operations?

(A) Drilling boreholes

(B) Cutting underground galleries

(C) Excavating soft or fragmented rock from a bench

(D) Conveying ore over long distances

(E) Answer not known

187. Which power source is primarily used to operate a Bucket Wheel Excavator (BWE)?

(A) Diesel-powered engines

(B) Solar power

(C) Electrically operated

(D) Hydraulic motors

(E) Answer not known

188. To open a mine for deep seated, the cut used is

(A) External box cut
(B) Internal box cut
(C) Trench
(D) Deep cut
(E) Answer not known

189. Stripping ratio is defined as

(A) Volume of overburden/weight of ore
(B) Mass of overburden/weight of ore
(C) Mass of overburden/mass of ore
(D) Weight of overburden/volume of ore
(E) Answer not known

190. At the pit limits the economic scenario of a mine should be

(A) Highest profit
(B) Lowest loss
(C) Lowest profit
(D) Break even
(E) Answer not known

191. A bucket line dredge has the following parameters, bucket capacity of 0.5 meter cube bucket line speed – 20 buckets per minute bucket fill factor – 80%. The hourly production rate is

(A) 4800 meter cube/hour
(B) 360 meter cube/hour
(C) 24 meter cube/hour
(D) 18 meter cube/hour
(E) Answer not known

192. A 250 tonne truck has a total cycle time of 16.5 minutes with an efficiency of 90%. The total productivity of the truck per hour is

(A) 820 tonnes/hour
(B) 82 tonnes/hour
(C) 910 tonnes/hour
(D) 8200 tonnes/hour
(E) Answer not known

193. If a shovel has a bucket capacity of 10 m^3 and the fill factor is 90% how much material can be loaded in one scoop.

(A) 8 m^3 (B) 9 m^3

(C) 10 m^3 (D) 11 m^3

(E) Answer not known

194. Which of the following excavator is preferred to be used for a bench height of 30 m or more?

(A) Bucket wheel excavator (B) Shovel

(C) Front end loader (D) Dragline

(E) Answer not known

195. Four benches are being worked by the open cast mining system, height, width and face angle for each bench are 15 m, 50 m and 70° respectively. The overall slope angle of the benches in degree

(A) 15.45 (B) 19.25

(C) 32.65 (D) 36.25

(E) Answer not known

196. What is disadvantage of surface mining?

(A) Ventilation (B) Roof control

(C) Environmental Damage (D) Shaft pillar

(E) Answer not known

197. Bench height is not majorly depend on

(A) Excavator reach (B) Width of bench

(C) Strength of bench (D) Blast-drill hole size

(E) Answer not known

198. Match factor is not depend on

(A) Shovel cycle time
(B) Dumper cycle time
(C) Shovel available time
(D) Number of dumper
(E) Answer not known

199. Haul road width is not depend on

(A) Widest machine will fly
(B) Tipper/dumper size
(C) Bench height
(D) Number of bench
(E) Answer not known

200. Which machine has highest engine capacity?

(A) Truck
(B) Dumper
(C) Dozer
(D) Excavator
(E) Answer not known