PROENGR.IN

STUDY MATERIAL FOR MINE MANAGER CERTIFICATE & PSU EXAMS

- Mine Management, Legislation & Safety
- Mine Machinery & Electricity
- Mine Ventilation And Environmental Hazards
- Winning & Working
- Mine Surveying

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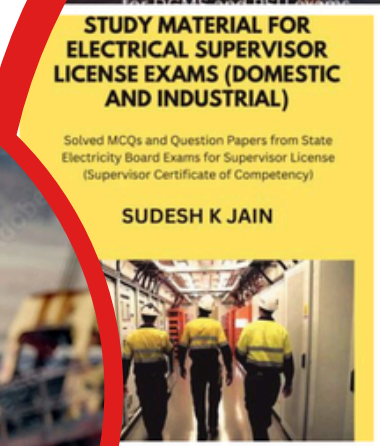
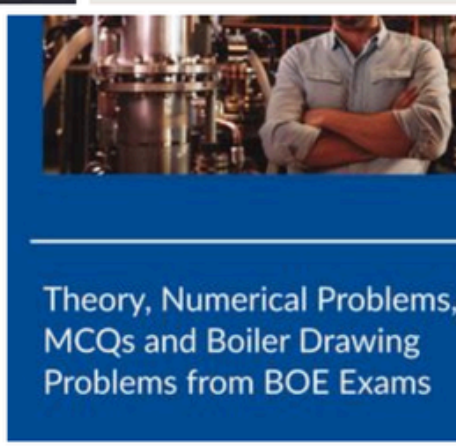
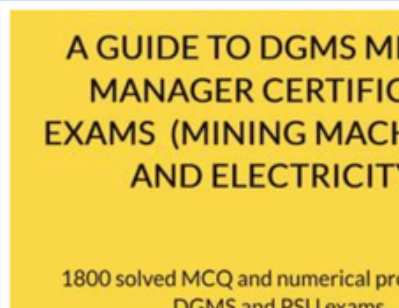








SCCL MT MINING EXAM 2024

1. What is the impact of high rock porosity on blasting?
1. Reduces explosive gas pressure*
2. Increased blast area
3. Enhanced ground vibration
4. Decreased air quality
Hint: Porous rock contains voids, cracks, and micro-fractures. When an explosive detonates, the high-pressure gases expand into these open spaces instead of pushing directly against solid rock.
This "energy bleed" causes a rapid pressure drop in the blast hole, meaning less gas pressure is available to heave and fracture the rock.

2. What is the primary advantage of using non-electric detonators in mining?
1. Reduced cost
2. Increased delay accuracy
3. Simplicity of use
4. Reduced susceptibility to misfires*
Hint: Non-electric systems (like shock-tube detonators) are not affected by stray electrical currents, static electricity, radio frequency (RF) signals, or lightning. In a mining environment, electrical interference from overhead power lines, grounded machinery, or even radio transmitters can cause electric detonators to fire prematurely or fail to fire altogether.

3. Who among the following is empowered to approve and permit explosives vans to be used in mines?
1. Regional Inspector of the mines
2. Controller of Explosives*
3. Both RI and Controller of Explosives
4. Manager of the mines

4. What is the full form of TNT?
1. Trinitrotoluene*
2. Total Nitrogen Test
3. Total NONEL Test
4. Total Nitration Test
Hint: TNT's full chemical name is 2,4,6-trinitrotoluene. It is a yellow, crystalline organic compound. It is one of the most well-known military and industrial explosives because it is highly stable, insensitive to shock and friction, and can be safely melted and poured into shells or bomb casings.

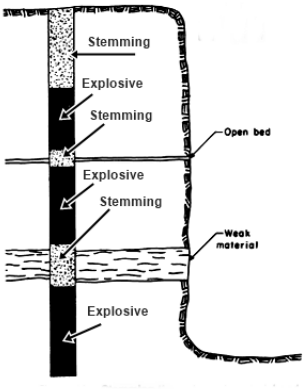
5. Which of the following types of containers is required for carrying explosives?
1. Cast iron
2. Copper
3. Aluminium
4. Hard galvanised iron or steel*

6. When will the detonator be inserted into the priming cartridge?
1. At the beginning of the shift
2. At the end of the shift
3. Immediately before blasting*
4. At any suitable time

7. Which condition must be avoided during the transportation of explosives?
1. Low temperatures
2. Low humidity
3. Slow driving speeds
4. Empty fuel tanks*
Hint: An empty or nearly empty fuel tank is filled with flammable hydrocarbon vapours mixed with air.

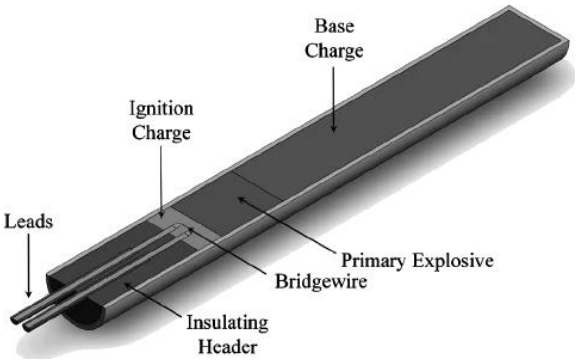
8. What is the primary goal of solid blasting?
1. Enhancing ore recovery
2. Increasing drilling speed
3. Reducing dust production
4. Controlling rock fragmentation*
Hint: "Solid blasting" is a technique where the entire face of the orebody or coal seam is blasted in one go, rather than undercutting or shearing it first. The primary objective is to break the solid rock into manageable, predictable pieces (fragments). Controlling fragmentation directly impacts the entire mining cycle—if fragmentation is poor (too large), secondary blasting or additional rock breaking is required, which slows down production and increases costs.

9. What is the role of stemming in blast design?
1. To delay detonation
2. To confine the explosive energy*
3. To increase blast area
4. To enhance ore recovery
Hint: Stemming is the inert material (such as crushed stone, sand, clay, or drill cuttings) that is packed into the top portion of a blast hole, above the explosive column.



When the explosive detonates, the stemming acts as a mechanical plug or seal. It prevents the high-pressure explosive gases from immediately venting straight out of the top of the borehole into the atmosphere.

10. Which component of a detonator is responsible for igniting the explosive charge?
1. Primary charge
2. Base charge*
3. Bridge wire
4. Delay element
Hint: In an electric detonator, an electrical current flows through the bridge wire, generating heat. This heat is what directly ignites the ignition mix or the primary charge, which in turn triggers the base charge to detonate the main explosive.



11. A building where explosives and detonators are stored is known as a _____.
1. shelter
2. magazine*
3. store
4. house

12. VOD is a term related to _____.
1. air blast
2. explosive*
3. exploder
4. blast vibration
Hint: **VOD** stands for **Velocity of Detonation**. It is the speed at which the shock wave travels through a column of explosive after it has been initiated.
This is a critical property of any explosive. It is typically measured in meters per second (m/s). For example, ANFO has a VOD of roughly 3,000–4,000 m/s.
The VOD determines the shattering power of the explosive. A high VOD means the explosive will fracture hard, brittle rock very effectively, while a lower VOD is better for heaving and moving softer rock.

13. The Truck Dispatch System uses the application of:
1. contour line
2. GPS*
3. mine plan
4. geographical map
Hint: **GPS** stands for **Global Positioning System**. In a Truck Dispatch System (commonly used in large open-pit mines), GPS is the fundamental technology that makes the system work.
GPS receivers are mounted on every haul truck, shovel, excavator, and ancillary

vehicle in the pit. The system uses real-time satellite data to track the exact location, speed, and status of each vehicle at all times. This live positional data is fed into a central computer, which uses sophisticated algorithms to assign trucks to loading units (shovels), direct them to dump points (crushers or stockpiles), and calculate the shortest, most efficient routes—all while avoiding traffic jams and minimizing idle time.

14. Which of the following software does NOT use the application of GIS?
1. SURFAC
2. DATAMINE
3. GEOSTAT
4. CLIMATE*

15. The computer programme used for predicting underground mine temperature is:
1. GEOPLAN
2. CLIMATE*
3. COLLPLAN
4. PREFECS

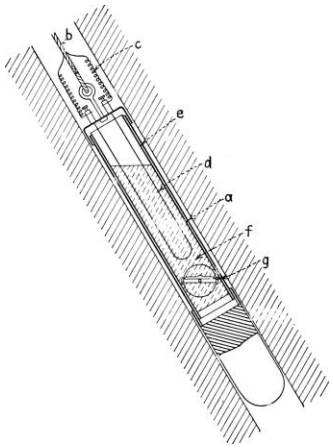
16. Which of the following purposes is NOT fulfilled while using GPS in surface mining?
1. Underground mine environment*
2. Navigation of mining equipment
3. Mapping and surveying of benches
4. Accident analysis*
Note: For this question, ambiguity is found in question/answer. Candidate will get full marks for this question if any of the correct options are chosen.

17. Which of the following is a mine planning software?
1. SARBEX
2. IDEX
3. MINEX*
4. CPEX
Hint: MINEX is a well-established software specifically designed for mine planning and geological modelling.

18. What is the use of Automatic Truck Control and Dispatching System (ATCDS)?
1. Increases truck haulage cost
2. Alters existing mine operating procedures significantly
3. Improves productivity of mining equipment*
4. Decreases productivity of mining equipment
Hint: Automatic Truck Control and Dispatching System (ATCDS) — often referred to in the industry as a Fleet Management System (FMS) — uses real-time GPS tracking, onboard computers, and central dispatch algorithms to assign haul trucks to loading units (shovels/excavators) and dumping points (crushers/stockpiles) in the most efficient way possible.

19. Which of the following is NOT a remote sensing technique?
1. GPS
2. GIS
3. CAD*
4. LIDAR

20. In Etch method of Bore Hole Survey, which of the following acids is used?
1. Hydrofluoric acid*
2. Hyaluronic acid
3. Hydrochloric acid
4. Sulphuric acid
Hint: In this method, a glass tube, partially filled with a dilute solution of hydrofluoric acid, is sealed and lowered into the borehole.



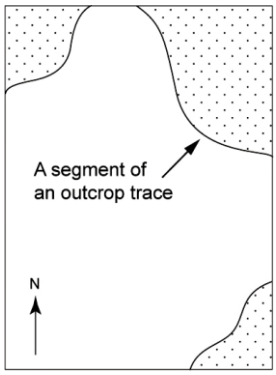
The tool is held stationary at the target depth for a set time. During this period, the acid reacts with the inner wall of the glass tube, etching a perfectly horizontal line onto it.

Once retrieved, the angle between this etched horizontal line and the long axis of the glass tube is measured. This angle directly corresponds to the inclination of the borehole from the vertical at that specific point.

21. The amount and direction of true dip is 1 in 2 due south. What is the gradient of a road driven on a bearing S 60° W?
1. 1 in 2
2. 1 in 4*
3. 1 in 5
4. 1 in 6
Hint: Gradient = True dip x cosθ
= (1/2) x $\cos 60^0$ = 1/4

22. Which of the following is NOT a duty of mine surveyor?
1. Make accurate surveys and levellings
2. Prepare plans and sections
3. Sign the plans, sections and tracings
4. Supervise the production operation*

23. The outcrop of a coal seam may be traced on a contour plan when:
1. only a seam outcrops
2. only the depth of seam is known
3. a seam outcrops and the depth of seam is known at different points*
4. a seam does not outcrop
Hint: To draw the line where a coal seam intersects the ground surface (its outcrop) on a topographic map (contour plan), we need to know the elevation of the seam at various points.



The outcrop occurs wherever the seam's elevation equals the ground elevation.

24. Which of the following terms is NOT related to chain surveying?
1. Offset
2. Base line
3. Survey station
4. True meridian*
Hint: True meridian is a term from compass surveying.

25. The compass is used for determining the:
1. length
2. area
3. direction*
4. volume

26. Which of the following terms is NOT related to Levelling?
1. Resection*
2. Datum line
3. Back sight
4. Line of collimation
Hint: Resection is a term from plane table surveying or compass surveying. It is a method used to determine the location of an unknown point by taking bearings or sighting to at least two known points.

27. When working under railway, an offset plan should be maintained on a scale having RF of:
1. 1:2000
2. 1:1500
3. 1:1000
4. 1:500*

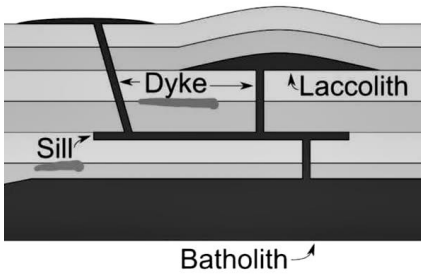
28. The survey of an extensive terrain and complex topography is possible with the application of:
1. GPS
2. remote sensing*
3. contour plan
4. mine plan
Hint: Remote sensing is the science of obtaining information about an object or area from a distance, typically via satellites or aircraft. It is uniquely suited for surveying extensive terrain (large, inaccessible areas) and complex topography (rugged, dense, or varied landscapes).

29. Lignite fields of Neyvelli are of the period of:
1. jurassic period
2. archaean period
3. tertiary period*
4. triassic period
Hint: The Neyveli lignite fields were formed during the Tertiary period, which is a major division of the geologic time scale spanning from about 66 million to 2.6 million years ago.

30. Which of the following bands is NOT found in bituminous coal?
1. Durain
2. Fusain
3. Acid rain*
4. Clarain

31. Coal deposits are the types of:
1. pneumatolytic deposits
2. hydrothermal deposits
3. metasomatic deposits
4. sedimentary deposits*
Hint: Coal is formed from the accumulation, compaction, and alteration of plant material (peat) over millions of years. This process occurs in swampy, waterlogged environments where plant debris accumulates faster than it can decay. Over time, layers of sediment bury the peat, and increased pressure and temperature transform it into coal.

32. Dykes and sills are types of:
1. igneous intrusions*
2. washouts
3. faults
4. folds
Hint: Dykes and sills are both types of igneous intrusions. This means they are formed when molten rock (magma) from deep within the Earth forces its way into pre-existing rock layers and cools and solidifies underground.



33. Which of the following coalfields has the highest reserve compared to others?
1. Raniganj
2. Jharia*
3. Ramgarh
4. East and West Bokaro

34. Which of the following coalfields is the only coking coal producer in India?
Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.
1. Raniganj
2. Jharia
3. Singrauli
4. Godavari

35. Which of the following minerals has the highest hardness among others?
1. Quartz
2. Apatite
3. Fluorite
4. Topaz
Hint: Mohs scale:
1 → Talc
2 → Gypsum
3 → Calcite
4 → Fluorite
5 → Apatite
6 → Orthoclase (Feldspar)
7 → Quartz
8 → Topaz
9 → Corundum
10 → Diamond

36. Match the following definitions with the terminology.
Definition
A. The departure of a bore hole, whether vertical or inclined, from its set course on its own

B. Measurement of the deviation of the bore hole
C. To correct the borehole's course or to force it into a curve which is sharper than, or in another direction to, that caused by deviation
D. To measure the deviation in angle only
Terminology
P. Borehole deflection
Q. Etch method
R. Deviation of the borehole
S. Borehole survey
1. A-P, B-Q, C-R, D-S
2. A-S, B-R, C-P, D-Q
3. A-R, B-S, C-P, D-Q*
4. A-R, B-S, C-Q, D-P

37. Match the following.
Supports used in shaft sinking
A. The wooden planks are securely held against the side of the excavation
B. Skeleton ring is suspended from the ring above
C. Skeleton rings of temporary lining
D. Each segment of skeleton ring is joined together
Name of the components of temporary lining
P. Fish plates
Q. Curb
R. Wedges
S. Hangers
1. A-P, B-Q, C-R, D-S
2. A-R, B-S, C-Q, D-P*
3. A-R, B-P, C-Q, D-S
4. A-S, B-Q, C-P, D-R

38. Which of the following statements about mechanised Longwall mining powered support is INCORRECT?
Statements
A Better roof support
B Less productivity
C Moderate speed of advance
D Considerable saving in manpower
1. A and B
2. B and C*
3. D and A
4. B and D

39. Which of the following is a completely mechanised shaft sinking method?
1. Shaft boring*
2. Freezing method
3. Caisson method
4. Sheet piling method
Hint: Shaft boring is a completely mechanized method that uses a large drilling machine to excavate the shaft from the surface.

40. Choice of the coal mining methods does NOT depend on the _____.
1. dip of the coal seam
2. depth of the occurrence
3. ratio of overburden to coal
4. output per man shift*

41. Select the INCORRECT statements which are given below about the problem of mining thick coal seams.
Statements
A Risk of overriding of coal pillars
B Less chances of spontaneous heating
C Inspection of roof is very difficult
D The magnitude of subsidence is less
1. A and C
2. A and B
3. C and D
4. B and D*

42. Wide stall method of mining for widening the galleries is applicable for:
1. laminated roof strata
2. weak roof
3. massive immediate roof*
4. friable roof
Hint: The wide stall method of mining is specifically designed for and best applied in conditions with a strong, competent roof. The presence of a massive immediate roof is stated as the most important requirement for applying the wide stall method. This strong roof can support the larger exposed span created when galleries are widened, preventing collapse.

43. A homogeneous formation is dealt with during exploration stage. The cores are not eroded by flushing water during the process

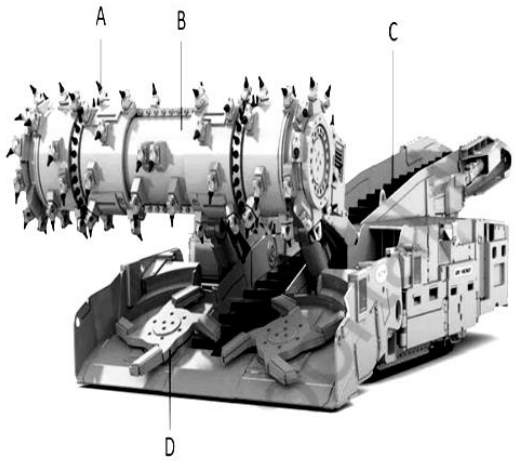
of collection of cores. Which type of core barrel is suitable for the above conditions?
1. Single tube*
2. Double tube
3. Triple tube
4. Wire line drilling
Hint: Single tube is the simplest and most rugged type of core barrel. It is specifically recommended for homogeneous, hard rock formations where the core is solid and not easily washed away or broken apart during drilling.

44. Match the following special methods of shaft sinking with the nature of strata.
Special method of shaft sinking
A. Piling system
B. Caisson method
C. Freezing method
D. Cementation process
Nature of strata
P. Unstable or friable strata with heavy inrush of water
Q. Fissured water bearing strata
R. Loose deposits of sand, mud, or alluvium
S. Strata consists of alternative tough and loose ground
1. A-R, B-S, C-P, D-Q*
2. A-R, B-S, C-Q, D-P
3. A-S, B-R, C-P, D-Q
4. A-P, B-Q, C-R, D-S

45. The occurrence of the coal seam is found at a depth of 180 m from the surface. The width of the gallery is 4.0 m. Find the distance between the centres of the adjacent pillars as per CMR 2017.
1. 16.5
2. 22.5
3. 30.5*
4. 25.5

46. Select the correct working sequence of underground bord and pillar method of coal mining from the below statements.
Statements
A Development of entire working area followed by pillar extraction
B The panel system of mining
C "Whole" followed by "broken" workings
Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.
1. A→C→B
2. A→B→C
3. C→A→B
4. B→C→A

47. The uppercase letters A, B, C, and D indicates the component of continuous miner. Match the following components of continuous miner with the below diagram.
A
B
C
D
Components of Continuous miner
P. Gathering arm loader
Q. Chain conveyor
R. Cutting picks
S. Cutter head



1. A-R, B-S, C-Q, D-P*
2. A-S, B-R, C-Q, D-P
3. A-R, B-S, C-P, D-Q
4. A-P, B-Q, C-R, D-S

48. In a Longwall method of working for coal, the face length of 100 m is extracted by a Single Ended Ranging Drum (SERD) with web depth of 0.6 m. The thickness of the coal seam is 2 m. Total time taken to extract one complete face length is 20 minutes. The total working hours of SERD per shift is 6 hours. Calculate the quantity of coal produced per shift in tonnes, considering the specific gravity of coal as 1.4.
1. 1008

2. 2016
3. 2160
4. 3024*
Hint: The volume V for one cut is:
V = Face Length x Web Depth x Seam Thickness
= 100 m x 0.6 m x 2 m
= 120 m^3
Number of cuts per shifts
= working hours per shift/time of cut
= (6 x 60)/20 = 18
Total volume of coal produced per shift
= 120 m^3/cut x 18 cuts = 2160 m^3
Density of coal = 1.4 t/m^3
Mass of coal = Volume x density
= 2160 x 1.4 = 3024 t

49. In a sublevel caving method of mining, the quantity of coal produced per day is 3000 tonnes. Total manpower used to achieve the production per shift is 50. Calculate the OMS in tonnes, assuming 3 shifts per day.
1. 60
2. 15
3. 20*
4. 25
Hint: OMS (Output per Man Shift)
= total coal produced per day/total man shifts per day
= 3000/(50 x 3)
= 20 t

50. Which of the following underground mining machineries is NOT used in thin coal seam mining practice?
1. Coal plough
2. Single ended ranging drum shearer
3. Continuous miner*
4. Armoured face conveyor

51. The permanent loss of any part or section of a body or the use of any part or section of a body involves:
1. minor injury
2. serious bodily injury*
3. reportable injury
4. fatality

52. If roof of the mine shelter is flat in nature, then roof height of not less than _____ metres to the lowest part of the roof shall be maintained as per Mines Rules 1955.
1. 1.5
2. 2
3. 2.5*
4. 3.5

53. The owner, agent or manager shall give a notice to the Chief Inspector and the Regional Inspector within _____ days from the date of the change, when a change occurs in the name or ownership of a mine as per CMR 2017.
1. 14
2. 10
3. 7*
4. 15

54. An open cast colliery is worked with shovel-dumper combination for excavation and transportation of overburden. The specifications of the dumpers which ply on the bench are given below.
Specifications Value
Rated payload = 54.5 tonne
Dump capacity = 36.4 m^3
Length = 9.09 m
Width = 5.1 m
Height = 4.57 m
Calculate the width of the bench thereof shall not be less than _____ metres as per coal mines regulation 2017.
1. 7.1
2. 10.2
3. 17.3
4. 15.3*
Hint: Based on the Coal Mines Regulations, 2017, the minimum bench width is determined by the size of the largest equipment operating on it. For a dumper, the width must be at least three times the dumper's width.
Minimum Bench Width = 3 x Dumper Width
= 3 x 5.1 = 15.3 m

55. Match the following apparatus/operations with their voltage limit as per Central Electricity Authority (CAE) regulation 2010.

Apparatus/Operation
A. Hand-held portable apparatus
B. Electric lighting in underground mines
C. Electric lighting in open cast mines
D. Portable hand lamps used in underground working
Voltage limit
P. The lighting system shall have a neutral point connected with earth and the voltage shall not exceed 125 Volt between phases
Q. The neutral point of the system is connected with earth and the voltage between the phase does not exceed 250 Volt
R. Voltage shall not exceed 30 Volt
S. Voltage shall not exceed 125 Volt
1. A-P, B-Q, C-R, D-S
2. A-Q, B-P, C-S, D-R
3. A-S, B-P, C-Q, D-R*
4. A-P, B-S, C-Q, D-R

56. 'Powers of inspectors of mines' is covered under which Section of Mine Act, 1952?
1. 5
2. 6
3. 7*
4. 8

57. The Workmen's Inspector shall be assisted by one additional Workmen's Inspector in mining discipline for every additional 1000 persons, where the number of persons employed in a mine exceeds _____ as per Mines Rules 1955.
1. 1200
2. 1400
3. 1500*
4. 1600

58. A leader shall be appointed by a _____, in every rescue team engaged in work with breathing apparatus in a mine as per mines rescue rules,1985.
1. manager
2. regional inspector
3. safety officer
4. superintendent*

59. Match the following plans with its corresponding feature.
Type of Plans
A. Surface plan
B. Underground plan
C. Water-danger plan
D. Ventilation plan
Features
P. The highest flood level of the area
Q. The position of fire-fighting equipment
R. The general direction and rate of dip of the strata
S. Subsidence
1. A-S, B-R, C-P, D-Q*
2. A-R, B-P, C-Q, D-S
3. A-S, B-R, C-Q, D-P
4. A-R, B-S, C-P, D-Q

60. The minimum factor of safety (FoS) for stay-wires, guard-wires or bearer-wires shall be _____ based on the ultimate tensile strength of the wire as per Central Electricity Authority (CAE) regulation 2010.
1. 1.5
2. 2.5*
3. 3.0
4. 3.5

61. The scale of consequence, scale of exposure, and scale of probability are 0.3, 3, and 2 respectively. Calculate the 'risk score' for a hazard as per DGMS (Tech.) Circular 13 of 2002.
1. 5.3
2. 0.45
3. 1.3
4. 1.8*
Hint:
Risk Score = Scale of Consequence × Scale of Exposure × Scale of Probability
= 0.3 × 3 × 2 = 1.8

62. Who is the chairman of the 'committee' under section 12 of the Mine Act, 1952?
1. The chief inspector of mines
2. Person to represent the interest of owners of mines
3. Inspector of mines
4. A person in the service of the government, not being the chief inspector or an inspector*

63. Who is responsible for giving approval of the draft bye laws, which shall be sent by the chief inspector or inspector after having the settlement by the committee?
1. District magistrate
2. Owner of the mine
3. Central government*
4. State government

64. Maternity leave shall be availed by female employees that is NOT exceeding _____ weeks as per Mine Act, 1952.
1. 6
2. 12*
3. 14
4. 15

65. The first-aid room shall have a floor space of not less than _____ square metres as per Mines Rules 1955.
1. 10*
2. 15
3. 20
4. 25

66. Every rescue station shall be maintained a rescue brigade of not less than _____ rescue trained persons as per the Mines Rescue Rules, 1985.
1. 16
2. 18*
3. 20
4. 14

67. The manager of a below ground mine shall ensure that at least _____ rescue trained persons are readily available at surface at any time, where more than 100 persons are ordinarily employed below ground.
1. 6
2. 7
3. 10
4. 5*

68. As per Coal Mine Regulation 2017, _____ means a landing or platform in a shaft and includes an excavation therefrom between the top and the bottom of the shaft.
1. incline
2. inset*
3. decline
4. drift

69. No manager shall vacate his office without giving due notice in writing to the owner or agent at least _____ days before the day on which he wishes to vacate his office as per CMR 2017.
1. 15
2. 21
3. 30*
4. 60

70. The shafts, inclines or outlets shall not be less than _____ metres distant from one another at any point as per Coal Mine Regulation 2017.
1. 14.5
2. 15.5
3. 12.5
4. 13.5*

71. Match the following winding equipment's with their frequency of examination as per Coal Mines Regulation 2017.
Winding equipment
A. The brake of the winding engine
B. The guides and the signalling arrangements fitted in a shaft
C. Reduction in the circumference of the rope
D. Internal parts of the winding engine
Frequency of examination
P. Once at least in every seven days
Q. Once at least in every thirty days
R. Once at least in every twenty-four hours
S. Once at least in every twelve months
1. A-R, B-P, C-Q, D-S*
2. A-R, B-Q, C-P, D-S
3. A-Q, B-R, C-S, D-P
4. A-S, B-R, C-P, D-Q

72. Match the following parts of flame safety lamp with their functions.
Parts of flame safety lamp
A. Inner gauge
B. Bonnet
C. Pillars
D. Asbestos rings
Function

P. Protects the glass from external hit
Q. Prevents the passage of flame from interior to exterior of lamp
R. Prevents the gases to come outside
S. Protects the wire gauges from damage
1. A-R, B-Q, C-S, D-P
2. A-S, B-Q, C-P, D-R
3. A-Q, B-S, C-P, D-R*
4. A-P, B-S, C-Q, D-R

73. As per CMR 2017, to prevent the eruption of water, all useful information including the position, extent and depth of the below mentioned features shall be acquired and kept recorded, EXCEPT:
A. any seam or section below another seam or section
B. any place in a seam or section, which is at a lower level than any other place in a lower seam or section
C. overriding of coal pillar
D. any water-bearing strata
1. A
2. B
3. C*
4. D

74. What is a crucial feature of a resuscitator used in mine rescues?
1. Provides continuous oxygen supply*
2. Measures heart rate
3. Monitors blood pressure
4. Records temperature

75. Which of the following laws primarily governs the flow of air in mine ventilation systems?
1. Boyle's Law*
2. Newton's Law
3. Darcy's Law
4. Ohm's Law
Hint: Boyle's Law states that for a fixed amount of gas at constant temperature, pressure and volume are inversely proportional (P ex l/V). In mine ventilation, this law is crucial because: (i) As air moves through underground workings, changes in pressure cause changes in air volume and density. (ii) It governs the compressibility effects of air, especially in deep mines where pressure differences are significant.

76. The physiological effect of blackdamp at 40% of blackdamp results in _____.
1. doubling of the rate of breathing
2. panting, headache and face turning blue
3. more frequent and deeper breathing*
4. death after hours

77. Select the INCORRECT steps against inundation of mine workings.
A. The highest flood level of stream, river, lake etc. should not be clearly marked.
B. Cut suitable drains round the periphery of the quarry.
C. Strata above mineral bed is permeable and outcropping in a river or lake, caving method should follow.
D. Maintain surface plan of the mine with contours and showing particularly low laying areas, lakes, water courses, boreholes, wells, dams, quarried outcrop zone.
1. B and C
2. C and D
3. A and C*
4. A and B

78. Which of the following is NOT a personal safety gadget?
1. Mask
2. Hand gloves
3. Safety belt
4. Safety lamp*

79. Which factor can influence the geothermal gradient in a region?
1. Rock type*
2. Surface vegetation
3. Atmospheric pressure
4. Human activities

80. Match the following mine gases with their properties.
Name of the mine gas
A. H_2S
B. CO_2
C. CO
D. N_2
Properties of the mine gas
P. Very soluble in water and not combustible

Q. Inert gas which neither burns nor supports combustion
R. Rotten egg
S. Hardly soluble in water and combustible
1. A-R, B-P, C-S, D-Q*
2. A-P, B-R, C-S, D-Q
3. A-R, B-P, C-Q, D-S
4. A-P, B-Q, C-R, D-S

81. For the detection of carbon monoxide (CO) in underground coal mines, a hopcalite detector is used. Hopcalite is a mixture of _____.
1. silica gel and potassium palladium sulphate
2. iodine pentoxide and sulphuric acid
3. manganese dioxide and copper oxide*
4. potassium superoxide and copper oxide
Hint: Hopcalite is used for the detection and removal of carbon monoxide (CO). It is a mixture of manganese dioxide (MnO_2) and copper oxide (CuO).

82. Match the following occupational hazards with their causes from.
Occupational hazards
A. Subsidence
B. Inundation
C. Mine fire
D. Coal bump
Cause
P. An instantaneous failure of a pillar, part of a pillar or several pillars of coal in working below ground
Q. Lateral or vertical ground movement caused by underground mining activities
R. Sudden inrush of water either from a surface source or from an underground source into the active mine workings
S. Spontaneous combustion of coal
1. A-P, B-Q, C-R, D-S
2. A-Q, B-R, C-S, D-P*
3. A-R, B-Q, C-S, D-P
4. A-Q, B-R, C-P, D-S

83. Which method is commonly used to reduce heat stress in mines?
1. Increasing work hours
2. Enhancing ventilation*
3. Reducing water supply
4. Increasing drilling speed

84. Which of the following methods is commonly used to calculate heat flow in mines?
1. Seismic survey
2. Thermal conductivity measurement*
3. Chemical analysis
4. Magnetic survey

85. Which of the following factors does NOT affect the resistance of airways in a mine?
1. Airway roughness
2. Airway diameter
3. Airway length
4. Rock type*

86. Holdback is a safety device which is used in _____.
1. conveyors*
2. locomotives
3. pumps
4. rope haulage
Hint:



87. Microprocessor-based control system must be used in the dumpers of capacity:
1. 25 tonne or more*
2. 45 tonne or more
3. 65 tonne or more
4. 85 tonne or more

88. Which of the following factors is NOT true for walking dragline compared to crawler dragline?
1. More reliable
2. Low maintenance
3. High maintenance*
4. Higher boom length

89. Which of the following types of pumps is more compact and efficient?

1. Kinetic pump*
2. Positive displacement pump
3. Diaphragm type reciprocating pump
4. Screw and vane type rotary pump

90. Which of the following is a safety device used in an electric power supply system?
1. Holdback
2. Circuit breaker*
3. Monkey catch
4. Idler

91. For satisfactory loading shovel operation, the voltage drop should be maintained at:
1. 65%
2. 75%
3. 85%
4. 95%*

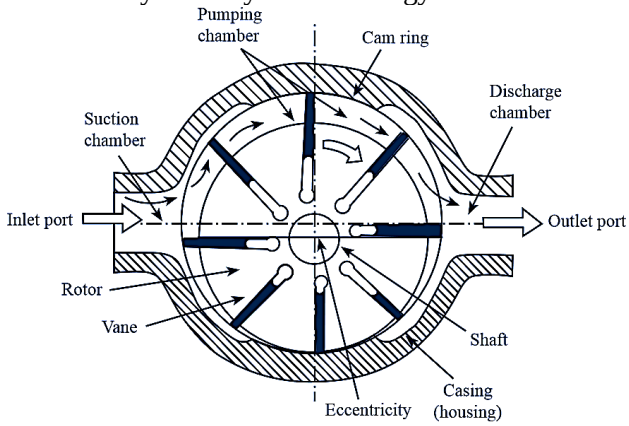
92. Which of the following machines can be used for the loading operation?
1. Ripper
2. Shovel*
3. Dozer
4. Scraper
Hint:
Ripper. Attached to a dozer or excavator; used to break or fracture hard rock/ground (ripping) before excavation.
Shovel. Excavates and loads material into haulers
Dozer. Can push material into piles.
Scraper. A self-loading machine that cuts, carries, and dumps material over short distances—used for bulk earthmoving.

93. A turbine pump discharges 1680 l/min with a total head of 150 m. Pump efficiency is 75%, and motor efficiency is 90%. Calculate the power required.
1. 45 kW
2. 61 kW*
3. 76 kW
4. 88 kW
Hint: j Q = 1680L/min = 1.68m^3/min = 0.028 m^3/s
Input power = $\rho gQH/\eta_p\eta_m$
= 1000 x 9.81 x 0.028 x 150/0.75 x 0.90
= 61000 W

94. Where an electrical installation is already connected to the supply system in mines, periodical inspection should be carried out at intervals NOT exceeding:
1. 1 year
2. 5 years*
3. 10 years
4. 15 years

95. The exhaust conditioner is used in:
1. rope haulage
2. trolley wire locomotive
3. battery locomotive
4. diesel locomotive*
Hint: Diesel locomotives produce toxic exhaust gases (like CO, NOx, and particulate matter). When used in underground mines or tunnels, these emissions must be treated or "conditioned" using an exhaust conditioner (such as a catalytic purifier or water scrubber) to reduce harmful pollutants before they are released into the confined environment.

96. Which of the following is NOT a kinetic type of pump?
1. Centrifugal pump
2. Turbine pump
3. Vane type pump*
4. Axial flow pump
Hint: Kinetic (or dynamic) pumps work by imparting velocity and kinetic energy to the fluid, which is then converted into pressure. A Vane type pump, on the other hand, is a positive displacement pump. It works by trapping a fixed volume of fluid between vanes and the casing, then forcing it out mechanically—not by kinetic energy.



Vane type pump

97. Which of the following pumps has the lowest pumping capacity?
1. Submersible pump
2. Roto pump*
3. Centrifugal pump
4. Turbine pump

98. Which of the following is NOT a type of ripper?
1. Hinge type
2. Parallelogram type
3. Impact type
4. Percussive type*

99. Bucket Wheel Excavators can cut and load the strata with compressive strength of:
1. less than 10 MPa*
2. more than 10 MPa
3. less than 20 MPa
4. more than 20 MPa

100. Which of the following is NOT a continuous mining machine for longwall faces?
1. Shearer
2. Plough
3. Trepanner
4. Surface miner*
Hint: A Surface miner is a continuous mining machine used in surface (open-pit) mining applications.

101. Which of the following machines can be used to crush big sized lumps in underground coal mines?
1. Surface miner
2. Feeder breaker*
3. Drilling machine
4. Load haul dumper

102. In any open-cast mine, the fault current in a 3.3 KV/6.6 KV system should NOT be more than:
1. 10 amps
2. 50 amps*
3. 100 amps
4. 120 amps

103. For satisfactory operation of dragline, the peak to peak Megawatt (MW) cyclic swing should NOT exceed:
1. 50%
2. 70%
3. 90%
4. 100%*

104. What is the primary cause of rock bursts?
1. Chemical reactions within the rock
2. Sudden release of stored strain energy*
3. Surface erosion
4. Volcanic activity
Hint: As mining progresses to greater depths, the overburden pressure increases. The rock mass stores elastic strain energy as it is compressed and deformed.
When mining activities (like blasting or cutting) disturb this stressed rock, or when the rock's strength is exceeded, the stored energy is released abruptly.

105. Which of the following types of mine roofs is characterised by a strong, solid rock that requires minimal support?
1. Laminated roof
2. Massive roof*
3. Blocky roof
4. Jointed roof

106. In the context of pressure arch theory, which factor most influences the formation of the pressure arch?
1. The width of the excavation*
2. The type of drilling equipment used
3. The depth of the excavation
4. The temperature of the surrounding rock
Hint: Pressure arch theory explains how stresses redistribute around an underground excavation. When a void is created, the overlying rock tends to sag, transferring its weight to the solid rock on the sides of the opening. This forms a natural "arch" of stressed rock above the excavation.

107. Which of the following is a commonly used method for testing the mine roofs?
1. Seismic reflection survey
2. Test using a strong beam of light*
3. Electrical resistivity survey

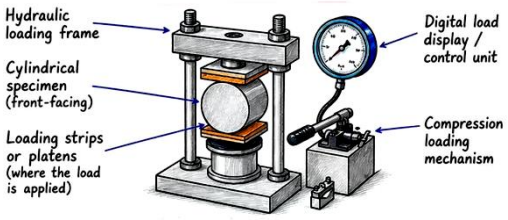
4. Magnetometer survey
Hint: Miners use a strong portable light to scan the mine roof. This helps identify fine cracks, sagging, loose blocks, and uneven strata that could be hazardous.

108. What is the typical surface manifestation of subsidence?
1. Mountain formation
2. Sinkholes*
3. River meandering
4. Desertification
Hint: **Subsidence** is the gradual sinking or sudden collapse of the ground surface due to underground material movement (often from mining, groundwater withdrawal, or natural cavity collapse). **Sinkholes** are depressions or holes in the ground that form when the roof of an underground cavity collapses. They are the classic surface expression of subsidence

109. What type of rock is sandstone, as per its origin?
1. Igneous
2. Metamorphic
3. Sedimentary*
4. Both igneous and metamorphic
Hint: Sandstone is a classic example of a sedimentary rock. It forms through the accumulation, compaction, and cementation of sand-sized mineral particles (mostly quartz and feldspar) over geological time.

110. Which parameter is NOT typically included in the RMR system?
1. Uniaxial compressive strength of rock material
2. Rock quality designation (RQD)
3. Groundwater conditions
4. Thermal conductivity of the rock*

111. The Brazilian test is used for _____.
1. UCS determination
2. tensile strength determination*
3. shear strength determination
4. modulus of elasticity
Hint: The Brazilian test (also called the split-cylinder test or indirect tensile test) is a standard laboratory method used to measure the indirect tensile strength of brittle materials like rock, concrete, and ceramics.



112. Which factor primarily affects the dispersion of airborne dust in mines?
1. Temperature
2. Humidity
3. Airflow patterns*
4. Light intensity

113. What chemical is often used in dust suppression on haul roads?
1. Calcium chloride*
2. Sodium bicarbonate
3. Potassium nitrate
4. Ammonium sulphate

114. What is the primary cause of bench failure in open-pit mines?
1. Heavy equipment
2. Poor blasting techniques
3. Geological discontinuities*
4. High ore grade
Hint: Geological discontinuities—such as joints, faults, bedding planes, fractures, and shear zones—are the primary and most critical factor controlling bench stability in open-pit mines.

115. Which instrument is used to measure the concentration of airborne dust particles?
1. Anemometer
2. Gravimetric sampler*
3. Hygrometer
4. Thermocouple

116. What is the primary cause of dump failure in mines?
1. Excessive rainfall*
2. Heavy equipment
3. Chemical reactions
4. Earthquakes*
Note: For this question, ambiguity is found in question/answer. Candidate will get full

marks for this question if any of the correct options are chosen.

117. What is the primary function of a dust extraction system in an underground mine?
1. To improve visibility
2. To maintain air temperature
3. To remove airborne dust*
4. To monitor gas levels

118. What is the main objective of a mine closure plan?
1. Maximising short-term profits
2. Ensuring the safety and stability of the site post-closure*
3. Increasing mineral extraction rates
4. Expanding the mining operations
Hint: A mine closure plan is a comprehensive strategy developed before, during, and after mining operations to ensure that the site is safely and sustainably decommissioned. While economic or operational considerations are important, the overarching goal is to eliminate risks to human health, safety, and the environment after mining closes.

119. Which regulatory body oversees mining operations in India?
1. EPA
2. DGMS*
3. OSHA
4. IBM
Hint: The primary regulatory body overseeing mining operations in India, particularly concerning safety, is the **Directorate General of Mines Safety** (DGMS).

120. Which organisation provides guidelines for sustainable mining practices in India?
1. DGMS
2. IBM*
3. OHSA
4. MSHA
Hint: The **Indian Bureau of Mines** (IBM) is the primary government agency in India that provides guidelines and promotes sustainable mining practices.

121. Which type of food storage is found in Rhodophyceae?
Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.
1. Starch
2. Mannitol
3. Floridean
4. Laminarin

122. Which tribal community celebrates the Chapchar Kut festival in India?
1. Garo
2. Mizo*
3. Naga
4. Khasi

123. What is the name of the well-known waterfall situated on the Sharavati River in the Western Ghats of India?
1. Gokak Falls
2. Jog Falls*
3. Sathodi Falls
4. Shiva Samudram Falls

124. Rath Yatra, one of the biggest festivals of Odisha, takes place once a year in which of the following towns?
1. Bhubaneswar
2. Puri*
3. Cuttack
4. Rourkela

125. Which of the following official languages of India belongs to the Dravidian language family?
1. Kannada*
2. Nepali
3. Bodo
4. Santhali

126. Who acts as the chief executive head of any state in India?
1. Governor*
2. Chief minister
3. President
4. Prime Minister

127. During the freedom movement in India, in which of the following years was a

parallel government known as ‘Prati Sarkar’ formed in Satara district of Maharashtra?
1. 1941-42
2. 1942-43*
3. 1943-44
4. 1944-45

128. Which of the following states accounted for the highest percentage of population in India?
1. Rajasthan
2. Bihar
3. Madhya Pradesh
4. Uttar Pradesh*

129. Select the most appropriate idiom to fill in the blank.
I taught my child to make sand castles at the beach, but she _____ of the sand moulds and twisted them into an unrecognizable shape.
1. made a pig's ear*
2. flogged a dead horse
3. grasped at straws
4. jumped the gun

130. Select the most appropriate option to fill in the blank.
The robbers left nothing, _____?
1. won’t they
2. do they
3. did they*
4. does they

131. Select the most appropriate option to fill in the blank.
Rohan and Shantanu are good players so on behalf of the school, _____ always represented the cricket team in the state level competition.
1. he
2. they*
3. them
4. we

132. Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the correct order to form a meaningful and coherent paragraph.
A. It continues to be the prerogative of veterans.
B. Unless the youth decide to be part of the process, the aged politicians will thrive.
C. Youth don’t seem to be too keen to take up politics.
D. We yearn to see a balance of both, the old and the young in politics.
1. CDBA
2. CBAD
3. CABD*
4. ABDC

133. Select the option that expresses the given sentence in indirect speech.
Charlie said, “I may gift a car to my wife on the occasion of our wedding anniversary.”
1. Charlie said he might gift a car to my wife on the occasion of their wedding anniversary.
2. Charlie said that I might gift a car to my wife on the occasion of their wedding anniversary.
3. Charlie said that he might gift a car to his wife on the occasion of their wedding anniversary*
4. Charlie said that he may gift a car to his wife on the occasion of our wedding anniversary.
Hint: In indirect speech, the pronouns and possessive adjectives change to match the perspective of the speaker (Charlie), and "may" typically changes to "might" in past tense reporting.

134. Select the most appropriate synonym of the given word.
Forthrightness
1. Deceit
2. Candor*
3. Forward
4. Inconsistent
Hint: Forthrightness means being direct, open, and honest in speech or expression. Candor is the exact synonym, as it also means openness and honesty.

135. The product of two numbers is 468 and their L.C.M. is 78. Find their H.C.F.
1. 6*
2. 5
3. 1
4. 14

Hint: Product of two numbers = L.C.M. x H.C.F.

136. P and Q together can fill a cistern with water in 28 hours. If P alone can fill the cistern with water in 56 hours, then in how many hours will Q alone fill three-fourth of the same cistern with water?
1. 42*
2. 84
3. 43
4. 85
Hint: Rate of P and Q together = 1/28 of the cistern per hour
Rate of P alone = 1/56 of the cistern per hour
Rate of Q alone
= (Combined rate) – (P's rate)
= (1/28) - (1/56) = 1/56
Time for Q to fill three-fourth of cistern
= work/rate = (3/4)/(1/56)
= 42 hours

137. The original price of a music set is ₹8500. The price is discounted by 10% and then raised by 10%. What is its new price (in ₹)?
1. 8415*
2. 7915
3. 8915
4. 7715
Hint: A 10% discount followed by a 10% increase results in a net change of:
8500 x (0.90) x (1.10) = 8500 x 0.99
= ₹ 8415

138. By a reduction of 20% on the price of 1 kg tea powder, a person is able to purchase 1 kg more tea powder for ₹800. Also, by a reduction of 20% on the price of 1 kg sugar, the person is able to purchase 2 kg more sugar for ₹400. Find the original price of 6 kg tea powder + 5 kg sugar.
1. ₹1,350
2. ₹1,250
3. ₹1,150
4. ₹1,450*
Hint: **Case 1: Tea Powder**
Let the original price of 1 kg tea = ₹ x
After a 20% reduction, new price = 0.80x
With ₹ 800, the original quantity bought = 800/x kg
With the reduced price, quantity bought =800/0.80x = 1000/x per kg
Given: the person buys 1 kg more at the reduced price.

$$\frac{1000}{x}-\frac{800}{x}=1$$

x = 200
Case 1: Sugar
Let the original price of 1 kg tea = ₹ y
After a 20% reduction, new price = 0.80y
With ₹ 800, the original quantity bought = 400/y kg
With the reduced price, quantity bought =400/0.80y = 500/y per kg
Given: the person buys 1 kg more at the reduced price.

$$\frac{500}{y}-\frac{400}{y}=1$$

y = 50
Cost of 6 kg tea + 5 kg sugar
= 6 x 200 + 5 x 50 = ₹ 1450

139. Suppose that ₹4,500 doubled in 5 years when compounded annually. How many more years will it take to get another ₹9,000 compound interest at the same rate of interest?
1. 15
2. 8
3. 10
4. 5*
Hint: P' = 2P = 2 x 4500 = 9000
Compound interest after 5 years
= P' - P = 9000 - 4500 = 4500
As per question
Total compound interest = compound interest after 5 years + 9000
= 4500 + 9000 = 13,500
Total amount P'' = P + total compound interest
= 4500 + 13500
= 18000
Now, P''/P' = 18000/9000 = 2
Since the money doubles every 5 years, it will take exactly 5 more years for the amount to grow from 9,000 to 18,000.

140. A person marks an article at 54% above the cost price and offers a 20% discount on the marked price. What is his gain percentage?

1. $27\frac{1}{2}$
2. $21\frac{3}{5}$
3. $23\frac{1}{5}$ *
4. $22\frac{4}{5}$

Hint: It is marked by m% and then discounted by d%.
Net gain % = m - d - (md/100)
= 54 - 20 - (54 x 20/100)
= 23.2%

141. In a certain code language, 'BOAT' is coded as '4286' and 'CRIB' is coded as '9752'.What is the code for 'B' in the given code language?
1. 2*
2. 4
3. 5
4. 7

Hint: The only common letter between BOAT and CRIB is 'B'.
The only common digit between their respective numerical codes, 4286 and 9752, is 2.
Therefore, the letter 'B' is represented by the code 2.

142. If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−', what will come in place of the question mark (?) in the following equation?
(6 B 14) A 4 C (19 B 3) D (14 B 2) = ?
1. 58
2. 40
3. 65
4. 50*

Hint:
Step 1: The equation becomes:
(6 × 14) ÷ 4 + (19 × 3) − (14 × 2) = ?
Step 1: Solve the parentheses first (using BODMAS)
BODMAS → B – Brackets, **O** – Order of powers or roots, **D** – Division, **M** – Multiplication **A** – Addition, and **S** – Subtraction.
(6 × 14) = 84
(19 × 3) = 57
(14 × 2) = 28
Now the equation is:
84 ÷ 4 + 57 − 28 = ?
Step 3: Perform Division
84 ÷ 4 = 21
Now:
21 + 57 − 28 = ?
Step 4: Perform Addition and Subtraction (left to right)
21 + 57 = 78
78 − 28 = 50

143. Seven people, L, M, N, W, X, Y and Z are sitting in a row, facing north. Only W sits to the right of Y. Only one person sits between Y and L. Only two people sit between L and M. Only two people sit between N and Z. Z sits at some place to the right of X.
Who sits at the extreme left end of the line?
1. M*
2. N
3. Z
4. X

Hint:
Only W sits to the right of Y
__, __, __, __, __,Y , W

Only one person sits between Y and L
__, __, __, L, __,Y , W

Only two people sit between L and M
M, __, __, L, __,Y , W

Only two people sit between N and Z
M, N, __, L, Z,Y , W

Z sits at some place to the right of X
M, N, X, L, Z,Y , W

144. A is the brother of D. D is the father of C. B is the mother of A. E is the daughter of C. F is C's wife. How is B related to E?
1. Father's mother
2. Mother's mother

3. Father's father's mother*
4. Mother's father's mother

145. In a certain code language,
'P + Q' means 'P is the daughter of Q';
'P – Q' means 'P is the wife of Q';
'P × Q' means 'P is the brother of Q' and
'P ÷ Q' means 'P is the son of Q'.
Based on the above, how is A related to E if 'A + B − C × D ÷ E'?
1. Son's daughter*
2. Son's sister
3. Daughter's daughter
4. Daughter's sister

146. This question is based on the following words.
END FIN LAP FUN
How many letters are there (in the English alphabetical order) between the second letter of the third word from the right and the third letter of the third word from the left?
1. 3
2. 4
3. 5
4. 6*
Hint:
Find the First Target Letter
Condition: Second letter of the third word from the right.
The third word from the right is FIN.
The second letter of FIN is I.

Find the Second Target Letter
The third word from the left is LAP.
The third letter of LAP is P.

Letters between I and P
I, J, K, L, M, N, O, P

These are 6 letters.

147. Which vital hardware component of a computer system is tasked with executing program instructions, performing calculations and overseeing data management processes?
1. Random Access Memory (RAM)
2. Graphics Processing Unit (GPU)
3. Central Processing Unit (CPU)*
4. Hard Disk Drive (HDD)

148. Which tab in MS PowerPoint allows you to access various tools and commands for creating and formatting slides in a blank presentation?
Options :
1. Insert
2. Design
3. Home*
4. View

149. In the file path 'C:\Program Files\Microsoft Office\Word.exe', what is 'Word.exe'?
1. Folder
2. Drive
3. File*
4. Extension

150. Which of the following transition effects does NOT allow you to specify the speed of the transition?
Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.
1. Fade
2. Wipe
3. Uncover
4. Push