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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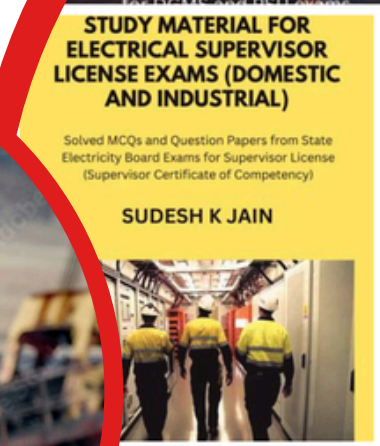
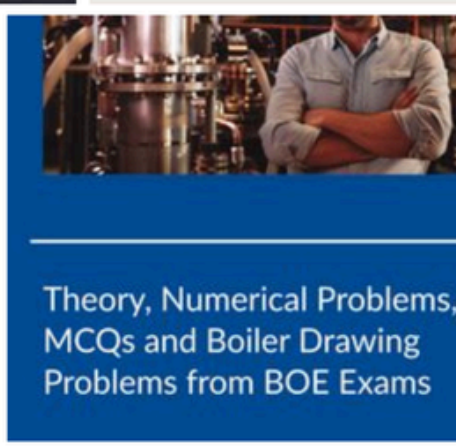
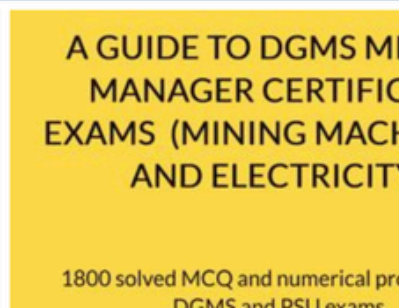








# SCCL JR. MINING ENGINEER TRAINEE EXAM 2024

1. The chief inspector or inspector and the owner, agent or manager are unable to agree as to the terms of the bye-laws, the chief inspector or inspector shall refer the draft bye-laws to the _____ for settlement as per Mine Act 1952.
1. District magistrate
2. Central government
3. Committee*
4. State government

2. No person shall act as a Workmen's Inspector of a mine unless, he has at least _____ years of experience in mines including at least two years in workings of the mines for which he is nominated.
1. 3
2. 4
3. 5*
4. 7

3. No person shall be appointed as Superintendent unless he has _____ years practical experience of belowground work in mines as per Mines Rescue Rules 1985.
1. 3
2. 5*
3. 7
4. 10

4. Suitable arrangements shall be made for persons to descend and ascend by such means of access and egress, where shaft is more than _____ metres in depth, such arrangements shall be by mechanical means so installed and maintained as to be constantly available for use as per CMR 2017.
1. 20
2. 25
3. 30*
4. 50

5. At every place in the mine where persons are required to work or pass, the air does not contain less than _____ of oxygen as per CMR 2017.
1. 16%
2. 19%*
3. 20%
4. 21%

6. As per Mines Act 1952, A committee should consist of how many qualified mining engineers who are not directly employed in the mining industry but are appointed by the central government?
1. 2*
2. 1
3. 3
4. 4

7. Which of the following are true regarding the objections with reference to the draft bye-laws, made by or on behalf of persons affected as per Mine Act 1952?
A. The specific grounds of objection
B. The omission in bye-laws if any
C. Additions or modifications asked for in bye-laws
1. Only A and B
2. A, B and C*
3. Only B and C
4. Only A and C

8. The first-aid room shall be in charge of a qualified medical practitioner, where the number of persons ordinarily employed in a mine is more than _____.
1. 500
2. 750
3. 1000*
4. 1500

9. Every shelter shall have a floor area of NOT less than _____ square metres as per Mine Rule 1955.
1. 10
2. 12
3. 14*
4. 16

10. No person shall be selected for training in rescue work, unless he is between _____ and _____ years of age as per Mines Rescue Rules 1985.

1. 18; 25
2. 19; 26
3. 20; 28
4. 21; 30*

11. When the ownership of a mine is transferred, the previous owner or his agent shall make over to the new owner or his agent, within a period of _____ days of the transfer of ownership as per CMR 2017.
1. 15
2. 10
3. 8
4. 7*

12. No person shall act or be employed as a manager unless he has attained _____ years of age as per Coal Mine Regulation 2017.
1. 18
2. 20
3. 23*
4. 25

13. An underground plan showing every important surface feature within the boundaries, such as railway, road, river, stream, water-course, tank, reservoir, opencast working and building which is within _____ metres of any part of the workings measured on the horizontal plane as per CMR 2017.
1. 45
2. 100
3. 150
4. 200*

14. All parts of suspension gear in regular use shall unless otherwise permitted by the Chief Inspector, be renewed after a period of service of NOT more than _____ years as per CMR 2017.
1. 6*
2. 7
3. 8
4. 9

15. In alluvial soil, moorum, gravel, clay, debris or other similar ground, the sides shall be sloped at an angle of safety NOT exceeding _____ from the horizontal as per CMR 2017.
1. 30°
2. 45°*
3. 50°
4. 60°

16. Which of the following are true about the powers of Inspectors of the Mines as per Mine Act 1952?
A. Examine the ventilation of the mine
B. Examine the sufficiency of the byelaws for the time being in force relating to the mine
C. Examine all matters and things connected with or relating to the health, safety and welfare of the persons employed in the mine
1. Only A and B
2. Only A and C
3. A, B and C*
4. Only B and C

17. Every mine where in more than _____ persons are employed, there shall be provided and maintained a first aid room as per Mine Act 1952.
1. 100
2. 120
3. 150*
4. 200

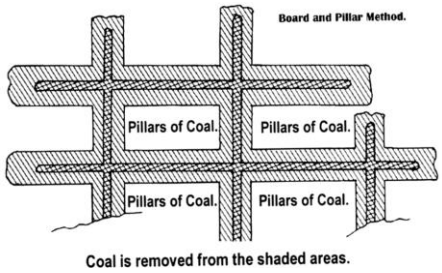
18. Every person employed in a mine who has completed a calendar years' service therein shall be allowed, during the subsequent calendar year, leave with wages at the rate of one day for every _____ days of work performed by him in case of a person employed below ground.
1. 10
2. 15*
3. 20
4. 25

19. When using rescue apparatus, the leader shall carry a watch, shall record the pressure of the compressed oxygen at intervals of ____ minutes as per Mines Rescue Rules 1985.
1. 10
2. 15
3. 20*
4. 25

20. Which of the following are true about content of Safety Management Plan as per CMR 2017? Contents of Safety Management Plan
A. Defined mine safety and health policy of the company
B. A plan to implement the policy
C. How the mine or mines intend to develop capabilities to achieve the policy
D. Principal hazard management plans
1. Only A and B
2. Only B and C
3. Only B, C and D
4. A, B, C and D*

21. Which of the following is NOT a mechanised shaft sinking method?
1. Shaft boring
2. Box hole drilling
3. Shaft drilling
4. Caisson method*
Hint:
**Shaft boring** – Uses a large-diameter rotary boring machine to excavate a full-face shaft, similar to tunnel boring machines (TBMs).
**Box hole drilling** – A mechanised method using a raise boring machine to drill a vertical or inclined hole from one level to another, often used for ore passes or ventilation shafts.
**Shaft drilling** – Involves using a large-diameter drill rig (e.g., reverse circulation or down-the-hole hammer) to drill a completed shaft from the surface.
**Caisson method** – Relies on gravity, excavation under the cutting edge, and sinking by adding weight; mechanisation is minimal compared to the others, and it is not powered by a rotating cutter head or drilling rig in the same sense.

22. Which method of coal mining is best suited to work at shallow depth?
1. Longwall
2. Bord and Pillar*
3. Horizon
4. Hydraulic
Hint:




23. In a Bord and pillar mining, the width of the pillar and galleries are 19.5 m and 3.0 m, respectively. The percentage of extraction during development is _____.
1. 26.8%
2. 32.5%
3. 24.8%*
4. 42.6%
Hint:

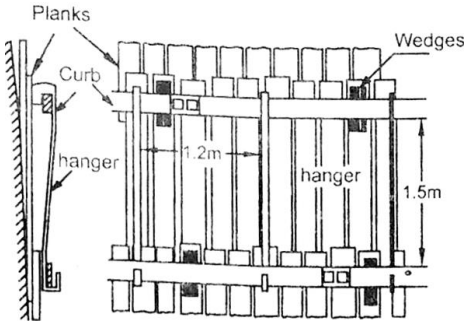
$$R = 1 - \frac{a^2}{(a+b)^2}$$

Here a = 19.5 m and b = 3 m

$$R = 1 - \frac{19.5^2}{(19.5+3)^2} = 0.248 = 24.8\%$$

24. The piling system of shaft sinking is suitable for loose deposits of sand, mud or alluvium near the surface up to a depth of _____ m from the surface.
1. 10
2. 15
3. 20*
4. 30

25. In temporary lining, the suspended skeleton ring by chains from the steel girder frame at the surface are securely held against the sides of the excavation by _____.
1. curbs
2. fish plates
3. wedges*
4. hangers
Hint:




26. The distance between the centres of any two adjacent pillars left in a seam or section shall NOT be less than _____ m corresponding to the depth of 120 m from the surface at that point and the width of the galleries of 3.5 m.
1. 16.5
2. 19.5*
3. 22.5
4. 25.5
Hint: As per CMR 2017
Exceeding 90 m but not exceeding 150 m → 19.5 m
Exceeding 60 m but not exceeding 90 m → 16.5 m
Exceeding 150 m but not exceeding 240 m → 22.5 m

27. Which of the following statements is/are true about the problems of mining thick coal seams?
A. Strata control is difficult
B. Inspection of roof is very easy
C. Risk of overriding of pillars
D. Percentage of extraction is high
1. A and C*
2. B and C
3. C and D
4. A, B and D
Hint:
**Strata control is difficult.** Thick seams require multi-slice or sublevel caving methods, leading to complex stress redistribution, increased risk of roof collapse, and difficulty in maintaining stable openings.
**Risk of overriding of pillars.** In depillaring or caving operations in thick seams, pillars from lower slices can get buried or overridden by fallen debris from upper slices, leading to incomplete extraction and safety hazards.

28. Which of the following conditions is NOT suited for hydraulic mining of coal?
*Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.*
1. Seam thickness
2. Seam gradient
3. Hardness of coal
4. Nozzle pressure

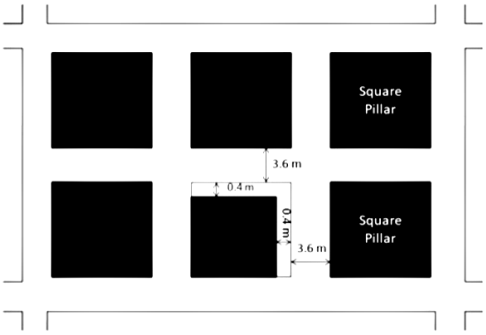
29. Match the following component factors of coal gasification with their processes.
**Component factors**
A. Oxidation zone
B. Reduction zone
C. Distillation zone
**Nature of processes**
P. Volatile matter is released which then mix with the gas and in the process enriching it.
Q. Coal reacts with oxygen of the gasification medium to produce CO and $CO_2$.
R. The $CO_2$ and water vapour entrained by the gas flow are almost completely reduced to CO and $H_2O$.
1. A-R, B-Q, C-P
2. A-P, B-Q, C-R
3. A-Q, B-R, C-P*
4. A-P, B-R, C-Q

30. Match the followings special methods of shaft sinking with the suitable strata conditions.
**Special methods of shaft sinking**
A. Pilling system
B. Caisson method
C. Freezing method
D. Cementation process
**Suitable strata conditions**
P. Fissured water bearing strata
Q. Unstable friable strata with heavy inrush of water
R. Loose deposits of sand, mud, or alluvium
S. Strata consist of alternative tough and lose ground
1. A-S, B-Q, C-R, D-P
2. A-R, B-S, C-Q, D-P*
3. A-R, B-S, C-P, D-Q

4. A-S, B-R, C-Q, D-P

31. Square pillars in Bord and pillar panel are of size 30 m centre to centre, and the galleries are of width 4 m. The tributary area for each pillar is _____ in $m^2$.
1. 116
2. 240
3. 348
4. 224*
Hint: Pillar width (a) = 30 - 4 = 26 m
Pillar area = 26 x 26 = 676 $m^2$
c/c area = 30 x 30 = 900 $m^2$
Tributary area for each pillar = 900 - 676 = 224 $m^2$

32. As shown in the given diagram, an underground panel in coal mine is being developed on Bord and pillar system. The pillar size is 30 m × 30 m from centre to centre, and the adjacent galleries are 3.6 m wide. The width of the gallery is widened up to 0.4 m. Calculate the increased area of extraction in $m^2$ during widening of the gallery.




1. 20.96*
2. 18.54
3. 16.82
4. 14.68
Hint:
**Before development**
Initial gallery width = 3.6 m
Initial pillar size: (30 - 3.6) x (30 - 3.6)
= 26.4 m x 26.4 m
= 696.96 $m^2$
Initial extraction area
= 900 - 696.96
= 203.04 $m^2$
**After development**
New gallery width
= 3.6 4- 0.4 = 4.0 m
New pillar size: (30 - 4.0) x (30 - 4.0)
= 26.0 m x 26.0 m
= 676.00 m2
New extraction area
= 900 - 676.00 = 224.00 $m^2$
Increased area of extraction
= 224.00 - 203.04 = 20.96 $m^2$

33. Match the following names of gases with their chemical formula.
**Name of the gas**
A. Blackdamp
B. Whitedamp
C. Stinkdamp
D. Firedamp
**Chemical formula**
P. $H_2S$
Q. $CH_4$
R. $CO_2$ + Nitrogen
S. CO
1. A-Q, B-R, C-P, D-S
2. A-S, B-Q, C-P, D-R
3. A-P, B-R, C-S, D-Q
4. A-R, B-S, C-P, D-Q*
Hint:
**Blackdamp** → $CO_2$ + Nitrogen (Blackdamp is a mixture of carbon dioxide and nitrogen, often found in mines after an explosion or in poorly ventilated areas, known for displacing oxygen).
**Whitedamp** → CO (Whitedamp is carbon monoxide, a toxic and flammable gas).
**Stinkdamp** → $H_2S$ (Stinkdamp is hydrogen sulphide, recognized by its rotten-egg smell).
**Firedamp** → $CH_4$ (Firedamp is methane, highly flammable and a major explosion hazard in coal mines).

34. Match the following hazards during pillar extraction with their cause.
**Hazards**
A. Bumps
B. Air blast from gob caving event
C. Roof falls
D. CO, CO2 and CH4 from adjacent gob
**Cause**
P. Rib instabilities
Q. Overlying abandoned working
R. Pillar instability

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

35. Sufficient cover over the roof of underground workings should be more than the prescribed limit of _____ m where the surface rocks are not well consolidated, (where the mine is worked by inclines and for the workings on the rise side if the mine is not deep).
1. 10
2. 15*
3. 20
4. 25

36. The velocity of air in the mine airway of size (2.2 × 1.8) m is 0.5 m/s. The kinematic viscosity of air is $0.16 \times 10^{-4}$ $m^2s^{-1}$. Calculate the Reynolds number.
1. 61875*
2. 56184
3. 48624
4. 62872
Hint: $Re = VD_h/\upsilon$
$D_h = 4A/P$
$= 4 \text{ x } (2.2 \text{ x } 1.8)/(2 \text{ x } 2.2 + 2 \text{ x } 1.8)$
$= 1.98 \text{ m}$
$Re = 0.5 \text{ x } 1.98/0.16 \text{ x } 10^{-4}$
$= 61875$

37. Match the following.
**Percentage of CO in air**
A. 0.02
B. 0.12
C. 0.2
D. 0.5 to 1.0
**Physiological effects**
P. Unconsciousness after 10 minutes at work or 30 minutes at rest
Q. Death after 10 to 15 minutes of work
R. Palpitations after 10 minutes at work or 30 minutes at rest
S. Headache, discomfort and possibility of collapse after 45 minutes at work or two hours at rest.
1. A-R, B-S, C-Q, D-P
2. A-S, B-R, C-P, D-Q*
3. A-S, B-R, C-Q, D-P
4. A-Q, B-S, C-P, D-R

38. The carbon monoxide (CO) detector 'Hoolamite' is a mixture of _____ and _____.
1. manganese dioxide, copper oxide
2. aluminium oxide, silver cyanide
3. iodine pentoxide, sulphuric acid*
4. iodine pentoxide, silver cyanide
Hint: Hoolamite was a carbon monoxide detector used in mines. It consists of iodine pentoxide mixed with sulphuric acid on an inert support. When CO reacts with iodine pentoxide, it releases iodine vapour, which can be detected by a colour change (usually with starch indicator).

39. Which of the following methane gas detectors DOES NOT work under the principle of Wheatstone bridge?
1. MSA D-6 Methanometer
2. Automatic Firedamp Detector
3. Oldham Methanometer
4. Interference Methanometer*
Hint: The Interference Methanometer works on the principle of refractive index change due to the presence of methane, using an optical interference method — not a Wheatstone bridge.

40. Which of the following statements are INCORRECT for GL-5 type of flame safety lamp?
A. It has two cylindrical glasses surrounding the flame.
B. It is used for percentage test of methane.
C. It uses colourless kerosene oil.
D. It has top feed arrangement.
1. Only A and B
2. A, B and C
3. Only B and D*
4. A, B and D

41. Match the following occupational diseases caused by specified dust.
**Name of the lung diseases**
A. Silicosis
B. Siderosis
C. Berylliosis
D. Asbestosis
**Type of dust**

P. Silicate of magnesium
Q. Quartz
R. Iron oxide
S. Beryllium
1. A-S, B-R, C-Q, D-P
2. A-R, B-S, C-P, D-Q
3. A-P, B-S, C-R, D-Q
4. A-Q, B-R, C-S, D-P*

42. In Proto Mark IV rescue apparatus, 'protosorb' is used as absorbent which is a mixture of _____ and _____.
1. calcium hydroxide, caustic soda*
2. manganese dioxide, caustic soda
3. calcium hydroxide, sodium cyanide
4. calcium chloride, soda phosphate
Hint: In the Proto Mark IV rescue apparatus (a closed-circuit breathing apparatus), Protosorb is the $CO_2$ absorbent. It is a mixture of calcium hydroxide and caustic soda. The sodium hydroxide helps accelerate the reaction with carbon dioxide, improving absorption efficiency.

43. Which of the following physical properties of rock does NOT depend on geothermal gradient?
Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.
1. Thermal conductivity
2. Specific heat
3. Density
4. Permeability

44. The rate of sensible heat transfer from the rock wall to the air is a linear function of the difference between the temperature of the rock wall and the mean air temperature as well as the _____.
1. specific heat
2. virgin rock temperature
3. coefficient of heat transfer*
4. thermal diffusivity

45. Which of the following(s) is/are NOT a mitigation measure for mine fire in underground coal mine?
A. Ensuring proper ventilation
B. Sealing off of worked out/depillared panels
C. Extraction of highly susceptible or thick coal seams in conjunction with caving
D. Removal of spalled fallen coal regularly from workings, which are sealed-off
1. C
2. A, C, D
3. C, D*
4. B, C, D

46. No working which has approached within a distance of _____ metres of any other working (not being a working which has been physically examined and found to be free from accumulation of water or other liquid matter) as per CMR 2017.
1. 30
2. 60*
3. 100
4. 120

47. In an underground coal mine,1 kg of air is passing through in a vertical downcast shaft of depth 100 m. Calculate the increase in heat (kJ/kg) due to auto compression.
1. 9.81
2. 0.98*
3. 0.098
4. 0.0098
Hint:
For 1 kg of air,
Increase in heat = mechanical energy converted to heat per kg
= gh = 9.81 x 100
= 981 J/kg
= 0.98 kJ/kg

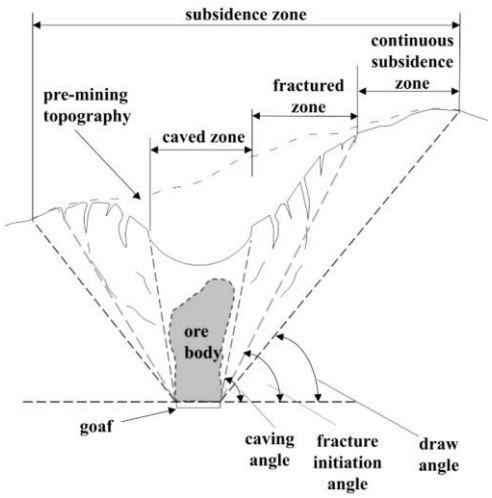
48. The compression and expansion are based on _____ and _____ process in mine refrigeration system.
1. isobaric, isothermal
2. isentropic, adiabatic*
3. isothermal, adiabatic
4. adiabatic, isochoric

49. The movement of the ground that can occur after underground coal mining is called _____.
1. rock burst
2. subsidence*
3. inundation
4. caving

Hint: After underground coal mining, especially Longwall or room-and-pillar mining, the ground above the mined-out area may sink or collapse due to the removal of coal. This downward movement of the ground surface is known as **subsidence**.
**Rock burst** – sudden, violent failure of rock under high stress.
**Inundation** – sudden inflow of water into the mine.
**Caving** – collapse of roof strata into the mined-out area (underground), not necessarily surface movement.

50. The Rock Mass Rating (RMR) of a roof 65 indicates _____.
1. fair
2. good*
3. poor
4. very good
Hint: RMR values indication
100-81 → Very good
80 - 61 → Good
60 - 41 → Fair
40-21 → Poor
20-0 → Very poor

51. The angle between the vertical and the line joining edge of the excavation with the point at the surface where subsidence diminishes to zero is known as _____.
1. angle of break
2. angle of contact
3. angle of draw*
4. angle of subsidence
Hint:




52. Visually, test of roof does NOT aim to detect _____.
1. ringing sound*
2. cracks in the roof
3. water percolation from roof
4. sign of weight on supports

53. Which of the following are correct about mine roof supports?
A. To prevent major collapses of mine roof
B. To protect miners from small rock falls that can occur from the immediate roof skin
C. To prevent deformation of mine openings for access, escape and ventilation of mine workings
D. To safeguard expensive machines used in mines
1. Only A and B
2. Only A, B and C
3. A, B, C and D*
4. B, C and D

54. Which of the following is NOT the parameter of Rock Mass Rating (RMR)?
1. Layer thickness
2. Weatherability
3. Groundwater
4. Support system*

55. Petrographic study of roof shales does NOT contain _____.
1. feldspar
2. clay minerals
3. limestone*
4. mica

Hint: A petrographic study of roof shales (the fine-grained sedimentary rocks directly above coal seams or other mineral deposits) typically examines the mineral composition of the shale. Shales are primarily composed of: Clay minerals, Quartz, Mica and Feldspar.

56. Match the following
**Type of roof support**
A. Roof bolt
B. Wooden chock
C. Shield support
D. Safari support
**Components**
P. Canopy
Q. Mild steel clamps
R. Bearing plate
S. Sleeper
1. A-R, B-S, C-P, D-Q*
2. A-S, B-R, C-P, D-Q
3. A-R, B-S, C-Q, D-P
4. A-P, B-S, C-R, D-Q

57. Dust concentration is generally represented by _____.
1. $g/m^3$
2. $mg/m^3$*
3. $g/cm^3$
4. $mg/cm^3$

58. Dust suppression system means:
1. to prevent dust from becoming airborne by spraying water*
2. to allow the dust particles for spreading in air
3. to free the dust particles that are already airborne
4. to hold the dust particles with a vessel

59. Which of the following methods is NOT used in sampling of coal dust?
1. Filtration
2. Sedimentation
3. Thermal precipitation
4. Coning and quartering*
Hint: Coning and quartering is a standard method used for reducing the sample size of a bulk solid material (like a large coal sample) in the laboratory to create a smaller, representative sample for analysis. It is not a method used for collecting or sampling airborne coal dust from the environment.

60. As per DGMS (Tech.) (S&T) Circular No.01, (Respirable Dust Measurements and Control to Prevent Pneumoconiosis in Mines), dated 21/01/2010, the size fraction of the respirable dust ranges from:
1. 0.1 to 10 μm*
2. 10 to 15 μm
3. 15 to 20 μm
4. 20 to 25 μm

61. If the shape of the dust particle is assumed to be spherical, and the buoyancy force excited by air is constant, the settling velocity ($V_t$) of dust particle a

$$V_t = \frac{gD^2(\rho_p - \rho_a)}{18\mu}$$

where D represents ____.
1. density of the dust particle
2. diameter of the dust particle*
3. drag force acting on the dust particle
4. dynamic viscosity of air

62. Photometer based direct-reading aerosol monitors use the principle of _____ to determine airborne dust concentration.
1. light absorption
2. gravimetric
3. light scattering*
4. light adsorption

63. Which of the following practices is NOT recommended for dust control in an open cast mine?
1. Spraying of water on haul road
2. Covered belt conveyor system of transportation
3. Reducing the speed of dumper
4. Covering unpaved road surface with soils*

64. Which of the following statements is/are INCORRECT about the drawbacks of wet suppression system in opencast mine?
A. Dust suppressed by water can again become airborne if allowed to dry up.

B. Water is safe for the environment and safe for workers to deal with on a daily basis.
C. Significant amount of water that is wasted during the process.
D. Water is inexpensive and usually easy to obtain.
1. A and B
2. C and D
3. C
4. B and D*

65. The disease which is caused by the inhalation of stone dust is known as _____.
Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.
1. silicosis
2. pneumoconiosis
3. nystagmus
4. siderosis

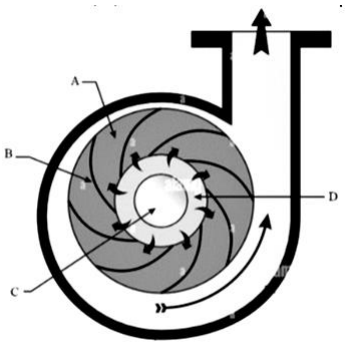
66. Shapes of plumes depend upon atmospheric stability conditions. Under stable atmospheric condition, which of the following conditions holds good?
1. Environmental lapse rate < Dry adiabatic lapse rate*
2. Environmental lapse rate > Dry adiabatic lapse rate
3. Environmental lapse rate = Dry adiabatic lapse rate
4. Environmental lapse rate>> Dry adiabatic lapse rate
Hint: Atmospheric stability determines how air parcels (and the pollutants/plumes within them) will behave when they are displaced vertically. This is governed by comparing the **Environmental Lapse Rate (ELR)**—the actual temperature decrease with height in the atmosphere—to the **Dry Adiabatic Lapse Rate (DALR)**, which is a constant ~9.8°C per kilometre (the rate at which a rising unsaturated air parcel cools).
For stable atmosphere (ELR < DALR), the surrounding air cools more slowly with height than a rising air parcel would. Therefore, a rising parcel finds itself cooler and denser than the surrounding air, causing it to sink back down. This suppresses vertical mixing. Under this condition, plumes tend to spread horizontally in a flat, fan-like shape (known as fanning plumes) and do not rise or disperse well vertically.

67. Which of the following equipment is NOT used to control the dust in open cast mine?
1. Bag filter
2. Scrubber
3. Crusher*
4. Electrostatic precipitator

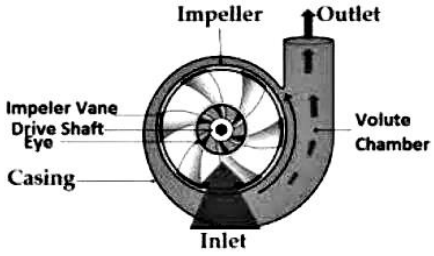
68. Which of the following is the purpose of using stone dust in underground coal mines?
1. To avoid inundation
2. To prevent coal dust explosion*
3. To reduce the chance of coal bumps
4. To minimise the effect of overriding of coal pillars
Hint: In underground coal mines, stone dust (typically finely ground limestone or dolomite) is deliberately spread and suspended onto the surfaces of roadways, roof, and ribs. Its primary purpose is explosion prevention and mitigation.

69. A locomotive weighs 15 tonnef, and the adhesion to the tracks is 2246 N per tonnef. Calculate the co-efficient of adhesion.
1. 4.367
2. 0.457
3. 0.229*
4. 2.246
Hint: $\mu$ = Adhesive force/weight
Adhesive force = 2246 x 15 N
1 tonnef = 9810 N
Weight = 15 tonnef = 15 x 9810 = 147,150 N

70. The letters A, B, C and D indicate different components of centrifugal pump. Match the following letters with their components.



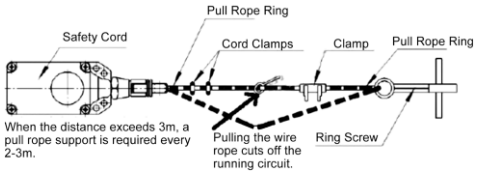

**Part**
A
B
C
D
**Components of Centrifugal pump**
P. Shaft
Q. Impeller
R. Vanes
S. Suction eye
1. A-Q, B-R, C-P, D-S*
2. A-R, B-Q, C-P, D-S
3. A-S, B-R, C-P, D.Q
4. A-P, B-Q, C-S, D-R
Hint:




71. 'Tricone rock roller' bit is most widely used in _____ drilling method.
1. percussive
2. diamond
3. rotary*
4. rotary percussive

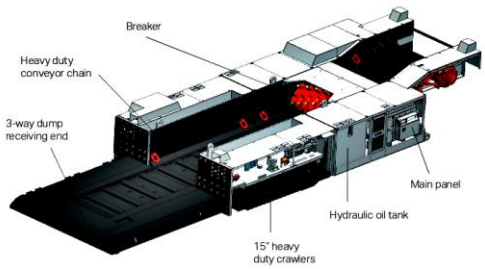
72. Match the following types of rope haulage with their respective components.
**Types of rope haulage**
A. Direct rope haulage
B. Endless rope haulage
C. Main and tail rope haulage
D. Gravity rope haulage
**Components**
P. Two drums
Q. Jig pulley
R. Clifton pulley
S. Slip ring induction motor
1. A-Q, B-R, C-P, D-S
2. A-S, B-R, C-P, D-Q*
3. A-R, B-S, C-P, D-Q
4. A-S, B-P, C-R, D-Q

73. The device which is used to terminate the belt conveyor operation immediately during emergency conditions is known as _____.
1. belt sway switch
2. tensioning arrangement
3. holdback
4. pull cord switch*
Hint: A pull cord switch (also known as a rope pull safety switch or emergency stop switch) is a safety device installed along the length of a belt conveyor. It consists of a steel wire rope (pull cord) that runs the entire length of the conveyor, connected to a latching switch mechanism at intervals.



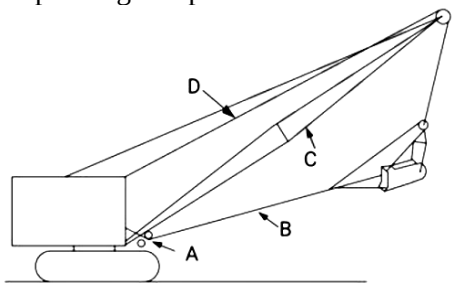

74. Which of the following are true about the benefits of man riding system?
A. The energy saved in travelling will leave the workmen relatively fresh at the face
B. Higher productivity
C. Saving in travelling time
D. The reduction in fatigue may result in reduced absenteeism
1. Only A and B
2. Only A, C and D
3. A, B, C and D*
4. Only B, C and D

75. Which of the following is NOT a component of feeder breaker?
1. Drag conveyor
2. Pick breaker
3. Gathering arm loader*
4. Hydraulic crawler drives
Hint:

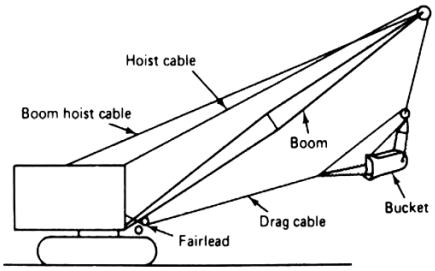



76. The chemical formula of 'yellow boy' is _____.
1. $H_2SO_4$
2. $FeS_2$
3. $Fe(OH)_3$*
4. $Fe_2O_3$
Hint: "Yellow boy" is a common term used in mining and environmental science to describe the yellowish-orange, gelatinous precipitate that forms in streams, drainage ditches, and mine effluents, particularly those affected by acid mine drainage (AMD). The precipitate mainly consists of iron oxyhydroxides.

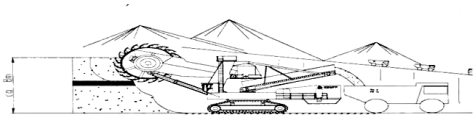
77. The uppercase letter A, B, C, and D represent different components of dragline. Match the uppercase letter with the corresponding components.




**Parts**
A
B
C
D
**Components of Dragline**
P. Boom
Q. Fairlead
R. Hoist cable
S. Drag cable
1. A-S, B-R, C-P, D-Q
2. A-Q, B-S, C-P, D-R*
3. A-S, B-P, C-R, D-Q
4. A-P, B-S, C-Q, D-R
Hint:




78. 'Terrace cut' for excavating a block, is associated with _____.
1. dragline
2. shovel
3. bucket wheel excavator*
4. surface miner
Hint:



79. Which of the following equipment is NOT used with continuous miner in Bord and Pillar method of working?
1. Quad bolter
2. Shuttle car
3. Feeder breaker
4. Side discharge loader*
Hint: a continuous miner system is a fully mechanized, high-productivity mining "package" that uses a specific set of equipment designed to work together for rapid coal extraction and transport. The standard equipment fleet includes a continuous miner, shuttle cars (or ram cars) for coal transport, a feeder breaker to size the coal and feed the conveyor belt, and a quad bolter for installing roof bolts to secure the newly exposed roof.

A Side Discharge Loader (SDL) is not part of this package. It represents an older, semi-mechanized technology.

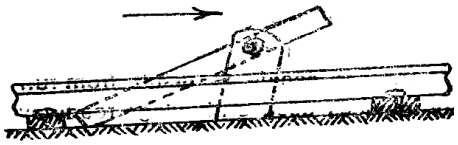
80. The mechanical fan which is NOT associated under the category of centrifugal fan is _____.

1. radial
2. forward curving
3. propeller*
4. backward curving

Hint: Centrifugal fans (also called radial blowers) work by accelerating air radially outward through an impeller. The main types of centrifugal fans are classified by the shape of their blades, which include: Radial (straight blades), Forward curving (blades curve in the direction of rotation) and Backward curving (blades curve opposite to the direction of rotation)
A propeller fan, on the other hand, belongs to the category of axial fans. In axial fans, the airflow is parallel to the shaft/axis of the fan (similar to a propeller on an airplane), rather than being discharged radially.

81. A pivoted piece of steel rail placed between the track rails so as to catch the axle of a backward runaway of tubs is called _____.
1. stop block
2. back catch*
3. backstay
4. drop warwick

Hint: A back catch is specifically defined as a pivoted piece of steel rail placed between the track rails in underground mining. Its purpose is to act as a safety device that swings up to catch the axle of a runaway tub (mine car) that is moving backward (in the wrong direction), preventing it from rolling out of control.

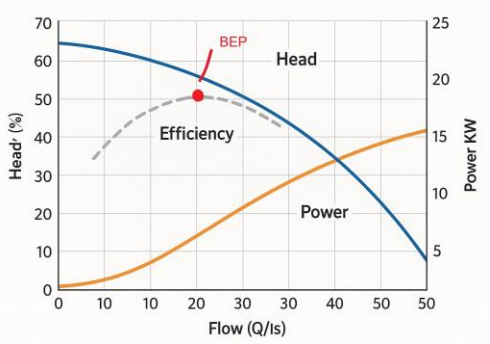


82. A belt of 1 m width (W) conveys material of bulk density 1.35 t/$m^3$ at a speed of 90 m/min. If the cross-sectional area of the material is 0.09 $W^2$, calculate the carrying capacity of the belt conveyor in tph.
1. 720
2. 854
3. 656*
4. 912

Hint: A = 0.09 x $(1)^2$ = 0.09 $m^2$
V = 90/60 = 1.5 m/s
Capacity (tph) = A x v x ρ x 3600
= 0.09 x 1.5 x 1.35 x 3600
= 656 tph

83. The flow at which the pump operates at the highest or optimum efficiency for a given impeller diameter is known as _____.
1. maximum head
2. best efficiency point*
3. maximum efficiency
4. optimum flow rate

Hint: The Best Efficiency Point (BEP) is the specific flow rate at which a centrifugal pump operates at its highest efficiency for a given impeller diameter. At this point, the pump experiences minimal internal recirculation, shock, and turbulence, meaning it converts the maximum amount of mechanical energy into fluid energy with the least losses.



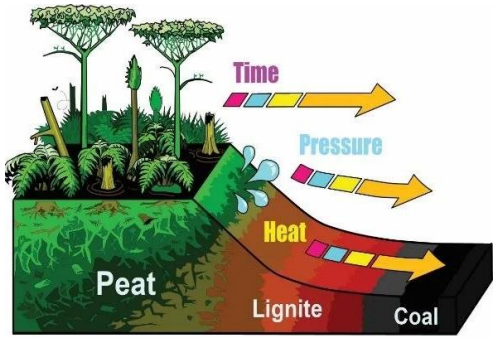

84. Match the following ripping mechanism with the type of strata.
**Ripping mechanism**
A. Ploughing
B. Crushing
C. Lifting
D. Breaking
**Type of strata**
P. Inclined stratified rocks by shearing
Q. Dense material without bedding planes
R. Fractured rocks having small defect spacing
S. Horizontally stratified rocks
1. A-Q, B-R, C-S, D-P*
2. A-P, B-S, C-Q, D-R

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

85. _____ and _____ are the hardest and softest minerals in Mohs scale of hardness.
1. Topaz; talc
2. Diamond; gypsum*
3. Diamond; talc
4. Corundum; calcite
Hint: The Mohs scale of hardness is a relative scale from 1 (softest) to 10 (hardest), based on a mineral's ability to scratch another.
Diamond is the hardest natural mineral, rated at 10 on the Mohs scale.
Talc is the softest mineral, rated at 1 on the Mohs scale.
Topaz → 8
gypsum → 2
Corundum → 9
Calcite → 3

86. Match the following terminology with the corresponding definition.
**Terminology**
A. Washouts
B. Dykes
C. Normal fault
D. Anticline
**Definition**
P. An upwardly convex flexure in which a given bed intersects a horizontal plane in both limbs
Q. The dislocations in which the hanging wall is displaced downwards relative to the footwall
R. The area where the coal has been partly or totally replaced by coarse grained elastic sediments
S. An intrusion which breaks the continuity of strata without displacement
1. A-S, B-R, C-Q, D-P
2. A-P, B-R, C-S, D-Q
3. A-R, B-S, C-Q, D-P*
4. A-R, B-Q, C-S, D-P

87. Select the correct sequence of coalification process.
1. Peat → Lignite → Bituminous → Anthracite*
2. Peat → Bituminous → Lignite → Anthracite
3. Peat → Anthracite → Bituminous → Lignite
4. Peat → Lignite → Anthracite → Bituminous
Hint: PLBA
**Peat** – The earliest stage; partially decayed plant matter with high moisture and low carbon content.
**Lignite** (brown coal) – The lowest rank of coal; still has high moisture and low heating value.
**Bituminous** – A medium-rank coal; widely used for thermal power generation and metallurgy; higher carbon content than lignite.
**Anthracite** – The highest rank of coal; has the highest carbon content, lowest moisture, and highest heating value.




88. India's major workable coal deposits occur in two distinct stratigraphic horizons called _____ and _____.
1. palaeozoic; tertiary*
2. mesozoic; tertiary
3. lower cretaceous; tertiary
4. lower jurassic, tertiary
Hint: India's major workable coal deposits are found in two distinct stratigraphic horizons. The primary deposits are the Palaeozoic (specifically Permian) Gondwana coals, which account for the vast majority of the country's coal resources. The second horizon is the much younger Tertiary coal deposits.

89. _____ coalfield is known for the storehouse of prime coking coal in India.
1. Singrauli

2. Raniganj
3. Godavari Valley
4. Jharia*
Hint: The Jharia coalfield in Jharkhand is widely recognized as the exclusive repository of prime coking coal in India. This high-quality bituminous coal is essential for producing metallurgical coke, which is used in steel manufacturing blast furnaces.

90. Select the correct sequence according to the position in Mohs scale of hardness.
1. Apatite, Calcite, Talc, Quartz, Diamond
2. Calcite, Apatite, Quartz, Diamond, Talc
3. Talc, Apatite, Quartz, Calcite, Diamond
4. Talc, Calcite, Apatite, Quartz, Diamond*
Hint:
Talc → 1 (softest)
Calcite → 3
Apatite → 5
Quartz → 7
Diamond → 10 (hardest)

91. Match the following banded constituents of bituminous coal with their appearances.
**Banded constituent of bituminous coal**
A. Vitrain
B. Clarain
C. Fusain
D. Durain
**Appearance**
P. Dull, black to grey black, hard, rough surface
Q. Bright, black, brittle, frequently with fissures
R. Silky luster, black, fibrous, soft, friable
S. Semi bright, black, very finely distributed
1. A-Q, B-S, C-R, D-P*
2. A-S, B-Q, C-R, D-P
3. A-S, B-R, C-Q, D-P
4. A-Q, B-S, C-P, D-R

92. Match the following geological periods with the corresponding localities as per the lignite deposit.
**Geological period**
A. Miocene period
B. Eocene period
C. Pleistocene period
**Localities**
P. Kashmir
Q. Tamil Nadu
R. Gujrat and Rajasthan
Options :
1. A-R, B-P, C-Q
2. A-R, B-Q, C-P
3. A-Q, B-R, C-P*
4. A-P, B-Q, C-R

93. Which method of mine surveying deals with computer application?
1. Dumpy Level
2. Theodolite Traversing
3. Geographical Information System*
4. Compass Traversing

94. Every entry in the book related to mine working shall be signed and dated by the surveyor and countersigned and dated by the _____ in the bound paged book as per CMR 2017.
1. safety officer
2. agent
3. assistant colliery manager
4. manager*

95. DGPS stands for:
1. Differential Geographical Positioning Satellite
2. Differential Global Placing Satellite
3. Differential Global Positioning System*
4. Differential Geographical Positioning System

96. Which of the following duties and responsibilities of a surveyor are INCORRECT?
A. Shall not put his signature with date
B. Make such accurate surveys and levellings
C. Shall not sign the plans, sections and tracing
D. Prepare plans and sections and tracings thereof
1. Only A and B
2. Only B and D
3. Only A and C*
4. A, B and C

97. Which of the following statements correctly describes the Republic Day of India, which commemorates the adoption of the Constitution of India on January 26, 1950?
1. The Republic Day marks the day when India formally became a sovereign democratic republic.
2. The first Republic Day parade was held in New Delhi in 1947.
3. The Republic Day is celebrated by unfurling the national flag and organising cultural performances across India.
4. The chief guest at India's Republic Day parade is typically a head of state or government from another country.
1. Only 1 and 3
2. Only 1, 3 and 4*
3. Only 2 and 4
4. 1, 2, 3 and 4

98. In which state of India can the final surviving habitat of Asiatic lions be found?
1. West Bengal
2. Gujarat*
3. Karnataka
4. Rajasthan

99. What is the Classic Mendelian phenotypic ratio for a dihybrid cross?
1. 9 : 3 : 3 : 1*
2. 7 : 4 : 4 : 1
3. 1 : 1 : 1 : 1
4. 8 : 6 : 1 : 1

100. What is the primary function of transpiration in plants?
1. Storage of excess glucose created by plants through photosynthesis
2. Facilitating the uptake of carbon dioxide for photosynthesis
3. Removing excess water from the plant through evaporation*
4. Producing glucose and oxygen from carbon dioxide and water

101. In the Women's IPL teams' auction, which team has the top bid of ₹1,289 crore in January 2023?
1. Bangalore
2. Mumbai
3. Ahmedabad*
4. Delhi

102. Who won the first medal in the Commonwealth games 2022 for India?
1. Sanket Sargar*
2. Mirabai Chanu
3. Sharath Kamal
4. Sunil Bahadur

103. Select the most appropriate pronoun to fill in the blank.
One cannot get everything _____ wishes for.
1. that
2. one*
3. he
4. she

104. Select the most appropriate option to fill in the blank.
The dentist preferred to remove only the aching _____.
1. the teeth
2. a teeth
3. tooth*
4. tooths

105. A machine could do this job much more easily.
1. This job would be done much more easily by a machine.
2. This job could be done much more easily by a machine*
3. This job will be done much more easily by a machine.
4. This job has been done much more easily by a machine

106. He said that he was unable to come just then because he was ill, but he would certainly start as soon as he recovered.
1. He said, "I will be unable to come just now because I am ill, but I will certainly start as soon as I recover."
2. He said, "I am unable to come just now because I am ill, but I will certainly start as soon as I recover."*
3. He said, "I cannot come just now because I am ill, but I would certainly start as soon as I recovered."

4. He said, “I will be unable to come just now because I am ill, but I will certainly be starting as soon as I recover.”

107. 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. The drawings were probably created 12,500 years ago.
B. The archaeologists made this discovery in 2019 but they kept it secret until now, ahead of the rock art’s debut in an upcoming documentary.
C. They thus provide further proof that the rainforest’s earliest inhabitants lived alongside Ice Age animals.
D. British and Colombian archaeologists have discovered a large display of ancient rock art on cliff faces in the Colombian Amazon rainforest.
1. DBCA
2. ABDC
3. DACB*
4. BDAC

108. Select the most appropriate meaning of the given idiom.
Call it a day
1. Stop working on something*
2. Stop night flight operations
3. Commemorate a special day
4. Stop work for an office picnic

109. The sum of 6 numbers is 324. Find their average.
1. 54*
2. 53
3. 55
4. 52

110. By selling an article for ₹114, a man loses 10%. At what price (in ₹) should he sell it to gain 50%?
1. 190*
2. 200
3. 180
4. 210

Hint: $CP = \frac{SP1}{(100\% - loss\%)} x100$

$= CP = \frac{114}{90} x100 = 126.67$

SP2 = CP x (100% + gain%)
= 126.67 x 1.50 = 190

111. The list price of an article is ₹36000 and a discount of 50% is offered on the list price. What additional discount per cent on the already discounted price must be offered to a customer to bring the net selling price to ₹1440?
1. 92*
2. 90
3. 96
4. 97

Hint: Price after first 50% discount = 36,000 ÷ 2 = ₹18,000.
Final target selling price = ₹1,440.
Additional discount required = 18,000 − 1,440 = ₹16,560.
Additional discount % = (16,560 ÷ 18,000) × 100 = 92%.

112. The sum of 6 numbers is 300. Find their average.
1. 50*
2. 49
3. 51
4. 48

113. In a certain code language, ‘fire breaks out’ is written as ‘ko ka ku’ and ‘go out and’ is coded as ‘ki ko ky’. How is ‘out’ coded in that language?
1. ka
2. ki
3. ko*
4. ku

Hint: By comparing both statements, the only common word on the left side is **'out'**. Correspondingly, the only common code on the right side is **'ko'**.

114. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)
1. ST - VX
2. BC - EG
3. JK - MO
4. FG - IJ*
Hint:
ST - VX
(19)(20) - (22)(24)

BC - EG
(2)(3) - (5)(7)

JK - MO
(10)(11) - (13)(15)

**FG - IJ**
(6)(7) - (9)(10) (Not following the pattern)

115. Each letter in the word BRINGS is changed to the letter immediately succeeding it in the English alphabetical order and then all the letters thus formed are arranged in alphabetical order. Which of the following letters will be second from the right in the new group of letters thus formed?
1. H
2. T
3. O
4. S*
Hint: 1. Change Each Letter to Its Successor
BRINGS → CSJOHT

Arrange in Alphabetical Order
CSJOHT → CHJOST

3. Find the Second Letter from the Right
CHJO**S**T

116. What will come in the place of the question mark (?) in the following equation, if '÷' and '×' are interchanged and '+' and '−' are interchanged?
38 − 5 ÷ 3 + 24 × 8 = ?
1. 50*
2. 51
3. 52
4. 53
Hint: The original equation is:
38 − 5 ÷ 3 + 24 × 8 = ?

After interchanging:
38 + 5 × 3 − 24 ÷ 8 = ?

Apply the standard order of operations BODMAS: Parentheses, Exponents, Multiplication and Division (from left to right), and Addition and Subtraction (from left to right)

Multiplication and Division first
5 × 3 = 15
24 ÷ 8 = 3
Now the equation becomes:
38 + 15 − 3 = ?

Perform Addition and Subtraction (left to right)
38 + 15 = 53
53 − 3 = 50

117. Which of the following Microsoft Excel tools lets the user automatically fill in a series of dates?
1. AutoComplete
2. AutoFill*
3. Auto Validation
4. Auto Formatting

118. Which of the following is NOT a way to secure a PC?
1. Availability
2. Confidentiality
3. Integrity
4. By not using Authentication*

119. How do you enable or disable Windows features such as Hyper-V or .NET Framework in Windows 10?
1. Control Panel > Programs > Programs and Features > Turn Windows features on or off*
2. Settings > System > Apps & features
3. Task Manager > Services
4. Settings > Update & Security > Windows Update

120. In a Windows Operating System, If you right-click on the Start button at the left of

the taskbar, a Quick Link menu will appear. Alternatively, which of the following keyboard shortcuts will show the Quick Link menu?

1. Windows logo key + X*
2. Windows logo key + T
3. Windows logo key + Q
4. Alt + Q