GENERAL APTITUDE

Q. No. 1 - 5 Carry One Mark Each

1. Mr. X speaks _____ Japanese _____ Chinese.

(A) neither / or (B) either / nor (C) neither / nor (D) also / but

Answer: (C) **Click here to watch video explanation**

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2. A sum of money is to be distributed among P, Q, R, and S in the proportion 5 : 2 : 4 : 3, respectively.

If R gets ₹ 1000 more than S, what is the share of Q (in ₹)?

(A) 500 (B) 1000 (C) 1500 (D) 2000

Answer: (D) **Click here to watch video explanation**

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3. A trapezium has vertices marked as P, Q, R and S (in that order anticlockwise).

The side PQ is parallel to side SR.

Further, it is given that, PQ = 11 cm, QR = 4 cm, RS = 6 cm and SP = 3 cm.

What is the shortest distance between PQ and SR (in cm)?

(A) 1.80 (B) 2.40 (C) 4.20 (D) 5.76

Answer: (B) **Click here to watch video explanation**

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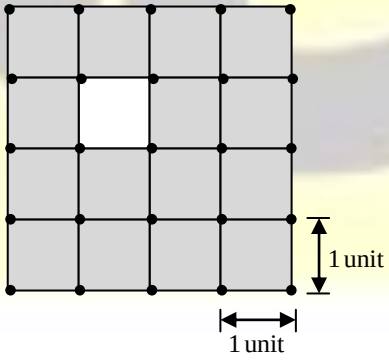
4. The figure shows a grid formed by a collection of unit squares. The unshaded unit square in the grid represents a hole.

What is the maximum number of squares without a "hole in the interior" that can be formed within the 4 × 4 grid using the unit squares as building blocks?

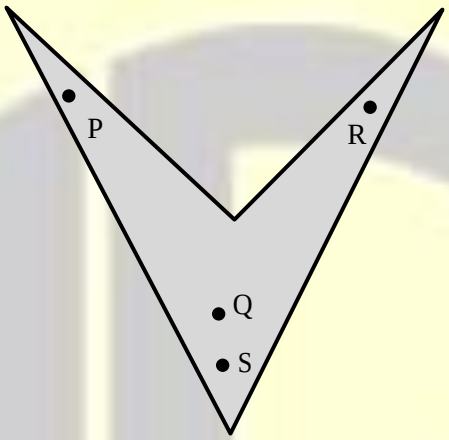


(A) 15 (B) 20 (C) 21 (D) 26

Answer: (B) **Click here to watch video explanation**

5. An art gallery engages a security guard to ensure that the items displayed are protected. The diagram below represents the plan of the gallery where the boundary walls are opaque. The location the security guard posted is identified such that all the inner space (shaded region in the plan) of the gallery is within the line of sight of the security guard.

If the security guard does not move around the posted location and has a 360° view, which one of the following correctly represents the set of ALL possible locations among the locations P, Q, R and S, where the security guard can be posted to watch over the entire inner space of the gall**ery.**



(A) P and Q (B) Q (C) Q and S (D) R and S

Answer: (C) **Click here to watch video explanation**

Q.No. 6-10 Carry Two Marks Each

6. Mosquitoes pose a threat to human health. Controlling mosquitoes using chemicals may have undesired consequences. In Florida, authorities have used genetically modified mosquitoes to control the overall mosquito population. It remains to be seen if this novel approach has unforeseen consequences.

Which one of the following is the correct logical inference based on the information in the above passage?

(A) Using chemicals to kill mosquitoes is better than using genetically modified mosquitoes because genetic engineering is dangerous

(B) Using genetically modified mosquitoes is better than using chemicals to kill mosquitoes because they do not have any side effects

(C) Both using genetically modified mosquitoes and chemicals have undesired consequences and can be dangerous

(D) Using chemicals to kill mosquitoes may have undesired consequences but it is not clear if using genetically modified mosquitoes has any negative consequence

Answer: (D) **Click here to watch video explanation**

7. Consider the following inequalities.

(i) $2x - 1 > 7$

(ii) $2x - 9 < 1$

Which one of the following expressions below satisfies the above two inequalities?

(A) $x \leq -4$ (B) $-4 < x \leq 4$ (C) $4 < x < 5$ (D) $x \geq 5$

Answer: (C) **Click here to watch video explanation**

8. Four points P(0, 1), Q(0, −3), R(−2, −1), and S(2, −1) represent the vertices of a quadrilateral.

What is the area enclosed by the quadrilateral?

(A) 4 (B) $4\sqrt{2}$ (C) 8 (D) $8\sqrt{2}$

Answer: (C) **Click here to watch video explanation**

9. In a class of five students P, Q, R, S and T, only one student is known to havecopied in the exam. The disciplinary committee has investigated the situationand recorded the statements from the students as given below.

Statement of P: R has copied in the exam.

Statement of Q: S has copied in the exam.

Statement of R: P did not copy in the exam.

Statement of S: Only one of us is telling the truth.

Statement of T: R is telling the truth.

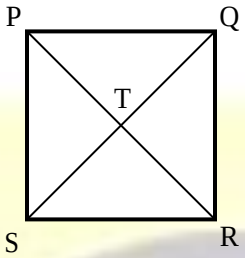
The investigating team had authentic information that S never lies.

Based on the information given above, the person who has copied in the exam is

(A) R (B) P (C) Q (D) T

Answer: (B) **Click here to watch video explanation**

10. Consider the following square with the four corners and the center marked as P, Q, R, S and T respectively.



Let X, Y and Z represent the following operations:

X: rotation of the square by 180 degree with respect to the S-Q axis.

Y: rotation of the square by 180 degree with respect to the P-R axis.

Z: rotation of the square by 90 degree clockwise with respect to the axis perpendicular, going into the screen and passing through the point T.

Consider the following three distinct sequences of operation (which are applied in the left to right order).

1. XYZZ

2. XY

3. ZZZZ

Which one of the following statements is correct as per the information provided above?

(A) The sequence of operations (1) and (2) are equivalent

(B) The sequence of operations (1) and (3) are equivalent

(C) The sequence of operations (2) and (3) are equivalent

(D) The sequence of operations (1), (2) and (3) are equivalent

Answer: (B) **Click here to watch video explanation**

MINING ENGINEERING

Q. No. 11–35 Carry One Mark Each

11. The value of $\lim_{x\to 0}\frac{(1-x)^n-1}{x}$ is

(A) 0 (B) 1 (C) –n (D) n

Answer: (C) Click here to watch video explanation

12. A velocity field in Cartesian coordinate system is expressed as

$v = x\hat{i} + y\hat{j} + p(z)\hat{k}$, where $p(0) = 0$

If $\text{div}\, v = 0$, $p(z)$ is

(A) 0 (B) –2z (C) 2 (D) 2z

Answer: (B) Click here to watch video explanation

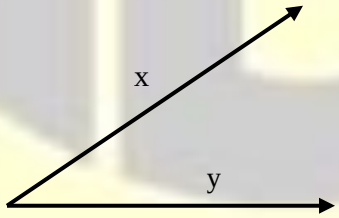
13. The constant term of the Fourier coefficients of the periodic function

$$f(x) = \begin{cases} -k, & \text{for } -\pi < x < 0 \\ k, & \text{for } 0 < x < \pi \end{cases}, f(x+2\pi) = f(x) \text{ and } k = \text{constant is}$$

(A) k (B) 2k (C) 2π (D) 0

Answer: (D) Click here to watch video explanation

14. Two vectors x and y are shown in the figure. The projection vector of x on y is



(A) $\frac{x^T y}{y^T y} y$ (B) $x \times y$ (C) $\frac{x \times y}{y^T y}$ (D) $\frac{x^T y}{x^T x} x$

Answer: (A) Click here to watch video explanation

15. A deposit has the grade attribute $X \in [0,30]$ with a density function f(x). For a cut-off grade x_c, the proportion of the ore in the deposit is given by

(A) $\int_0^{30} f(x)dx - \int_0^{x_c} f(x)dx$ (B) $\frac{1}{2}\int_0^{30} f(x)dx - \int_0^{x_c} f(x)dx$

(C) $\frac{1}{2}\int_0^{30} f(x)dx + \int_0^{x_c} f(x)dx$ (D) $\int_0^{x_c} f(x)dx$

Answer: (A) **Click here to watch video explanation**

16. The drilling technique applicable for mineral exploration is

(A) Percussive drilling (B) Tricone roller drilling

(C) Rotary-percussive drilling (D) Diamond core drilling

Answer: (D) **Click here to watch video explanation**

17. Match the rock with its metamorphosed form

Igneous/Sedimentary rock	Metamorphic rock
P. Granite	**I.** Quartzite
Q. Limestone	**II.** Gneiss
R. Sandstone	**III.** Schist
S. Gabbro	**IV.** Marble

(A) P-II, Q-IV, R-I, S-III (B) P-III, Q-I, R-IV, S-II

(C) P-IV, Q-III, R-I, S-II (D) P-II, Q-III, R-IV, S-I

Answer: (A) **Click here to watch video explanation**

18. Identify the WRONG statement: Break-even stripping ratio

(A) takes into account the maximum pit slope that is safe

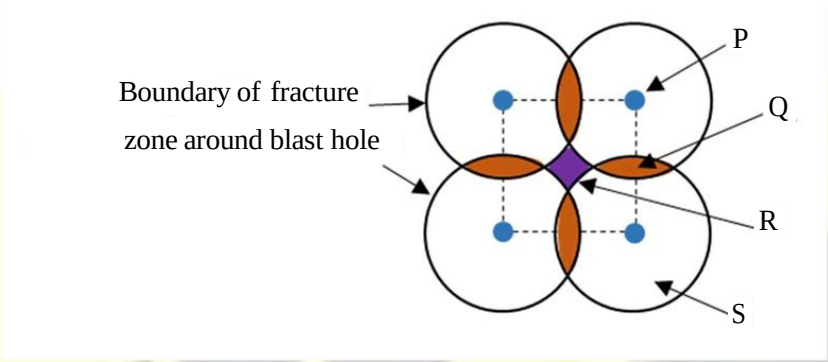
(B) helps in determining the volume of the overburden

(C) presents the maximum possible mine size that is economical

(D) takes into account the life of the mine

Answer: (D) **Click here to watch video explanation**

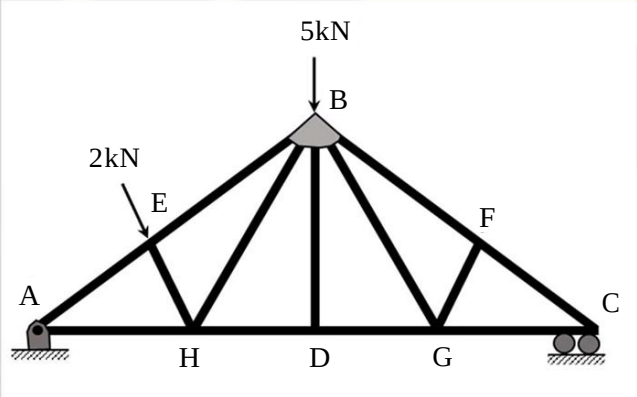
19. A square pattern of blasting is shown in the figure. For the case of simultaneous blast, identify the zone of no fragmentation



(A) P (B) Q (C) R (D) S

Answer: (C) **Click here to watch video explanation**

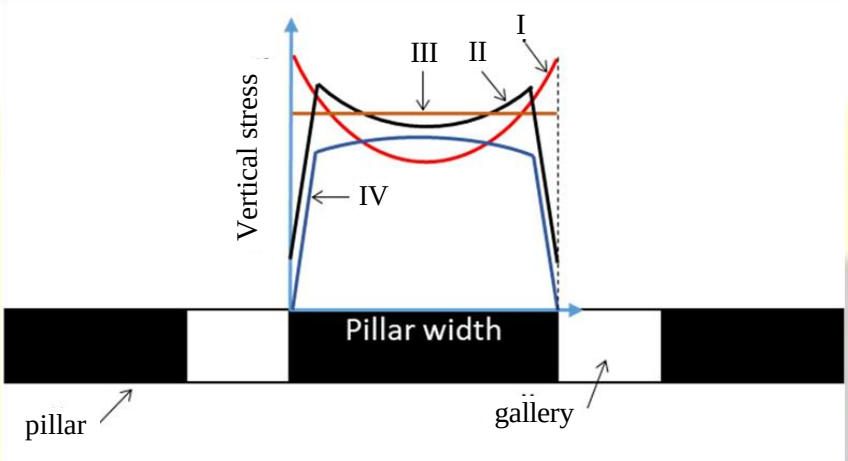
20. In the truss shown in the figure, the force in the member BD, in kN is_____.



(A) 7 (B) 5 (C) 2 (D) 0

Answer: (D) **Click here to watch video explanation**

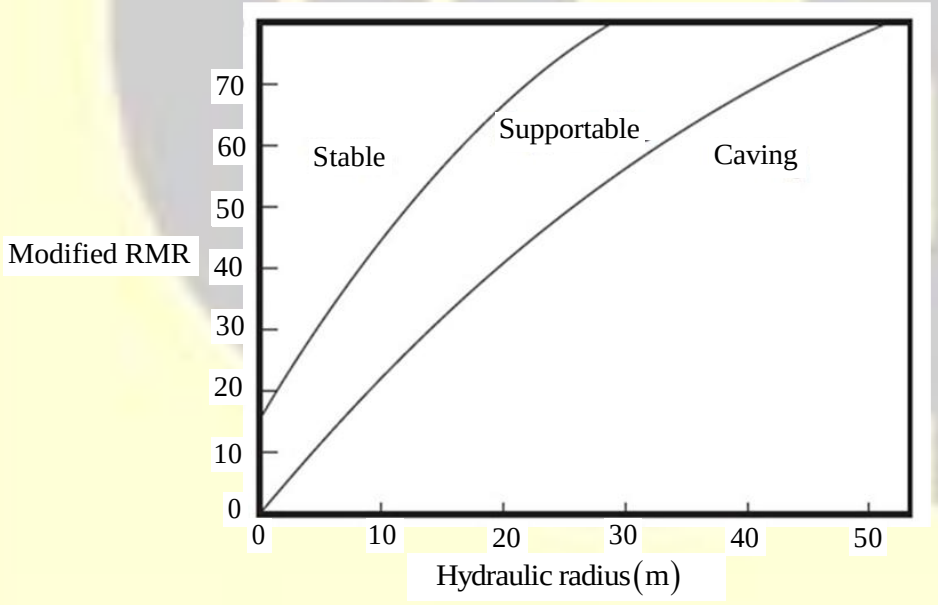
21. The correct vertical stress profile in the case of tributary area method for pillar design is



(A) I (B) II (C) III (D) IV

Answer: (C) **Click here to watch video explanation**

22. The bottom section of a stoping block has dimensions 200 m × 40 m. If the modified RMR of rock mass is 50, the appropriate method of mining on the basis of Laubscher's chart in the figure is



(A) Shrinkage stoping (B) Cut and fill

(C) Block Caving (D) Sublevel stoping

Answer: (B) **Click here to watch video explanation**

23. Match the machine with its component.

Machine	Component
P. Continuous miner	**I.** Flight bar
Q. Jack hammer	**II.** Lemniscate link
R. AFC	**III.** Loading apron
S. Shield support	**IV.** Rifle bar

(A) P-III, Q-IV, R-I, S-II (B) P-IV, Q-III, R-I, S-II

(C) P-III, Q-IV, R-II, S-I (D) P-IV, Q-III, R-II, S-I

Answer: (A) **Click here to watch video explanation**

24. Which one of the following is NOT a notifiable disease as per Indian mining legislation?

(A) Silicosis (B) Noise induced hearing loss

(C) Nystagmus (D) Asbestosis

Answer: (C) **Click here to watch video explanation**

25. If the ambient lapse rate is higher than the dry adiabatic lapse rate, the atmosphere is

(A) stable (B) neutral (C) unstable (D) strongly stable

Answer: (C) **Click here to watch video explanation**

26. Identify the WRONG statement:

The application of controlled air recirculation in an underground work place can

(A) increase the air velocity at the work place

(B) lead to increased concentration of contaminants in the work place

(C) require the installation of an additional fan in the system

(D) lead to overall ventilation cost savings

Answer: (B) **Click here to watch video explanation**

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

(A) Wearing course → Base → Sub base → Sub grade

(B) Wearing course → Sub base → Base → Sub grade

(C) Wearing course → Sub grade → Sub base → Base

(D) Wearing course → Base → Sub grade → Sub base

Answer: (A) **Click here to watch video explanation**

28. A mining company produces iron ore and sells to another company. Royalty to be paid is on the basis of

(A) quantity of ore produced

(B) quantity of ore sold

(C) difference between the quantities of ore produced and sold

(D) net profit

Answer: (B) **Click here to watch video explanation**

29. The cost of a screw compressor with an estimated life of 15 years is ₹ 21,00,000. If the depreciation of the compressor charged, using 'sum-of-the-years-digits' method, at the end of 4thyear is ₹ 2,00,000, the salvage value, in ₹ is_____. (*round off to one decimal place*)

Answer: (100000) **Click here to watch video explanation**

30. A safety device consists of two independent critical components X_1 and X_2. Thefailure of any one or both of these components can cause an accident. The failureprobabilities of components$X_1$and $X_2$are 0.2 and 0.1, respectively. The probabilityof occurrence of an accident is_____. (*round off to two decimal places*).

Answer: (0.28) **Click here to watch video explanation**

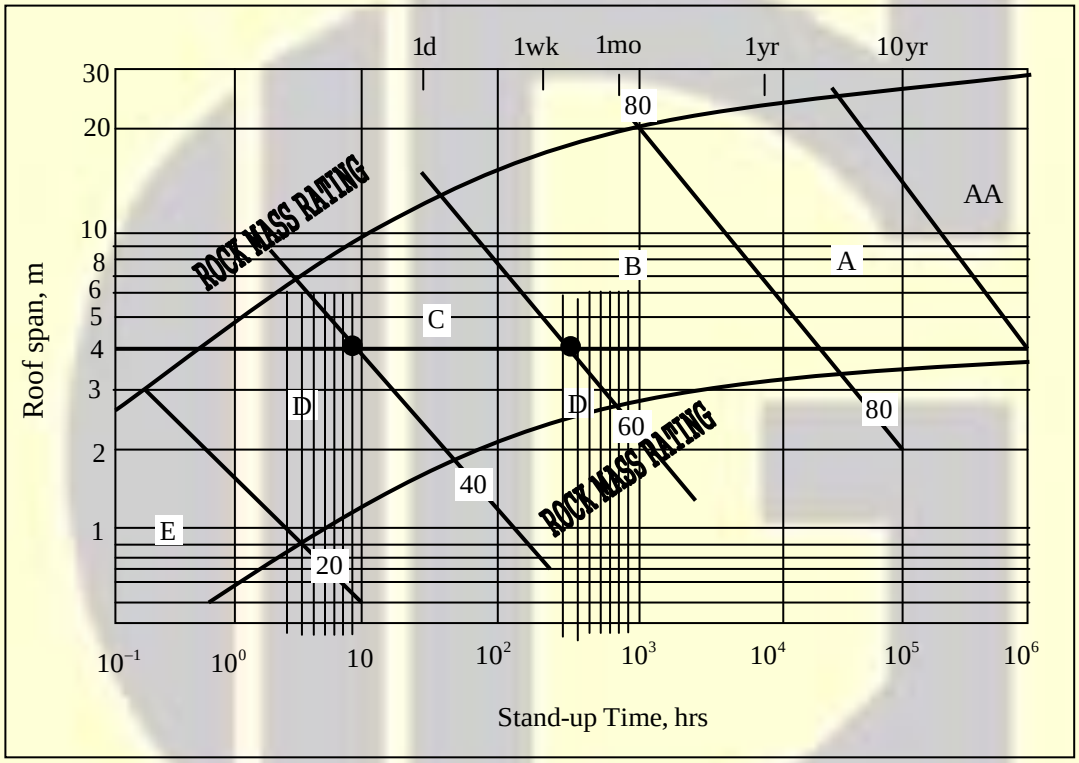
31. In a levelling survey, a reading is taken as 2.25 m. However, along the line of sight there is deflection of 20 cm with respect to vertical position of the staff. The correct reading, in m is_____. (*round off to two decimal places*)

Answer: (2.24) **Click here to watch video explanation**

32. Water flows through a vertical sand column of cross sectional area 4000 mm^2 and length 300 mm. For a water head of 600 mm, quantity of seepage water is 100 mm^3/min. The hydraulic conductivity of the sand column, in mm/min is_____. (*round off to three decimal places*)

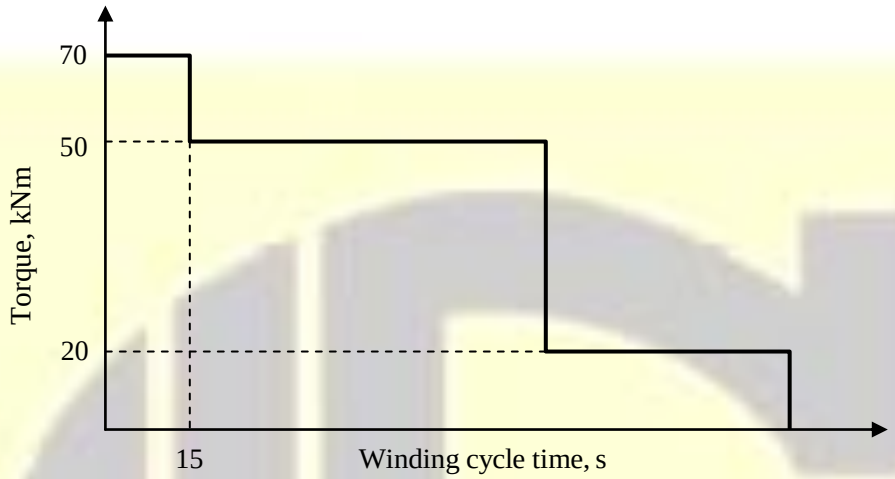
Answer: (0.0125) **Click here to watch video explanation**

33. The modified Lauffer diagram as shown in the figure relates to roof span, RMR and stand-up time. In a metal mine, roof span of a drive is 4 m. If the RMR of the rock mass changes from 40 to 60, then the stand-up time increases by a factor of_____. (*round off to two decimal places*)



Answer: (57.14) **Click here to watch video explanation**

34. In a friction winder, the skip accelerates to a steady speed over a time span of 15 s from the start. The torque vs. time diagram for the winding cycle is shown in the figure. The deceleration time in seconds is_____. (*round off to one decimal place*)



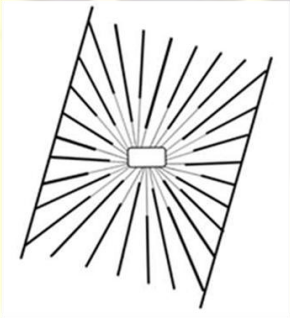
Answer: (10) **Click here to watch video explanation**

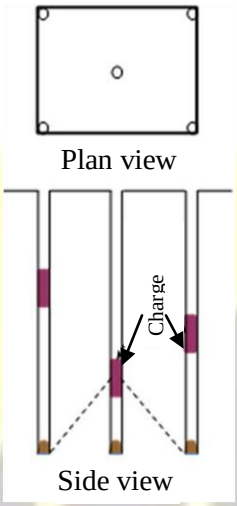
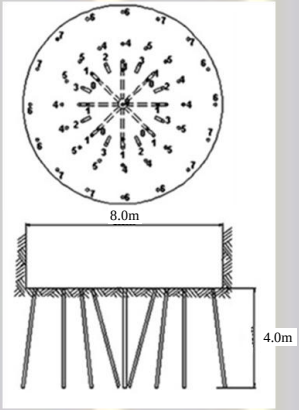
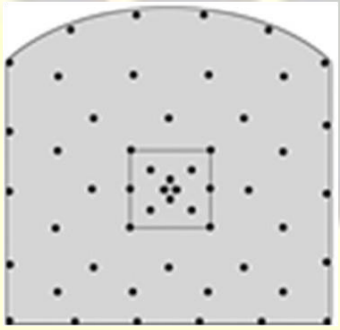
35. At a measurement station, the air quality parameters $PM_{2.5}$, NO_2 and O_3 have the AQI sub-index values as 180, 96, and 84, respectively. The AQI for the station is_____. (in integer)

Answer: (180) **Click here to watch video explanation**

Q.No. 36-65 Carry Two Marks Each

36. Match the drilling pattern with mining operation

	Drilling Pattern		Mining Operation
P.		**I.**	Drifting

Q.		**II.**	Shaft Sinking
R.		**III.**	Sublevel stoping
S.		**IV.**	Drop Raising

(A) P→II, Q→III, R→I, S→II

(B) P→III, Q→IV, R→I, S→II

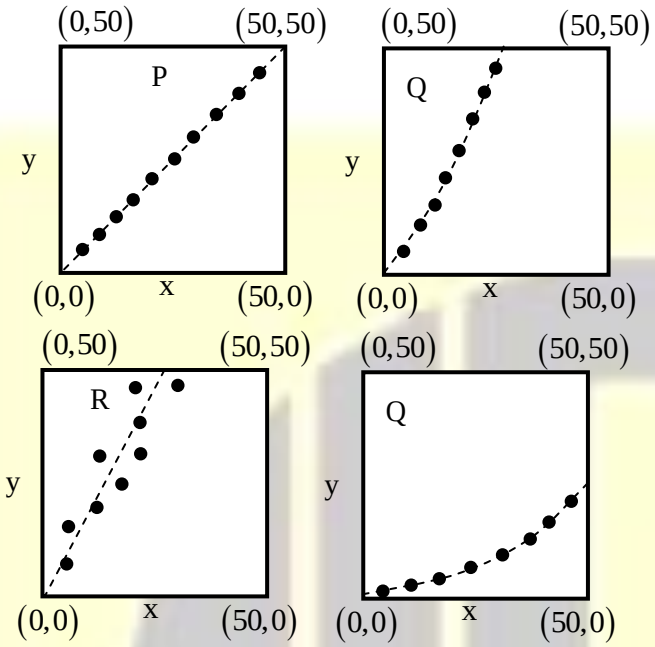
(C) P→II, Q→I, R→IV, S→III

(D) P→III, Q→IV, R→II, S→I

Answer: (D)

Click here to watch video explanation

37. The closest match of the scatter plot between the variables X and Y with the approximate attribute is



	Attribute
I	$\sigma_x > \sigma_y, 0 < \rho_{xy} < 1.0$
II	$\sigma_y > \sigma_x, \rho_{xy} = 1.0$
III	$\sigma_y > \sigma_x, 0 < \rho_{xy} < 1.0$
IV	$\sigma_x = \sigma_y, \rho_{xy} = 1.0$

σ_x = standard deviation of variable X

σ_y = standard deviation of variable Y

ρ_{xy} = Pearson's correlation coefficient between X and Y

(A) P→I, Q→II, R→III, S→IV

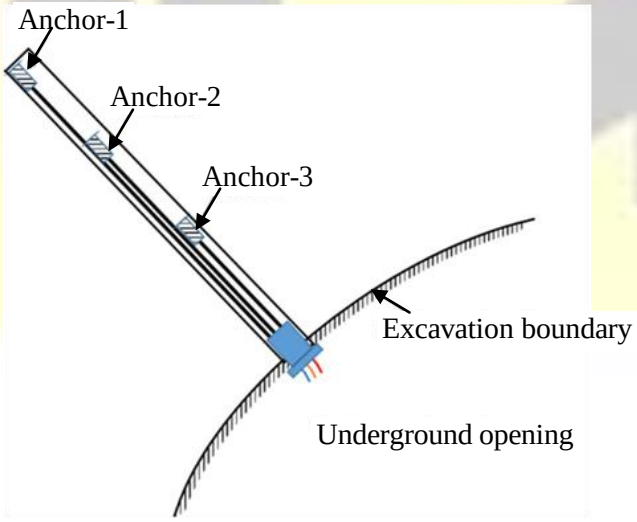
(B) P→II, Q→I, R→IV, S→III

(C) P→III, Q→IV, R→I, S→II

(D) P→IV, Q→II, R→III, S→I

Answer: (D) **Click here to watch video explanation**

38. A 3-point borehole extensometer is installed to identify the location of a single discontinuity plane in a hanging wall rock by measuring deformations at three locations as shown in the figure. The absolute readings of deformations measured on two different dates are listed in the table. Based on the measured data the most likely inference is



Date	Anchor-1 (mm)	Anchor-2 (mm)	Anchor-3 (mm)
May 2, 2021 (initial reading)	34.52	29.04	43.11
June 1, 2021	40.56	34.67	44.78

(A) Discontinuity between Anchor-1 and Anchor-2

(B) Discontinuity between Anchor-2 and Anchor-3

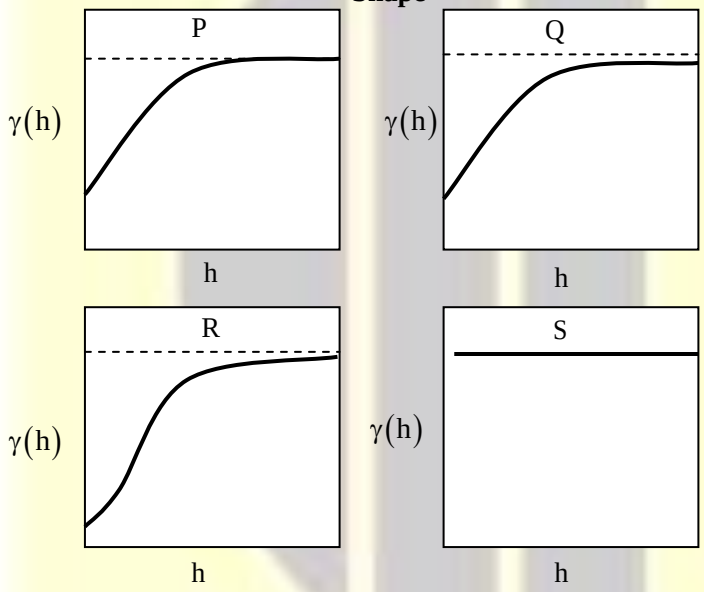
(C) Discontinuity between Anchor-3 and excavation boundary

(D) No noticeable discontinuity

Answer: (B) **Click here to watch video explanation**

39. Match the semi-variogram shape with the model name and the property

Shape



	Semi – variogram		Property
I	Pure nugget	E	reaches sill at finite range
II	Expoential	F	reaches sill asymptotically
III	Spherical	G	reaches sill instantaneously
IV	Gaussian		

$\gamma(h)$ = semi-variogram

h = lag distance

(A) P→III→E, Q→II→F, R→IV→E, S→I→G

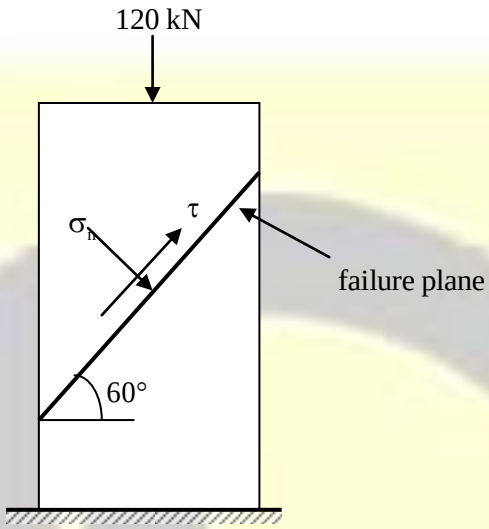
(B) P→II→F, Q→I→G, R→III→E, S→IV→E

(C) P→IV→G, Q→III→F, R→II→E, S→I→E

(D) P→II→E, Q→I→E, R→III→F, S→IV→G

Answer: (A) **Click here to watch video explanation**

40. In a uniaxial compressive strength test, a rock sample of diameter 50 mm fails at an angle of 60° as shown in the figure. If the peak load at failure is 120 kN, the normal and shear stresses on failure plane respectively, in MPa are_____ and _____.



(A) 15.28 and 26.46
(B) 26.46 and 15.28
(C) 57.02 and -15.28
(D) -15.28 and 15.28

Answer: (A) **Click here to watch video explanation**

41. A coal mining company examines the option of buying two types of dumpers with the following details.

Parameter	Type-1	Type-2	Constraints
Capital cost per dumper (in ₹ crore)	3.0	4.0	Maximum capital available for purchasing is ₹ 120 crore
Capacity in tonne	40	50	Minimum daily tonnage to be hauled is 31,000
Daily trips for each dumper	20	20	
Operating cost (in ₹) per tonne	300.0	200.0	

In order to minimize the operating cost, the optimum fleet of dumpers of Type-1 and Type-2, respectively are

(A) 20, 15 (B) 0, 30 (C) 0, 31 (D) 40, 0

Answer: (A) **Click here to watch video explanation**

42. Let f(x) be a continuous and differentiable functions on [3, 18]. If f(3) = –50 and $f'(x) \le 20$, then the largest possible value of f(18), is _____ (in integer).

Answer: (250) **Click here to watch video explanation**

43. Let $\frac{dT}{dt} \propto (T_R - T)$, where T_R and T temperatures in degree centigrade of a room and thermometer, respectively, and t denotes time in minutes. A thermometer at a reading of 2°C is brought in a room of temperature 40°C. Two minutes later the thermometer reads 15°C. The time elapsed in minutes when the thermometer reads 39.5°C, is _____ (round off to two decimal places).

Answer: (20.68) **Click here to watch video explanation**

44. In a health centre, the probability of 'full occupancy' of COVID beds for a day is 0.8. Assuming Binomial probability distribution, the probability of full occupancy exactly for 5 days in a week, is _____ (round off o three decimal places)

Answer: (0.275) **Click here to watch video explanation**

45. Following information is given for a drilling operation to be carried out for overburden removal in a surface mine.

Volume of rock blasted per round, m^3	: 3, 20, 000
Number of blast holes	: 100
Drill hole diameter (D), mm	: 200
Length of subgrade drilling	: 8D
Bench height, m	: 30
Powder factor, m^3/kg	: 3.2

The amount of explosive per unit of charge in kg/m, is _____ (round off to two decimal places).

Answer: (37.88) **Click here to watch video explanation**

46. The shaft-top coordinates of two vertical shafts are given below. The depth of the shaft A and B are 200m and 149 m, respectively.

Shaft	Latitude (m)	Departure (m)	Surface RL (m)
A	N670.0	W150.0	250
B	N170.0	E50.0	209

The downward gradient of the line joining the bottom of the two shafts in degrees, is_____. (*round off to two decimal places*)

Answer: (1.06) **Click here to watch video explanation**

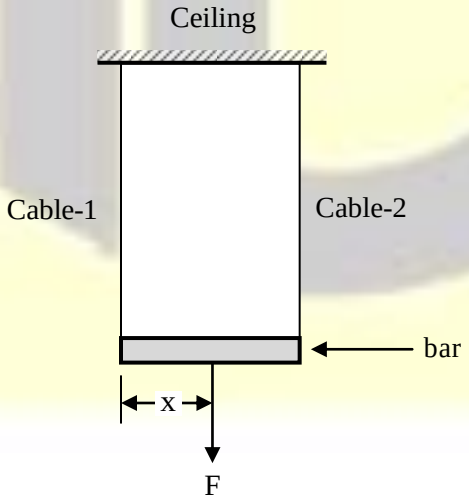
47. The oxygen-balanced equation for explosive ANFO is given below.

$$3NH_4NO_3 + CH_2 \rightarrow 7H_2O + CO_2 + 3N_2$$

For 100 litre of fuel oil having density 850 kg/m^3, the amount of ammonium nitrate to be mixed, in kg, is _____ (round off to two decimal places).

Answer: (1457) **Click here to watch video explanation**

48. Two weightless cables of equal length and cross sectional area are hanging from a ceiling as shown in the figure. They are connected by a horizontal light bar of length 1.0 m and pulled by a force, F. The modulus of elasticity of Cable-1 and Cable-2 are 50 GPa and 200 GPa, respectively. If the deformation in both the cables is equal, the distance x, in m is_____. (*round off to one decimal place*)



Answer: (0.8) **Click here to watch video explanation**

49. A circular tunnel of radius 3 m is constructed in a hydrostatic stress field of 15 MPa. The modulus of elasticity and Poisson's ratio of the rock are 5 GPa and 0.25, respectively. A uniform support pressure p_i is applied at tunnel boundary to restrict the radial deformation at the tunnel boundary to 4 mm. The value of p_i in MPa is_____. (round off to two decimal places)

Answer: (9.67) **Click here to watch video explanation**

50. The extraction ratio during development of a bord and pillar panel is 0.15 in a flat coal seam. The panel is further extracted by widening the galleries, and the extraction ratio changes to 0.25. The percentage change in pillar stress, considering tributary area method, is_____. (round off to two decimal places)

Answer: (13.1) **Click here to watch video explanation**

51. In a small metal mine a battery powered locomotive hauls a train of mine tubs such that:

The weight of the train of mine tubs, tonne	: 3.0
The coefficient of friction between the wheels and the rails	: 0.06
The coefficient of adhesion between the loco wheels and the rails	: 0.2
Time required from the start to reach speed of 1.8 m/s through constant acceleration, min	: 3.0
Upward gradient to be negotiated	: 1 in 20

The minimum weight of the locomotive in tonnes to meet these design requirements, is_____. (round off to one decimal place)

Answer: (3.7) **Click here to watch video explanation**

52. A pump lifts mine water of density 1020 kg/m^3, at 250 m^3/hr from a depth of 150 m. The overall pumping efficiency is 68%. Considering a head loss of 15 m due to pipe friction and shock, the motor input power, in kW is _____. (round off to two decimal places).

Answer: (168.6) **Click here to watch video explanation**

53. In a surface mine bench, overburden is removed by the shovel-dumper combination. For the dumper:

Time required at the loading station	: 3.0 min
Time required at the unloading station	: 1.0 min
Distance between loading and unloading stations	: 4.5 km
Average speed during loaded travel	: 12.0 km/hr
Average speed during empty travel	: 18.0 km/hr

Minimum number of dumpers required to avoid idle time of the shovel, is _____. (in integer)

Answer: (14) **Click here to watch video explanation**

54. In a bord and pillar development panel, headings of 4.4 m × 2.5 m are advanced using solid blasting. The average pull per round of blast is 1.2 m. On an average 12 faces are blasted per day. Density of coal is 1500 kg/m^3. The mine operates in three shifts. If the average daily employment is 330 persons, labour productivity (OMS) of the panel in tonne, is_____. (round off to two decimal places)

Answer: (0.72) **Click here to watch video explanation**

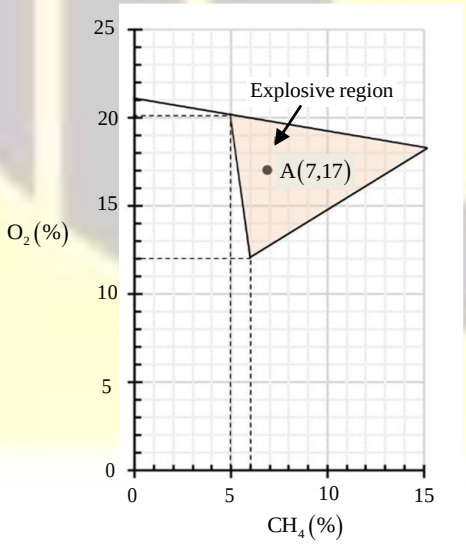
55. In a longwall face, the full seam thickness of 3 m is cut by a shearer with a web of depth 0.7 m. The hauling speed of shearer during cutting is 12 m/min. The trough cross-section of AFC is 0.4 m^2 and the average loading coefficient is 0.7. In order to evacuate coal from the face without spillage, the speed of AFC, in m/s is_____. (round off to one decimal place)

Answer: (1.5) **Click here to watch video explanation**

56. A city is spread over an area of 20 km × 40 km. Wind, at an average speed of 4 m/s, enters perpendicular to the 20 km long side. On a winter day the inversion layer exists over the city at a height of 100 m. PM_1 is emitted from the city at a rate of 1 kg/s. The steady state PM_1 concentration in the city air, in µg/m^3, assuming Box model, is_____. (round off to one decimal place)

Answer: (125) **Click here to watch video explanation**

57. The point 'A' as shown in the Coward flammability diagram represents the gas composition of a sealed-off area of a coal mine. The volume of the sealed-off area is 10000 m^3. Inert gas is proposed to be injected into the sealed-off area so that the gas composition comes below the LEL (lower explosibility limit). The minimum volume of the inert gas required (at the same pressure as that of the sealed-off area), in m^3 is_____. (round off to one decimal place)



Answer: (2167.56) **Click here to watch video explanation**

58. An underground workshop has dimensions of 8 m length, 6 m width and 4 m height. Four identical luminaires are placed at the four corners of the roof. Each luminaire is of 100 W capacity with luminous efficacy of 100 lumen/W. Light is transmitted spherically from luminaires and there are no reflections. The illumination on the horizontal plane at the centre of the floor, in lux is_____. (round off to two decimal places)

Answer: (48.98) **Click here to watch video explanation**

59. An underground AC plant requires the delivery of 250 US gpm (15.85 US gpm = 1.0 lps) of chilled water. For this purpose, ice-pellets at 0^{o}C temperature (latent heat of melting, 334 kJ/kg) are mixed with water at 20 ^{o}C (specific heat 4.18 kJ/kg^{o}C) on the surface. The mixture is adiabatically transported to the underground location such that the water at 7 ^{o}C becomes available for the AC plant. The requirement of ice-pellets in tonne/hr to meet the design condition, is _____. (round off to two decimal places)

Answer: (7.39) **Click here to watch video explanation**

60. An intake shaft has resistances of $0.05\ \text{Ns}^2/\text{m}^8$ up to a depth of 400 m. The airflow rate is 100 m^3/s and the average density is 1.2 kg/m^3. A barometer reads 99.375 kPa when placed on surface. Considering acceleration due to gravity is 9.81 m/s^2, the reading of the barometer at the depth of 400m, in kPa is _____ (round off to two decimal places).

Answer: (103.58) **Click here to watch video explanation**

61. The net present values (NPV) of two mining project proposals A and B are as given.

$\text{NPV}_A = -0.01i^2 - 0.02i + 4.44$

$\text{NPV}_B = -0.03i^2 - 0.01i + 6.55$

where, i is discount rate

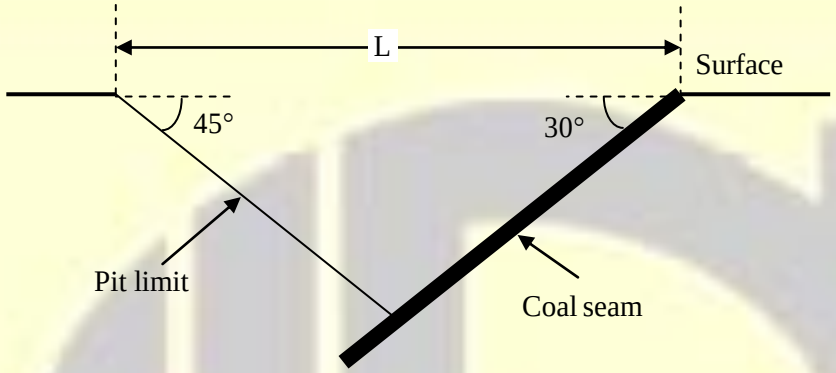
The required rate of return for which both the proposals have equal possibility of acceptance and rejection, is _____. (*round off to two decimal places*)

Answer: (10.52) **Click here to watch video explanation**

62. The value of $\int_0^1 x\log(1+x)dx$, is _____ (round off to two decimal places).

Answer: (0.25) **Click here to watch video explanation**

63. A coal seam of uniform thickness 12 m is dipping at an angle 30° as shown in the figure. The ultimate pit is demarcated based on allowable instantaneous stripping ratio of 10 $m^3/$tonne and safe slope angle of 45°C. The density of coal is 1.41 tonne/m^3. The length, L in m is _____ (round off to two decimal places). ..figure need to draw



Answer: (326) **Click here to watch video explanation**

64. A mine has a reserve of 150 million tonne (Mt) and is designed for a maximum production capacity of 5 Mt per year. In the first year the production is 2 Mt and it increases by 20% each year. The reserve in Mtthat remains at the end of 15 years, is_____. (round off to two decimal places)

Answer: (85.31) **Click here to watch video explanation**

65. Information on Activity-Time duration of a projected is provided below

Activity	Predecessor event	Successor event	Estimated Time Duration (weeks)		
			Pessimistic	Most likely	Optimistic
A	1	2	20	15	4
B	1	3	12	8	4
C	2	3	16	11	6
D	3	4	20	13	12
E	2	4	13	8	3
F	1	4	45	35	25

The expected project duration in weeks, is_____. (*in integer*)

Answer: (39) **Click here to watch video explanation**