

PROVISIONAL ANSWER KEY

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Department	Ground Water Department

Question1:-Which of the following is (are) the feature(s) of management functions?

- (i) Monitoring actual performance, comparing actual to standard and taking action if necessary
- (ii) Defining goals, establishing strategies and developing plans to integrate and coordinate activities

A:-(i)

B:-(ii)

C:-(i) and (ii)

D:-None

Correct Answer:- Option-C

Question2:-Which of following is an advantage of decentralisation of authority?

A:-Makes it more difficult to have a uniform policy

B:-Increases the complexity of coordination of organisational units

C:-Makes it possible to compare the performance of organisational units

D:-None

Correct Answer:- Option-C

Question3:-Stock of materials used to satisfy customer demand or to support the production of service or goods is called _____

A:-Work-in process

B:-Inventory

C:-Buffer stock

D:-None of these

Correct Answer:- Option-B

Question4:-Which of the following is not a time estimate of Program Evaluation and Review Technique?

A:-Optimistic time

B:-Operational time

C:-Pessimistic time

D:-Most likely time

Correct Answer:- Option-B

Question5:-Which of following is(are) correct for Economic order Quantity (EOQ)?

- (i) Annual ordering cost equals to annual holding cost.
- (ii) Total annual cost is minimum.

A:-(i)

B:-(ii)

C:-(i) and (ii)

D:-None

Correct Answer:- Option-C

Question6:-In the following, which is not a process chart activity?

A:-Delay

B:- Inspection

C:-Operation

D:-None of these

Correct Answer:- Option-D

Question7:-Which is following is not a method of sales forecasting?

A:-Delphi method

B:-Market research

C:-Sales force estimates

D:-None of these

Correct Answer:- Option-D

Question8:-Control charts based upon measurement of quality characteristics are called _____

A:-Control chart for attributes

B:-Random control charts

C:-Quality control charts

D:-Control chart for variables

Correct Answer:- Option-D

Question9:-Identify the crystal system corresponding to the following lattice parameter relationships

$$a \neq b \neq c; \alpha = \beta = \gamma = 90^\circ$$

A:-Cubic

B:-Hexagonal

C:-Orthorhombic

D:- Monoclinic

Correct Answer:- Option-C

Question10:-Which of the following materials has the possibility of having a microstructure with graphite flakes distributed in a matrix of ferrite, pearlite, or a mix of both?

A:-Grey Cast Iron

B:-White Cast Iron

C:-Malleable Cast Iron

D:-Spheroidal Cast Iron

Correct Answer:- Option-A

Question11:-Which of the following statements are correct?

- (i) Martensite is the hardest microconstituent in Iron-Carbon alloys
- (ii) Cementite is much harder but more brittle than ferrite
- (iii) Cast irons are a class of ferrous alloys with carbon content less than 2%

A:-Only i

B:-Only i and ii

C:-Only ii and iii

D:-Only i and iii

Correct Answer:- Option-B

Question12:-Which of the following statements are correct?

- (i) Aluminium alloys do not have a fatigue limit.
- (ii) A cast iron rod subjected to a tension test, exhibits a cup-and-cone fracture.
- (iii) Creep is a form of failure that occurs when subjected to dynamic and fluctuating stresses.

A:-Only i

B:-Only i and ii

C:-Only ii and iii

D:-Only i and iii

Correct Answer:- Option-A

Question13:-Match the following:

- | | |
|---------------------|-----------------------------------|
| P Knoop Hardness | (i) Uses depth of penetration |
| Q Rockwell Hardness | (ii) Uses a tungsten carbide ball |
| R Brinell Hardness | (iii) Measures Microhardness |
| | (iv) Measure of toughness |

A:-P-iii, Q-iv, R-ii

B:-P-iv, Q-i, R-ii

C:-P-iv, Q-iii, R-ii

D:-P-iii, Q-i, R-ii

Correct Answer:- Option-D

Question14:-In a vernier protractor, the main scale is graduated in 1° intervals. It has a vernier scale of 12 divisions, which covers 23° in the main scale. What is the least count of the instrument?

A:-0.12 minutes

B:-12 minutes

C:-5 minutes

D:- $\frac{1}{12}$ minutes

Correct Answer:- Option-C

Question15:-Which of the following statements are correct?

- (i) Increasing the rake angle reduces the tendency of formation of built-up edge.
- (ii) Cast iron, when machined, produces continuous chips.
- (iii) In orthogonal cutting, the cutting force acts in the direction of cutting speed.

A:-Only (i)

B:-Only (iii)

C:-Only (ii) and (iii)

D:-Only (i) and (iii)

Correct Answer:- Option-D

Question16:-Match the following

- | | |
|-----------|---|
| P Reaming | i Produces a regularly shaped roughness on cylindrical surfaces |
|-----------|---|

Q Counter sinking ii Smoothing of a drilled hole

R Trepanning iii Produces a hole without reducing all the material removed to chips

S Knurling iv Produces depressions on the surface to accommodate screw heads

A:-P-iii, Q-iv, R-ii, S-i

B:-P-ii, Q-iv, R-iii, S-i

C:-P-ii, Q-iii, R-iv, S-i

D:-P-iv, Q-i, R-ii, S-iii

Correct Answer:- Option-B

Question17:-Which physical quantity is defined as force per unit length?

A:-Viscosity

B:-Stress

C:-Surface tension

D:-Pressure

Correct Answer:- Option-C

Question18:-Bernoulli's equation in its standard form $(P + \frac{1}{2}\rho v^2 + \rho gz = \text{constant})$ assumes the fluid is

A:-Compressible and viscous

B:-Incompressible and inviscid

C:-Compressible and inviscid

D:-Incompressible and highly viscous

Correct Answer:- Option-B

Question19:-An incompressible liquid with a density of 990kg/m³ is pumped from an initial pressure of 1 bar to a final pressure of 30 bar. What is the specific isentropic work required by the pump in kJ/kg?

A:-2.93

B:-3

C:-0.30

D:-3.13

Correct Answer:- Option-A

Question20:-Which fluid property directly determines the occurrence of cavitation in a liquid flow?

A:-Vapour pressure

B:-Dynamic viscosity

C:-Bulk modulus of elasticity

D:-Surface tension

Correct Answer:- Option-A

Question21:-Identify correct statement

A:-Pelton turbine is a radial flow turbine

B:-Kaplan turbine is radial flow impulse turbine

C:-Francis turbine is a reaction radial flow turbine

D:-A turbine is called impulse if inlet of the turbine total energy is only pressure energy

Correct Answer:- Option-C

Question22:-Which of the following units represents the smallest magnitude of pressure?

A:-1 kgf/cm²

B:-1 Millibar

C:-1 mm of Hg

D:-1 N/m²

Correct Answer:- Option-D

Question23:-Two horizontal plates are placed 1.25cm apart, the space between them being filled with oil of viscosity 14 poises. Shear stress (N/m²) in oil if upper plate is moved with a velocity of 2.5m/s is

A:-2.8

B:-28

C:-280

D:-2800

Correct Answer:- Option-C

Question24:-Water flows through a pipe with a diameter of 20cm at cross- section 1 and 10cm at cross-section 2. If the flow velocity at section 1 is 4m/s, what is the flow velocity at section 2 in m/s?

A:-16

B:-1

C:-2

D:-4

Correct Answer:- Option-A

Question25:-Find the stress developed in an unconstrained steel rod of length 1 m when the temperature rises by 50 °C. If $\alpha = 12 \times 10^{-6} / ^\circ\text{C}$ and $E = 200 \text{ GPa}$, the compressive stress developed in the rod is _____.

A:-60 MPa

B:-120 MPa

C:-100 MPa

D:- None of the above

Correct Answer:- Option-D

Question26:-Two areas A and B have the same mass and the same total area, but area B has more of its material located close to the reference axis than area A. Which statement is correct?

A:-B has smaller moment of inertia

B:-B has larger moment of inertia

C:-Both have the same moment of inertia

D:-Moment of inertia is independent of the location of area

Correct Answer:- Option-A

Question27:-A close-coiled helical spring of mean diameter and wire diameter is subjected to axial load. If the spring index is increased while keeping D fixed, the stiffness of the spring _____.

A:-Increases

B:-Decreases

C:-Remains unchanged

D:-First increases and then decreases

Correct Answer:- Option-B

Question28:-

A simply supported beam of length 4 m carries a uniformly distributed load of 2 kN/m over the entire span and a concentrated load of 4 kN at mid-span. The maximum bending moment (in KN.m) is:

A:-8

B:-10

C:-12

D:-16

Correct Answer:- Option-A

Question29:-In an interference fit the lower limit of the shaft is greater than the upper limit of the hole. The maximum interference is equal to:

A:-Upper limit of shaft — Lower limit of hole

B:-Lower limit of shaft — Upper limit of hole

C:-Upper limit of shaft — Upper limit of hole

D:-Mean shaft diameter — Mean hole diameter

Correct Answer:- Option-A

Question30:-A deep-groove ball bearing is preferred when there is:

A:-Radial load + Impact load

B:-High radial load

C:-Radial load + axial load

D:-Radial load + high axial load

Correct Answer:- Option-C

Question31:-In a simple Watt governor, the height of the governor is 200 mm at a mean speed of 60 rpm. If the speed increases by 2 %, the approximate change in height is

A:-4 mm (decrease)

B:-8 mm (decrease)

C:-4 mm (increase)

D:-8 mm (increase)

Correct Answer:- Option-B

Question32:-When a material is subjected to three mutually perpendicular equal tensile stresses of intensity σ , the volumetric strain is:

A:- $\sigma(1-2\mu)/E$

B:- $3\sigma(1+\mu)/E$

C:- $\sigma(1+2\mu)/E$

D:- $3\sigma(1-2\mu)/E$

Correct Answer:- Option-D

Question33:-The pressure on the isentropic compression curve of a diesel engine at $\frac{1}{8}$ th and $\frac{7}{8}$ th of the strokes are 1.5 bar and 14 bar respectively. If the cut-off occurs at $\frac{1}{15}$ th of the heat addition stroke, what is the compression ratio of the engine.

A:-14.2

B:-16.2

C:-13.8

D:-19.2

Correct Answer:- Option-B

Question34:-A single cylinder 4 stroke cycle oil engine works on diesel cycle. The following readings were taken when the engine was running at full load. Area of the indicator card = 3cm². Length of the diagram =4cm, Spring constant = 10bar/cm. Speed of the engine=400rpm, Load on the brake drum =380N, Spring balance reading = 50N, Diameter of the brake drum=120cm, fuel consumption = 2.8kg/Hr, Calorific value of the fuel is 42MJ/kg, bore of the cylinder = 16cm, Stroke of the piston is =20cm. Find the approximate friction power of the engine in kW

A:-11.71

B:-5.86

C:-15.86

D:-1.76

Correct Answer:- Option-D

Question35:-The self-view factor F_{11} of a conical cavity having a semi vertex angle ' θ ' and height 'h' is given by .

A:- $\sin\theta$

B:- $1-\sin\theta$

C:- $\sin\frac{\theta}{2}$

D:- $\frac{1-\sin\theta}{2}$

Correct Answer:- Option-B

Question36:-Two fins A and B of length 1 meter each and the thermal conductivities are k and 4k respectively have their one end immersed in an enclosure at 100°C. If the temperature at the end of B is 40°C, then for 'A' at what distance the temperature will be 40°C

A:-0.125m

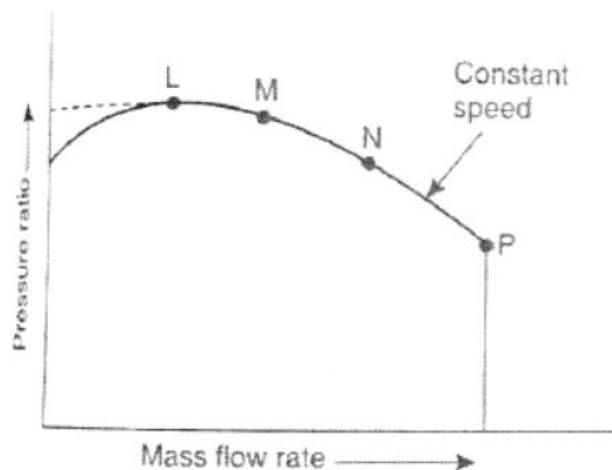
B:-0.25m

C:-0.5m

D:-0.82m

Correct Answer:- Option-C

Question37:-The figure below shows the characteristic curve of a centrifugal compressor running at a constant speed. The phenomenon of stonewall typically happens at point



A:-L

B:-M

C:-N

D:-P

Correct Answer:- Option-D

Question38:-The method in which the spark plugs are clubbed together for the companion cylinders known as

A:-Twin spark

B:-Dual spark

C:-Double spark

D:-Waste spark

Correct Answer:- Option-D

Question39:-Two reversible refrigerators R_1 and R_2 , whose coefficient of performances 3 and 4 respectively are arranged in series. Then the coefficient of performance of the combined system is

A:-1.5

B:-2

C:-4

D:-12

Correct Answer:- Option-A

Question40:-The supply air temperature is 16°C and apparatus dew point temperature is 12°C for the cooling coil with by-pass factor of 0.2. What is the temperature at the inlet of the cooling coil?

A:- 8°C

B:- 12.45°C

C:- 32°C

D:- 35°C

Correct Answer:- Option-C

Question41:-_____ is an auxiliary wheel of an implement to maintain a uniform depth of working.

A:-Gauge wheel

B:- Land wheel

C:-Coulter wheel

D:-Rear furrow wheel

Correct Answer:- Option-A

Question42:-A four bottom 30 cm M.B plough has a working depth of 20 cm and draft of 1200 kg. It is working at a speed of 5 km/hr with field efficiency of 80%. Calculate the actual field capacity.

A:-0.48 ha/hr

B:-0.60 ha/hr

C:-0.048 ha/hr

D:-0.24 ha/hr

Correct Answer:- Option-A

Question43:-A fluted feed seed drill has 5 furrow openers of single disc type. The furrow openers are spaced 20 cm apart. The main drive wheel has a diameter of 100 cm. How many turns of main drive wheel would occur when the seed drill has covered one hectare of area?

A:-318

B:-1000

C:-314

D:-3185

Correct Answer:- Option-D

Question44:-Which of the following statements are true about impact cutter?

(i) A rotary cutter has knives rotating in a vertical plane

(ii) Flail shredder has knives rotating in horizontal planes parallel to the direction of travel

(iii) An impact cutter relies primarily upon the inertia of the material being cut to furnish the opposing force required for shear

A:-Only (i)

B:- Only (ii)

C:-Only (iii)

D:-All of the above (i, ii & iii)

Correct Answer:- Option-C

Question45:-Diesel engine has compression ration ranging from _____ to _____

A:-12:1 to 14:1

B:-14:1 to 22:1

C:-5:1 to 8:1

D:-8:1 to 12:1

Correct Answer:- Option-B

Question46:-Inflation pressure in the rear wheel of the tractor varies from _____ to _____

A:-0.8 to 1.2 kg/cm²

B:- 2 to 2.5 kg/cm²

C:-0.8 to 1.2 N/m²

D:-2 to 2.5 N/m²

Correct Answer:- Option-A

Question47:-Which of the following statements are correct about draft of ploughs

- (i) Unit draft decreases with increase in width of cut
- (ii) Among all the ploughs used surface tillage, indigenous plough shows the maximum unit draft
- (iii) Draft increases with increased rate of ploughing

A:-Only (i)

B:-Only (ii)

C:- Only (iii)

D:-All of the above (i, ii & iii)

Correct Answer:- Option-D

Question48:-The horizontal component of pull, parallel to the line of motion is known as _____

A:-Line of pull

B:-Horizontal suction

C:-Draft

D:-Horizontal clearance

Correct Answer:- Option-C

Question49:-Calculate the depreciation per hour, when the 25 hp tractor costs Rs.4,00,000/-, life of tractor is 12 year. Working hours per year is 1000 hours.

A:-Rs. 36

B:-Rs. 30

C:-Rs. 33

D:-Rs. 27

Correct Answer:- Option-B

Question50:-Which of the following Indian Standard specifies the test code for electric tractors?

A:-IS 19262:2025

B:-IS 15925:2025

C:- IS 5994:2025

D:-IS 15919:2025

Correct Answer:- Option-A

Question51:-Which of the following technologies is used in first generation solar photovoltaic system?

A:-Crystalline silicon Technology

B:-Thin film PV technology

C:-Organic PV technology

D:- Amorphous silicon technology

Correct Answer:- Option-A

Question52:-Which of the following statements are correct about objectives of ergonomic studies in agriculture

- (i) To find best fit between worker and job conditions
- (ii) To make sure that workers are uninjured during working
- (iii) To make sure that workers are comfortable and more productive

A:-Only (i & ii)

B:-Only (i & iii)

C:-Only (ii & iii)

D:- All of the above (i, ii & iii)

Correct Answer:- Option-D

Question53:-Consider the following statements related to fixed and floating type biogas plants.

- (i) Fixed dome type biogas plant has more life span in comparison to floating gas holder type biogas plant.
- (ii) Effect of low temperature during winter on gas production is less in fixed dome type in comparison to floating type biogas plant.
- (iii) Low cost of maintenance and low capital investment in floating type biogas plant in comparison to fixed dome type biogas plant.

Which of the statements given above is/are correct statements?

A:-Only (i & iii)

B:-Only (ii & iii)

C:-Only (i & ii)

D:-All of the above (i, ii & iii)

Correct Answer:- Option-C

Question54:-Given below are two statements related to wind energy conversion.

Statement — I (St — I): The power available in wind is proportional to square of wind speed.

Statement — II (St — II): For open areas, wind speed increases with approximately one seventh power of height from the ground.

In light of the above statements, choose the most appropriate answer from the options given below:

A:-Both statements are TRUE

B:-Both statements are FALSE

C:-St I-TRUE and St II-FALSE

D:-St I - FALSE and St II - TRUE

Correct Answer:- Option-D

Question55:-Consider the following statements related to gasifier technology and types of gasifiers.

- (i) Up-draft gasifier: Suitable for wide range of biomass and low-quality fuels.
- (ii) Down-draft gasifier: Fuel movement is from top to bottom, opposite to gas flow.
- (iii) Up-draft gasifier: Mostly applied for large-scale industrial applications in comparison to down-draft gasifier.

Which of the statements given above is/are correct statements?

A:-Only (i & iii)

B:-Only (ii & iii)

C:-Only (i & ii)

D:-All of the above (i, ii & iii)

Correct Answer:- Option-A

Question56:-Consider the following statements related to Soil properties influencing irrigation:

Soil-water relations.

- (i) Loamy sand has more proportion of sand in comparison to sandy loam.
- (ii) Hygroscopic water is not available to plants.
- (iii) Hydraulic conductivity depends on properties of soil and fluid.

Which of the statements given above is/are correct statements?

A:-Only (i & iii)

B:-Only (ii & iii)

C:-Only (i & ii)

D:-All of the above (i, ii & iii)

Correct Answer:- Option-D

Question57:-Match the numerical values (List-II) of different characteristics (List-I) with reference to Cook's method of runoff estimation.

List - I

List - II

- (i) Surface storage-High surface depression (a) 20
- (ii) Vegetal cover-About 50% of area (b) 10
- (iii) Soil infiltration-Very less (c) 5
- (iv) Relief-Steep slope and rugged terrain (d) 30 to 40

A:-i-c; ii-b; iii-d; iv-a

B:-i-c; ii-b; iii-a; iv-d

C:-i-b; ii-c; iii-a; iv-d

D:-i-b; ii-c; iii-d; iv-a

Correct Answer:- Option-B

Question58:-Consider the following related to linear, aerial and relief aspects of watersheds.

- (i) Linear aspects: Stream order, law of stream number and length of overland flow.
- (ii) Areal aspects: Law of stream areas, length ratio and drainage density.
- (iii) Relief aspects: Relative relief, channel slope and ruggedness number.

Which of the statements given above is/are correct statements?

A:-Only (i & iii)

B:- Only (ii & iii)

C:-Only (i & ii)

D:-All of the above (i, ii & iii)

Correct Answer:- Option-A

Question59:-Given below are two statements related to classification of levelling.

Statement — I (St— Cross section levelling — It is the process of determining the elevations of series of points at measured intervals along a predetermined base line.

Statement — II (St— Fly levelling — Provide an approximation idea of the nature of the ground.

In light of the above statements, choose the most appropriate answer from the options given below:

A:-Both statements are TRUE

B:-Both statements are FALSE

C:-St I - TRUE and St II - FALSE

D:-St I - FALSE and St II - TRUE

Correct Answer:- Option-D

Question60:-Match List-I with List-II and select the correct answer.

- | List-I | List-II |
|-----------------------|---|
| (i) Optical sensor | (a) Rely on natural radiation |
| (ii) Microwave sensor | (b) 400 to 700 nm |
| (iii) Passive sensor | (c) 1 mm to 1 m |
| (iv) Active sensor | (d) Independent of natural illumination |

A:-i-c; ii-b; iii-d; iv-a

B:-i-c; ii-b; iii-a; iv-d

C:-i-b; ii-c; iii-a; iv-d

D:-i-b; ii-c; iii-d; iv-a

Correct Answer:- Option-C

Question61:-Consider the following statements related to on farm structures for water conveyance — control and distribution.

- (i) Diversion boxes are helpful to convey water to different parts of the farm.
- (ii) Spiles are used to distribute water from ditches to field.
- (iii) Culverts are used for water conveyance when road surface lies close to the field surface.

Which of the statements given above is/are correct statements?

A:-Only (i & iii)

B:-Only (ii & iii)

C:-Only (i & ii)

D:-All of the above (i, ii & iii)

Correct Answer:- Option-C

Question62:-Given below are two statements related to hydraulic conductivity and drainable porosity.

Statement — I (St — Only soil influences on hydraulic conductivity. But, transmitted water has no influence on I): hydraulic conductivity.

Statement — II (St — The drainable porosity will be 25% when 100 cm³ of water drains freely under gravity from II): 500 cm³ of saturated soil.

In light of the above statements, choose the most appropriate answer from the options given below:

A:-Both statements are TRUE

B:- Both statements are FALSE

C:-St I - TRUE and St II - FALSE

D:-St I - FALSE and St II - TRUE

Correct Answer:- Option-B

Question63:-For lifting 7.6 litres/second, water against 10 meters of head with pump efficiency of 80%, the required water horse power (WHP) and shaft horse power (SHP) would be

A:-2.0 and 3.0

B:-2.0 and 2.5

C:-1.0 and 1.5

D:-1.0 and 1.25

Correct Answer:- Option-D

Question64:-Given below are two statements related to drip irrigation system — hydraulic design.

Statement — I (St — Total energy, drop by friction in lateral line is directly proportional to the diameter of lateral line. I):

Statement — II (St — Ramser formula can also be used for head loss calculation in lateral and submains of drip irrigation system in place II): of William and Hazen equation.

In light of the above statements, choose the most appropriate answer from the options given below:

A:-Both statements are TRUE

B:-Both statements are FALSE

C:-St I - TRUE and St II - FALSE

D:-St I - FALSE and St II - TRUE

Correct Answer:- Option-B

Question65:-Which of the following statements are correct regarding energy requirement in size reduction?

- (i) Size reduction requires mechanical energy.
- (ii) Production of new surface area requires energy.
- (iii) Finer grinding generally requires more energy.
- (iv) Energy requirement is independent of particle size.

A:-Only i and ii

B:-Only ii and iii

C:-Only i, ii and iii

D:- All of the above i, ii, iii and iv

Correct Answer:- Option-C

Question66:-Which law states stress is directly proportional to strain within the elastic limit?

A:-Kick's law

B:-Newton's law

C:-Hooke's law

D:- St. Venant law

Correct Answer:- Option-C

Question67:-Consider the following pairs related to cleaning and grading:

Equipment	Cleaning/ Grading basis
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(i) Indented cylinder	Roundness
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(ii) Screen	Size
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(iii) Gravity separator	Density
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(iv) Spiral separator	Length
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How many pairs given above are correctly matched?

A:-One pair

B:-Two pair

C:-Three pair

D:-Four pair

Correct Answer:- Option-B

Question68:-The primary objective of blanching of foods is to:

A:- Increase moisture content

B:-Inactivate enzymes and prevent deterioration reactions

C:-Increase microbial activity

D:-Increase the fat content

Correct Answer:- Option-B

Question69:-The LSU (Louisiana State University) dryer is primarily used for drying

A:-Fruits and vegetables

B:-Grains

C:-Dairy products

D:-Meat products

Correct Answer:- Option-B

Question70:-Consider the following statements about safe storage of grains:

(i) Low temperature generally helps to reduce insect activity.

(ii) Aeration can help control grain temperature and moisture gradients.

(iii) High relative humidity is always desirable for grain storage.

Which of the above statements are correct?

A:-Only i and ii

B:-Only ii and iii

C:-Only i and iii

D:-All of the above i, ii and iii

Correct Answer:- Option-A

Question71:-Which of the following is an igneous rock?

A:-Sandstone

B:-Limestone

C:-Granite

D:-Shale

Correct Answer:- Option-C

Question72:-Which sequence represents progressively increasing geological investigation detail in the UNFC framework?

A:-Detailed exploration → reconnaissance → prospecting → general exploration

B:-Reconnaissance → prospecting → general exploration → detailed exploration

C:-Prospecting → reconnaissance → detailed exploration → general exploration

D:- General exploration → reconnaissance → prospecting → detailed exploration

Correct Answer:- Option-B

Question73:-Which method is particularly applicable when unstable water-bearing ground creates serious difficulties during, shaft sinking?

A:-Ground freezing

B:-Room-and-pillar mining

C:-Longwall mining

D:-Hydraulic mining

Correct Answer:- Option-A

Question74:-Which factor directly affects the capacity of a hoisting system?

A:-Payload

B:-Hoisting speed

C:-Cycle time

D:- All of the above

Correct Answer:- Option-D

Question75:-Core recovery in drilling is commonly expressed as:

A:- $(\text{Recovered core length} / \text{drilled length}) \times 100$

B:- $(\text{Drilled length} / \text{recovered length}) \times 100$

C:- $(\text{Ore length} / \text{total reserve}) \times 100$

D:- $(\text{Grade} / \text{thickness}) \times 100$

Correct Answer:- Option-A

Question76:-In a bench blasting pattern, burden refers to the distance between:

A:-Two adjacent blast holes

B:-A blast hole and the free face

C:-Two benches

D:-The drill machine and blast hole

Correct Answer:- Option-B

Question77:-For an explosive column in a blasthole, the use of stemming material primarily helps to:

- A:-Confine the explosive gases and improve energy utilization in rock breakage
- B:-Increase the velocity of detonation of the explosive
- C:-Reduce the density of the explosive
- D:- Increase the sensitivity of the detonator

Correct Answer:- Option-A

Question78:-In a conventional bench blasting pattern, if the burden is increased substantially while other parameters remain unchanged, the most likely consequence is:

- A:- Improved fragmentation due to increased confinement
- B:-Increase in explosive sensitivity
- C:-Elimination of flyrock
- D:-Increased likelihood of poor fragmentation and toe formation

Correct Answer:- Option-D

Question79:-In controlled blasting, pre-splitting is primarily adopted to:

- A:-Increase the production blast powder factor
- B:-Increase the burden of production holes
- C:-Create a fracture plane along the final excavation boundary and reduce back-break
- D:-Increase the explosive energy transmitted into the surrounding rock mass

Correct Answer:- Option-C

Question80:-Which one of the following carry the character of levying the heavy burden on production of waste in the beginning that adversely affect the cash-flow in the earlier years?

- A:-Average Stripping Ratio
- B:-Declining Stripping Ratio
- C:-Increasing Stripping Ratio
- D:- Break-even Stripping Ratio

Correct Answer:- Option-B

Question81:-The design of haulroad follows the geometry of the open pit and is run almost parallel to its longer axis is

- A:-Semi-permanent road
- B:-Switchback
- C:-Spiral
- D:-Richards

Correct Answer:- Option-C

Question82:-Name the following equipment is connected with non-cyclic operation

- A:-Front-end loader
- B:-Shovel
- C:-Dragline
- D:-Bucket Wheel Excavator

Correct Answer:- Option-D

Question83:-Horizon mining system is normally applied to the mining of steeply inclined seams with gradients of

A:-In excess of 15°

B:-Between 2° and 5°

C:-Between 10° and 15°

D:- Less than 2°

Correct Answer:- Option-A

Question84:-A deposit must contain atleast certain percentage of metal in it and the lowest admissible limit of metallic content of an ore is known as

A:-Simple ore

B:-Economic ore

C:-Tenor

D:-Pocket ore

Correct Answer:- Option-C

Question85:-The fraction of slime in the mill tailings used for filling and fill stopes should not exceed 10%, the reason being

A:-To facilitate quick drainage of the fill material

B:-To reduce solution while mucking

C:-For easy installation of chock-mate

D:- To provide smooth movement of mucking equipment

Correct Answer:- Option-A

Question86:-Consider the following statements regarding GPS/GNSS, Total Station and DGPS:

(i) GPS/GNSS is particularly useful for determining spatial position.

(ii) Total stations generally require line-of- sight observations between the instrument and target.

(iii) DGPS does not use any correction technique and provides the same accuracy as a standalone GPS receiver.

Which of the statements given above are correct?

A:-(ii) and (iii) only

B:-(i) and (iii) only

C:-(i) and (ii) only

D:-(i), (ii) and (iii)

Correct Answer:- Option-C

Question87:-A line has a whole-circle bearing of 225° . Its reduced bearing is:

A:-N 45° E

B:- N 45° W

C:-S 45° E

D:-S 45° W

Correct Answer:- Option-D

Question88:-Which of the following best describes the principal objective of pillar design in underground mining?

A:-To maximize the extraction ratio by reducing pillar dimensions without considering the strength of the surrounding rock mass

B:-To determine the optimum pillar dimensions so that the pillar can safely withstand the expected loading while achieving the desired mineral recovery

C:-To determine pillar dimensions solely from the thickness of the ore seam, irrespective of depth and loading conditions

D:-To maintain a constant pillar size throughout the mine regardless of variations in geological and rock-mass conditions

Correct Answer:- Option-B

Question89:-A coal mine increases its production from 7,000 tonnes to 10,000 tonnes per day. During the same period, the man-shifts increase from 700 to 1,000 per day. Based on Output per Man Shift (OMS), which of the following is correct?

A:-Production increases, but OMS remains unchanged

B:-Production and OMS both increase

C:-Production increases, but OMS decreases

D:- Production remains unchanged, but OMS increases

Correct Answer:- Option-A

Question90:-Consider the following statements regarding commonly used mine-planning software:

(i) Datamine provides tools for resource modelling and mine planning.

(ii) Vulcan supports 3D geological modelling and mine design.

(iii) The technical suitability of a mine-planning software package can be determined solely from its name, irrespective of project requirements and workflow.

(iv) Surpac provides tools for geological modelling and mine design.

Which of the statements given above are correct?

A:-(i) and (ii) only

B:-(i), (ii) and (iv) only

C:-(ii), (iii) and (iv) only

D:- (i), (ii), (iii) and (iv)

Correct Answer:- Option-B

Question91:-A mine ventilation airway has a cross-sectional area of 12 m^2 . The quantity of air flowing through the airway is $180 \text{ m}^3/\text{s}$. What is the average air velocity?

A:-10 m/s

B:-12 m/s

C:-15 m/s

D:- 18 m/s

Correct Answer:- Option-C

Question92:-A return airway carries $120 \text{ m}^3/\text{s}$ of air containing 0.4% methane. The permissible methane concentration is 0.8%. Assuming methane emission remains constant, what is the minimum quantity of air theoretically required to dilute the methane concentration to 0.8% if the methane emission rate is $0.48 \text{ m}^3/\text{s}$?

A:- $40 \text{ m}^3/\text{s}$

B:- $50 \text{ m}^3/\text{s}$

C:- $60 \text{ m}^3/\text{s}$

D:- $80 \text{ m}^3/\text{s}$

Correct Answer:- Option-C

Question93:-A mining machine produces a noise level of 95 dB(A) at the operator's position. If the permissible exposure duration at this noise level is 2 hours, which of the following represents the most appropriate interpretation?

A:-The operator can work continuously for 8 hours

B:-The operator should not be exposed continuously beyond the specified 2-hour duration

C:- Noise exposure is safe because it is below 100 dB(A)

D:- Noise has no occupational health significance below 100 dB(A)

Correct Answer:- Option-B

Question94:-A mine dumper of total mass 40,000 kg moves at a speed of 5 m/s on a road having a gradient of 1 in 20. Assume rolling resistance is 2% of the weight and drivetrain efficiency is 80%. Calculate the approximate engine power required to overcome the gradient and rolling resistance. ($g=9.81 \text{ m/s}^2$)

A:-150 kW

B:-172 kW

C:-196 kW

D:-250 kW

Correct Answer:- Option-B

Question95:-A rock slope is subjected to a driving force of 1.500 kN and the available resisting force along the potential failure surface is 2,250 kN. What is the factor of safety?

A:-0.67

B:-1.25

C:-1.50

D:-2.00

Correct Answer:- Option-C

Question96:-A rectangular mine pillar is subjected to a vertical load of 6,000 kN. The pillar has dimensions 5 m x 4 m. Calculate the average vertical stress in the pillar.

A:-150 kPa

B:-300 kPa

C:-600 kPa

D:-1,200 kPa

Correct Answer:- Option-B

Question97:-Which of the following statements is / are correct about the Mines Act, 1952?

(i) The Mines Act, 1952 extends to the whole of India.

(ii) "Mine" means any excavation where any operation for the purpose of searching for or obtaining minerals has been or is being carried on.

(iii) The Chief Inspector of Mines is appointed by the State Government.

A:-Only (ii & iii)

B:- Only (i & ii)

C:-All of the above (i, ii & iii)

D:-Only (i & iii)

Correct Answer:- Option-B

Question98:-As per the Mines Rules, 1955, a suitable first-aid room shall be provided and maintained in good order at every mine employing more than _____ persons on any one day of the preceding calendar year.

A:-150

B:-100

C:-50

D:-250

Correct Answer:- Option-A

Question99:-Which of the following statements is/are correct about mine fires and inundation?

- (i) Graham's ratio (CO/O_2 deficiency) is used for early detection and assessment of spontaneous heating.
- (ii) Carbon monoxide is generally the earliest reliable indicator gas of an incipient underground fire.
- (iii) Drilling of advance boreholes ahead of the working face is a recognized precaution against inundation from old water-logged workings.

A:-Only (i & ii)

B:-Only (ii & iii)

C:-All of the above (i, ii & iii)

D:-Only (i & iii)

Correct Answer:- Option-C

Question100:-Which of the following statements is/are correct regarding vocational training of mine workers under the Mines Vocational Training Rules, 1966?

- (i) A person proposed to be employed in a mine, who has not held such previous employment, is required to undergo the prescribed initial training before employment.
- (ii) A person returning to employment in a mine after an absence exceeding one year is required to undergo refresher training within one month of joining duty.
- (iii) A person who has undergone initial training is permanently exempted from all subsequent vocational training.

A:-Only (i)

B:-Only (ii)

C:-All of the above (i, ii & iii)

D:-Only (i & ii)

Correct Answer:- Option-D