

General Instructions

- (i) This question paper contains 120 questions. All questions are compulsory.
- (ii) It comprises 120 single-correct multiple-choice questions.
- (iii) Attempt every question; detailed solutions are provided in the companion solutions booklet.

1. The following are the paddy yields (in kg/plot) for 14 plots: 30, 32, 35, 38, 40, 42, 48, 49, 52, 55, 58, 60, 62, 65. The 25th percentile (Q_1) yield in kg/plot will be:

- (A) 37.25
- (B) 38.00
- (C) 40.00
- (D) 48.50

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2. Match List-I with List-II.

List-I (Nature of data)	List-II (Most appropriate measure)
(A) Qualitative data	(I) Geometric mean
(B) Raw data with extreme values	(II) Median and Mode
(C) Dealing with rates, speeds and prices	(III) Mode
(D) Calculating relative change	(IV) Harmonic mean

Choose the *correct* answer from the options given below:

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

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3. Consider the following probability distributions.

- (A) Normal distribution
- (B) Binomial distribution
- (C) Poisson distribution
- (D) F-distribution
- (E) Chi-square distribution

In which of the above distributions are mean and variance equal:

- (A) (A) only.
- (B) (B) only.
- (C) (C) only.
- (D) (D) and (E) only.

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4. For two invertible matrices A and B of suitable orders, the value of $(AB)^{-1}$ is:

- (A) $(BA)^{-1}$
- (B) $B^{-1}A^{-1}$
- (C) $A^{-1}B^{-1}$
- (D) $(AB')^{-1}$

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5. The angle between vectors $A = 2i - j + 2k$ and $B = 6i - 3j + 6k$ is:

- (A) 0
- (B) 30
- (C) 45
- (D) 60

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6. Synchronous Speed of an AC induction motor depends on:

- (A) Frequency of the supply voltage
- (B) Number of poles
- (C) Current
- (D) Voltage

Choose the *correct* answer from the options given below:

- (A) (A) and (B) only.
- (B) (B) and (C) only.
- (C) (C) and (D) only.
- (D) (A) and (D) only.

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7. Hydrometer readings are corrected for:

- (A) Temperature correction
- (B) Meniscus correction
- (C) Dispersing agent correction
- (D) Pressure correction

Choose the *correct* answer from the options given below:

- (A) (A) and (B) only.
- (B) (C) and (D) only.
- (C) (A), (B) and (C) only.
- (D) (B), (C) and (D) only.

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8. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).

Assertion (A): In case of soils, compressive normal stresses are taken as positive.

Reason (R): Most of the normal stresses acting on soils are compressive in nature.

In light of the above statements, choose the *correct* answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

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9. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).

Assertion (A): The current drawn by the motor lags behind the voltage applied.

Reason (R): Motor is an inductive load.

In light of the above statements, choose the correct answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is not the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

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10. Consider the following statements:

- (A) Real power is expressed in kW.
- (B) Apparent power is expressed in kV.
- (C) Reactive power does not provide useful mechanical work.
- (D) A motor operating at a given load and supply voltage draws active and reactive power.
- (E) Both real power and apparent power are expressed in kW.

Choose the correct answer from the options given below:

- (A) (A), (C), (D) and (E) only.
- (B) (A) and (B) only.
- (C) (B) and (D) only.
- (D) (A), (B), (C) and (D) only.

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11. Given below are two statements:

Statement (I): The porosity of a soil cannot exceed 100 per cent.

Statement (II): The degree of saturation cannot be zero per cent.

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

- (A) Both Statement (I) and Statement (II) are true.
- (B) Both Statement (I) and Statement (II) are false.
- (C) Statement (I) is true but Statement (II) is false.
- (D) Statement (I) is false but Statement (II) is true.

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12. Which of the following statements are true in case of electric fuse:

- (A) It is generally made of materials having low melting point.
- (B) It is made of materials having high conductivity.
- (C) It has inverse time-current characteristics.
- (D) It is inserted in series with the circuit to be protected.

Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (A), (B) and (D) only.
- (C) (A), (C) and (D) only.
- (D) (A), (B), (C) and (D).

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13. Consider the following statements:

- (A) Absolute pressure is always positive.
- (B) Vacuum can not exceed local atmospheric pressure.
- (C) Gage pressure is the difference between absolute pressure and atmospheric pressure.
- (D) Negative gauge pressure is same as vacuum.

Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (A), (C) and (D) only.
- (D) (A), (B), (C) and (D).

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14. Consider the following statements related to Mohr failure hypothesis:

Statement (I): Shear stress on the failure envelope is the maximum shear stress in the element.

Statement (II): The maximum shear stress acts on a plane inclined at 45° to major principle plane.

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

- (A) Both Statement (I) and Statement (II) are true.
- (B) Both Statement (I) and Statement (II) are false.
- (C) Statement (I) is true but Statement (II) is false.
- (D) Statement (I) is false but Statement (II) is true.

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15. Which of the following Law's are based on gradient:

- (A) Stefan-Boltzmann law
- (B) Fourier's law
- (C) Newton's law of cooling
- (D) Fick's law

Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (A), (C) and (D) only.
- (D) (A), (B) and (D) only.

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16. Match List-I with List-II:

List-I (Process)	List-II (Characteristic)
(A) Adiabatic	(I) No volume change takes place
(B) Isochoric	(II) No pressure change takes place
(C) Isobaric	(III) No temperature change takes place
(D) Isothermal	(IV) No heat transfer takes place

Choose the correct answer from the options given below:

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

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17. A red brick wall of length 5 m, height 4 m and thickness 0.25 m has a temperature on the inner surface of 40 degree C and on the outer surface of 110 degree C. The thermal conductivity of the red brick is $k = 0.70$ W/mK. What will be the temperature at an interior point of the wall, 20 cm from the inner wall?

- (A) 96 degree C
- (B) 74 degree C
- (C) 54 degree C
- (D) 48 degree C

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18. Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R).

Assertion (A): Counter flow heat exchanger is more effective than a parallel flow heat exchanger.

Reason (R): For same temperature limits of hot and cold fluids, the overall heat transfer coefficient of counter flow heat exchanger is more than parallel flow heat exchanger.

In light of the above statements, choose the correct answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

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19. Match List-I with List-II.

List-I (Property)		List-II (Fluid type)	
(A)	Apparent viscosity decreases with increasing deformation rate	(I)	Dilatant fluids
(B)	Shear stress is directly proportional to rate of deformation	(II)	Newtonian fluids
(C)	Behaves as a solid until a minimum yield stress is exceeded and subsequently exhibits a linear relation between stress and rate of deformation	(III)	Pseudoplastic fluids
(D)	Viscosity increases with increasing deformation rate	(IV)	Bingham-plastic fluids
(E)	Shear stress is not directly proportional to deformation rate	(V)	Non-Newtonian fluids

Choose the correct answer from the options given below.

- (A) (A) - (III), (B) - (II), (C) - (IV), (D) - (I), (E) - (V)
- (B) (A) - (II), (B) - (V), (C) - (I), (D) - (III), (E) - (IV)
- (C) (A) - (IV), (B) - (I), (C) - (V), (D) - (II), (E) - (III)
- (D) (A) - (V), (B) - (III), (C) - (IV), (D) - (II), (E) - (I)

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20. Bernoulli's equation is conservation of

- (A) Mass
- (B) Energy
- (C) Momentum
- (D) Angular Momentum

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21. If a body is in equilibrium, we may conclude that

- (A) No force is acting on the body.
- (B) The resultant of all the horizontal forces acting on it is zero.
- (C) The resultant of all the vertical forces acting on it is zero.
- (D) The moments of the forces about any point is zero.

Choose the correct answer from the options given below.

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (A), (C) and (D) only.
- (D) (A), (B) and (D) only.

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22. The centre of gravity of a right circular cone of diameter (d) and height (h) lies at a distance of _____ from the base measured along the vertical radius.

- (A) $h/2$
- (B) $h/3$
- (C) $h/4$
- (D) $h/6$

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23. If the moment of inertia of a body along a perpendicular axis passing through its centre of gravity is 50 kg.m^2 and the mass of the body is 30 kg. What will be the moment of inertia (kg.m^2) of the same body along another axis, which is 50 cm away from the current axis and parallel to it?

- (A) 80.0
- (B) 57.5
- (C) 110.0
- (D) 65.0

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24. The moment of inertia of a triangular section of base (b) and height (h) about an axis passing through its vertex and parallel to the base is _____ times as that passing through its centre of gravity and parallel to the base.

- (A) Twelve
- (B) Nine
- (C) Six
- (D) Four

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25. Which of the following quantities have unit as Newton-metre (N-m)?

- (A) Work
- (B) Energy
- (C) Torque
- (D) Power
- (E) Momentum

Choose the **correct** answer from the options given below:

- (A) (C) only
- (B) (A), (B) and (C) only
- (C) (B) only
- (D) (D) and (E) only

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26. A flywheel starts from rest and revolves with an acceleration of 0.5 rad/sec^2 . What will be its angular displacement after 10 seconds?

- (A) 5 radians
- (B) 25 radians
- (C) 35 radians
- (D) 50 radians

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27. Which of the following constitute kinematic link?

- (A) Piston, piston rod and crosshead
- (B) Connecting rod with big and small end bearings
- (C) Crank, crankshaft and flywheel
- (D) Cylinder, engine frame and main bearings

Choose the **correct** answer from the options given below:

- (A) (A), (B) and (C) only
- (B) (B), (C) and (D) only
- (C) (A), (C) and (D) only
- (D) (A), (B), (C) and (D)

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28. Given below are two statements:

Statement (I): A kinematic link may consist of several parts rigidly fastened together so that they do not move relative to one another.

Statement (II): A kinematic link need not be a rigid body but it must be a resistant body.

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

- (A) Both **Statement (I)** and **Statement (II)** are true.
- (B) Both **Statement (I)** and **Statement (II)** are false.
- (C) **Statement (I)** is true but **Statement (II)** is false.
- (D) **Statement (I)** is false but **Statement (II)** is true.

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29. Kutzbach equation between degrees of freedom (n), number of links (l), number of joints (j) and number of higher pairs (h) of a mechanism having plane motion is given by

- (A) $n = 3(l - 1) - 2j - h$
- (B) $n = 3(l + 3) - 2j - h$
- (C) $n = 3(l - 3) - 2(j - h)$
- (D) $n = 3(l + 1) - j + 2h$

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30. Select the correct sequence of increasing size (thickness) of clay minerals

- (A) Montmorillonite
- (B) Chlorite
- (C) Kaolinite
- (D) Illite

Choose the **correct** answer from the options given below:

- (A) (B), (A), (C), (D)
- (B) (A), (D), (B), (C)
- (C) (C), (B), (A), (D)
- (D) (D), (C), (A), (B)

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31. Given below are two statements, one is labelled as **Assertion (A)** and the other one labelled as **Reason (R)**.

Assertion (A): A good CI engine fuel, like diesel oil, is a bad SI engine fuel, and a good SI engine fuel, like petrol, is a bad CI engine fuel.

Reason (R): A good CI engine fuel requires high self-ignition temperature and good SI engine fuel requires low self-ignition temperature.

In light of the above statements, choose the **correct** answer from the options given below.

- (A) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
- (B) Both **(A)** and **(R)** are true but **(R)** is NOT the correct explanation of **(A)**.
- (C) **(A)** is true but **(R)** is false.
- (D) **(A)** is false but **(R)** is true.

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32. Consider the following statements regarding C.I. engine and S.I. engine

- (A) C.I. engines are more bulky than S.I. engines
- (B) C.I. engines are more efficient than S.I. engines
- (C) Lighter flywheels are required in C.I. engines

Choose the **correct** answer from the options given below:

- (A) (A) and (C) only
- (B) (B) and (C) only
- (C) (A) and (B) only
- (D) (A), (B) and (C)

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33. An engine has a swept volume of 300 cm^3 , clearance volume of 25 cm^3 . Its volumetric efficiency is 0.80 and mechanical efficiency is 0.90. The volume of mixture taken in per stroke is

- (A) 325 cm^3
- (B) 275 cm^3
- (C) 240 cm^3
- (D) 270 cm^3

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34. A two stroke cycle gives _____ the number of power strokes as compared to four stroke cycle engine at the same engine speed.

- (A) Half
- (B) Same
- (C) Double
- (D) Four times

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35. The overall mechanization level in India ranges from

- (A) 20-25 %
- (B) 40-45 %
- (C) 55-60 %
- (D) 75-80 %

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36. Match List-I with List-II.

List-I (Farm Equipment)	List-II (Action)

(A) Turn wrest plough	(I) Moves all the soil towards same side.
(B) Disc plough	(II) Moves the soil in opposite directions.
(C) Disc harrow	(III) Used for shallow ploughing.
(D) Vertical disc plough	(IV) Has an arrangement that the plough bottom can be changed from right hand to left hand by rotating it approximately 180 degree.
(E) Off-set disc harrow	(V) Well suited for working under low hanging branches in orchards.

Choose the correct answer from the options given below:

- (A) (A) - (V), (B) - (IV), (C) - (I), (D) - (II), (E) - (III)
- (B) (A) - (II), (B) - (III), (C) - (V), (D) - (I), (E) - (IV)
- (C) (A) - (I), (B) - (II), (C) - (III), (D) - (IV), (E) - (V)
- (D) (A) - (IV), (B) - (I), (C) - (II), (D) - (III), (E) - (V)

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37. Which seed metering mechanism in a planter brushes out excess seeds from the cells of the feed mechanism?

- (A) Edge drop
- (B) Cut off
- (C) Knock out
- (D) Flat drop

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38. Which of the following is primary function of broadcaster?

- (A) Open the seed furrow to proper depth
- (B) Meter the seed
- (C) Distribute seed over a given width of land

(D) Deposit the seed in the furrow in acceptable pattern

(E) Cover the seed and compact soil around it

Choose the correct answer from the options given below:

(A) (A), (B), (C), (D) and (E).

(B) (A), (B), (D) and (E) only.

(C) (A), (D) and (E) only.

(D) (B) and (C) only.

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39. Match List-I with List-II.

List-I (Field operation)	List-II (Equipment used)
(A) Intercultural operation	(I) Rotavator
(B) Deep ploughing	(II) Cultivator
(C) Soil pulverization	(III) Sub-soiler
(D) Conservation tillage	(IV) Strip-till drill
(E) Soil Inversion	(V) MB plough

Choose the correct answer from the options given below:

(A) (A) - (I), (B) - (V), (C) - (II), (D) - (IV), (E) - (III)

(B) (A) - (IV), (B) - (I), (C) - (V), (D) - (III), (E) - (II)

(C) (A) - (II), (B) - (III), (C) - (I), (D) - (IV), (E) - (V)

(D) (A) - (IV), (B) - (II), (C) - (I), (D) - (V), (E) - (III)

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40. A flat fan nozzle is most suitable for

- (A) Foliage spray
- (B) Insect control
- (C) Spot spray
- (D) Herbicide spray

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41. Given below are two statements:

Statement (I): Drift is more serious problem with dusts compared to sprays.

Statement (II): Drift can be minimized by producing sprays having small volume mean diameter (VMD).

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

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42. Registration and alignment are the cutting knife adjustments related to

- (A) Reaper
- (B) Mower
- (C) Combine harvester
- (D) Reaper binder

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43. Select the most appropriate sequence of involvement of different parts of combine harvester from crop interception to grain collection

- (A) Cutter bar
- (B) Auger
- (C) Straw walker
- (D) Cylinder and concave
- (E) Reel

Choose the correct answer from the options given below:

- (A) (A), (B), (C), (D), (E).
- (B) (E), (A), (B), (D), (C).
- (C) (A), (B), (E), (D), (C).
- (D) (E), (C), (D), (A), (B).

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44. As per BIS, for safe use of threshers

- (A) The minimum length of feeding chute should be 90 cm.
- (B) The feeding chute should be covered up to a minimum length of 45 cm.
- (C) The feeding chute should be inclined to the horizontal at an angle of 5-10 degree.
- (D) The feeding chute should be made of stainless steel.
- (E) The feeding chute should have an alarming system.

Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (B), (D) and (E) only.
- (D) (A), (B) and (E) only.

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45. Maximum torque in a tractor is generated at speed

- (A) At which maximum power is generated
- (B) Lower than the speed at which maximum power is generated
- (C) Higher than the speed at which maximum power is generated.
- (D) At which minimum power is generated.

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46. Match List-I with List-II.

List-I (Harvesting machine)	List-II (Crop)
(A) Digger	(I) Cotton
(B) Reaper	(II) Potato
(C) Picker	(III) Cereal crops
(D) Snapper	(IV) Forage crops
(E) Mower	(V) Maize

Choose the correct answer from the options given below:

- (A) (A) - (IV), (B) - (III), (C) - (V), (D) - (I), (E) - (II)
- (B) (A) - (I), (B) - (III), (C) - (V), (D) - (II), (E) - (IV)
- (C) (A) - (V), (B) - (IV), (C) - (II), (D) - (I), (E) - (III)
- (D) (A) - (II), (B) - (III), (C) - (I), (D) - (V), (E) - (IV)

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47. Which of the following is harvesting machine?

- (A) Cotton picker
- (B) Potato Digger
- (C) Mower
- (D) Tree shaker

Choose the correct answer from the options given below:

- (A) (C) only.
- (B) (A) and (B) only.
- (C) (B), (C) and (D) only.
- (D) (A), (B), (C) and (D).

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48. The acceptable work load for average Indian workers is about

- (A) 35 % of individual's maximum aerobic power (VO_{2max})
- (B) 50 % of individual's maximum aerobic power (VO_{2max})
- (C) 65 % of individual's maximum aerobic power (VO_{2max})
- (D) 80 % of individual's maximum aerobic power (VO_{2max})

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49. Consider the following statements related to biomass conversion techniques.

Statement (I): Thermo-chemical processes have higher efficiencies than bio-chemical processes.

Statement (II): In comparison to bio-chemical conversion techniques, thermo-chemical conversion techniques have superior ability to decompose lignin.

Choose the correct answer from the options given below.

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

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50. Which country is having a full-fledged Ministry for Development of New and Renewable Resources?

- (A) India
- (B) Bangladesh
- (C) Japan
- (D) China

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51. A tractor operated sprayer has 24 nozzles spaced 50 cm apart. Time lost in turning is 8% and filling the tank takes 7% of the time. If the sprayer is operated at a speed of 5 km/h, calculate the coverage area in ha per hour.

- (A) 2.6
- (B) 3.0
- (C) 5.1
- (D) 6.0

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52. The major drawbacks of conventional tillage are categorized as:

- (A) Decrease of soil organic matter
- (B) Decrease of soil moisture
- (C) Short-term potential for soil compaction
- (D) Adversely affect the soil structure

Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (A), (B) and (D) only.
- (D) (A), (B), (C) and (D).

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53. Given below are two statements:

Statement (I): The soil texture is defined as the relative proportion, by weight percentage, of sand, silt and clay in soil.

Statement (II): The aeration in fine textured soil is medium to poor.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

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54. A 2-bottom, 50 cm MB plough is being operated at a speed of 5 km/h. If the time lost in turning is 8 per cent, how many hours will be required to plough 23 ha of land?

- (A) 23
- (B) 46
- (C) 50
- (D) 100

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55. A bullock drawn country plough cuts a trapezoidal furrow having 16 cm top width and 4 cm bottom width. The depth of ploughing is 15 cm. If the plough forms an angle of 45° with the horizontal and the average soil resistance is 0.71 kg/cm^2 , calculate the pull exerted by the bullocks in kgf.

- (A) 107
- (B) 150
- (C) 211
- (D) 300

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56. The tractor develops a torque of 35 kg-m at an engine speed of 1350 RPM. Calculate the BHP of the tractor.

- (A) 45
- (B) 66
- (C) 90
- (D) 77

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57. The volume of tyre filled with water for ballasting purpose is:

- (A) 25%
- (B) 50%
- (C) 75%
- (D) 90%

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58. Which is the most appropriate method to measure soil tilth?

- (A) Chemical analysis
- (B) Aggregate analysis
- (C) Biological analysis
- (D) Observational analysis

• • •

59. Match List-I with List-II

List-I (Link) List-II (Type of load)

- (A) Rock shaft (I) Bending and shear
- (B) Lower link (II) Axial
- (C) Upper link (III) Axial, bending and shear
- (D) Lift arm (IV) Torsion, bending and shear

Choose the correct answer from the options given below:

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

• • •

60. Which of the parameter is affected by the peripheral speed of cylinder in thresher?

- (A) Cleaning of grains
- (B) Threshing efficiency
- (C) Grain separation
- (D) Aspirating efficiency

• • •

61. The undesirable components which need to be removed during refining of crude vegetable oils include:

- (A) Colouring and odouring matters
- (B) Free fatty acids
- (C) Gums
- (D) Waxes

Choose the correct answer from the options given below:

- (A) (A) and (C) only.
- (B) (A), (B), (C) and (D).
- (C) (A) and (D) only.
- (D) (A), (C) and (D) only.

• • •

62. Match List-I with List-II

List-I

- (A) Falling rate period
- (B) Absolute humidity
- (C) Percent humidity
- (D) Constant rate period

List-II

- (I) Ratio of humidity with respect to humidity at saturation point
- (II) Critical moisture content
- (III) Equilibrium moisture content
- (IV) Ratio of kg of water vapour in kg of dry air

Choose the correct answer from the options given below:

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

• • •

63. When one ton of grain with 25% (wb) moisture content is to be dried to 20% (wb), then the amount of water to be evaporated will be?

- (A) 100 kg
- (B) 150 kg
- (C) 75 kg
- (D) 125 kg

• • •

64. Important functions of a septic tank includes:

- (A) Storage of sludge and scum
- (B) Removal of solids from the sewage
- (C) Decomposition of solid sewage under aerobic conditions

(D) Decomposition of solid sewage under anerobic conditions

Choose the correct answer from the options given below:

(A) (A), (B) and (C) only.

(B) (A), (B) and (D) only.

(C) (A), (C) and (D) only.

(D) (B), (C) and (D) only.

• • •

65. In the adiabatic drying process, if there is a decrease in the value of dry bulb temperature, then:

(A) The values of humidity ratio and relative humidity increase, and water vapour pressure decreases.

(B) The values of humidity ratio and relative humidity decrease, and water vapour pressure increases.

(C) The values of humidity ratio, relative humidity and water vapour pressure all increase.

(D) The values of humidity ratio, relative humidity and water vapour pressure all decrease.

• • •

66. Destoner is a form of separator that separates the:

(A) Feed material into two fractions as per the difference in shape factor

(B) Feed material into heavy particles from the lighter particles

(C) Feed material into two fractions only as per the difference in specific gravity

(D) Feed material into multiple fractions as per the difference in specific gravity

Choose the correct answer from the options given below:

- (A) (A) only.
- (B) (B) and (C) only.
- (C) (C) only.
- (D) (B) and (D) only.

• • •

67. When a mass of grain having an angle of internal friction of 30 degrees is stored in a bin, what will be the Rankine's earth pressure coefficient?

- (A) 1
- (B) 0.5
- (C) 0.33
- (D) 0.45

• • •

68. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).

Assertion (A): Parboiled rice develops less rancidity than raw rice during storage.

Reason (R): The process of parboiling destroys some of the natural antioxidants present in rice.

In light of the above statements, choose the correct answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

• • •

69. The COP of a refrigerator working on reverse Carnot cycle (T_2 = higher temperature, T_1 = lower temperature) is given by:

- (A) $\frac{T_2 - T_1}{T_1}$
- (B) $\frac{T_2 - T_1}{T_2}$
- (C) $\frac{T_2}{T_2 - T_1}$
- (D) $\frac{T_1}{T_2 - T_1}$

• • •

70. Which among the following criteria is used for describing shape of an object?

- (A) Roundness
- (B) Sphericity
- (C) Charted standards
- (D) Resemblance of geometric bodies

Choose the correct answer from the options given below:

- (A) (A) and (B) only.
- (B) (A), (B) and (D) only.
- (C) (A), (B) and (C) only.
- (D) (A), (B), (C) and (D).

• • •

71. Given below are two statements, one labelled as Assertion (A) and the other labelled as Reason (R).

Assertion (A): LSU dryer is considered as a continuous flow-mixing type of grain dryer.

Reason (R): In LSU dryer, inverted V-shaped air channels are arranged in such a way that air is forced through the descending grain while moving from feed end to discharge end.

In light of the above statements, choose the correct answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

• • •

72. The uniformity of grind of a powdered sample is indicated by which of the following index?

- (A) Fineness modulus
- (B) Bond's index
- (C) Work index
- (D) Uniformity index

Choose the correct answer from the options given below:

- (A) (A) only.
- (B) (D) only.
- (C) (B) and (D) only.
- (D) (A) and (C) only.

• • •

73. Which of the following statement(s) holds correct for a screw press?

- (A) Compression ratio is the ratio of the volume displaced per revolution at feed end to that at discharge end.

(B) Volume displaced at feed end is considerably less than at discharge end.

(C) Volume displaced at feed end is considerably greater than at discharge end.

(D) Volume displaced at feed end is equal to that at discharge end.

Choose the correct answer from the options given below:

(A) (A) and (B) only

(B) (A) and (C) only

(C) (D) only

(D) (A) and (D) only

• • •

74. The effective tension of a belt conveyor -

(A) Reduces with decrease in belt speed

(B) Increases with increase in belt speed

(C) Doesn't depend on belt speed

(D) Reduces with increase in belt speed

• • •

75. Cyclone separator design is based on -

(A) High tangential velocity

(B) Low radial velocity

(C) Low tangential velocity

(D) High radial velocity

Choose the correct answer from the options given below:

- (A) (A) and (C) only
- (B) (A) and (B) only
- (C) (A) and (D) only
- (D) (C) and (D) only

• • •

76. Which among the following is a bag storage structure?

- (A) Bhukari
- (B) PUSA bin
- (C) Silo
- (D) CAP

• • •

77. Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R).

Assertion (A): Thermal conductivity of a single grain is always greater than that of bulk grain.

Reason (R): Thermal conductivity of air is comparatively less than that of food grain.

In light of the above statements, choose the correct answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

• • •

78. What is the amount of heat to be removed from 2 tons of apples when cooled from 25°C to 5°C? Specific heat of apple is 0.1 kcal/kg°C.

- (A) 4000 kcal
- (B) 1000 kcal
- (C) 2000 kcal
- (D) 40,000 kcal

• • •

79. Frictional force of granular material is -

- (A) Proportional to normal load
- (B) Independent of the area of the sliding surface
- (C) Proportional to actual area of contact
- (D) Dependent on nature of material in contact

Choose the correct answer from the options given below:

- (A) (A) and (C) only
- (B) (A), (B), (C) and (D)
- (C) (A), (B) and (D) only
- (D) (C) and (D) only

• • •

80. Which of the following is related to international trade and promotion?

- (A) AGMARK
- (B) APEDA
- (C) PFA
- (D) FSSAI

• • •

81. Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R).

Assertion (A): Falling film evaporators are most suitable for food that become thicker with concentration.

Reason (R): In falling film evaporator, food film moves downward under gravity instead of buoyancy force.

In light of the above statements, choose the correct answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

• • •

82. Match List-I with List-II.

List-I	List-II
(A) Deep bin	(I) Pulse milling
(B) Shallow bin	(II) Janssen
(C) Break roll	(III) Rankine
(D) CFTRI method	(IV) Wheat milling

Choose the correct answer from the options given below:

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

• • •

83. Agricultural waste from which activated carbon can be manufactured include(s)

- (A) Rice husk
- (B) Groundnut shell
- (C) Oil cake
- (D) Mango stone

Choose the correct answer from the options given below:

- (A) (A) and (B) only.
- (B) (A), (B), (C) and (D).
- (C) (C) and (D) only.
- (D) (A), (B) and (D) only.

• • •

84. Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R).

Assertion (A): In a rubber roll sheller, paddy is sheared and compressed between two rollers so that its husk is stripped off.

Reason (R): Rollers in a rubber roll sheller rotate in same direction at different speed to increase contact of one roll longer than the other roll.

In light of the above statements, choose the correct answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

• • •

85. Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R).

Assertion (A): Process of blanching minimises discolouration of food during dehydration.

Reason (R): Blanching cleans raw material and reduces surface bacterial load of the produce.

In light of the above statements, choose the correct answer from the options given below.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (C) (A) is true but (R) is false.
- (D) (A) is false but (R) is true.

• • •

86. The diameter of largest inscribing circle of an object is observed to be 20 mm. What would be the sphericity of the object if diameter of smallest circumscribing circle is 30 mm?

- (A) 0.6
- (B) 1.5
- (C) 1
- (D) 0.5

• • •

87. It is found that the energy required to reduce particle from a mean diameter of 10 mm to 5 mm is 1 kJ/kg. Using Rittinger's law, what is the energy requirement to reduce the same from a diameter of 1 mm to 0.5 mm?

- (A) 5 kJ/kg
- (B) 100 kJ/kg
- (C) 10 kJ/kg
- (D) 1 kJ/kg

• • •

88. Loose housing barn is one in which

- (A) Milking parlour is separately constructed
- (B) Animals move about freely in a covered or partially covered yard
- (C) Animals are housed and milked in same building
- (D) Permits changes in herd size without any difficulty

Choose the correct answer from the options given below:

- (A) (A), (B), (C) and (D).
- (B) (B), (C) and (D) only.
- (C) (A) and (B) only.
- (D) (A), (B) and (D) only.

• • •

89. Process of freezing food below eutectic temperature and converting solid ice crystals directly into vapour form is known as

- (A) Individual quick freezing (IQF)
- (B) Freeze drying
- (C) Freezing
- (D) Freeze encapsulation

• • •

90. Pyrolysis of biomass at a relatively low temperature produces

- (A) Mixture of combustible gases having low calorific value
- (B) Combustible gas and carbon char
- (C) Carbonaceous char
- (D) Liquid fuel of very high calorific value

• • •

91. Given below are two statements:

Statement (I): Soil and water conservation consists of prevention and control of soil erosion caused due to water. It also includes conserving rain water and soil moisture for the purpose of crop production.

Statement (II): Soil erosion severely affects hilly areas because of steep slopes.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

• • •

92. The major activities of the command area development are:

- (A) Modernisation and efficient operation of irrigation systems as well as development of main drainage systems.
- (B) Construction of field channels.
- (C) Land shaping and levelling job are not required.
- (D) Construction of field drains.

Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (A), (B) and (D) only.
- (D) (A), (C) and (D) only.

• • •

93. Given below are two statements:

Statement (I): In the case of moderate rain at non uniform intensities, Φ -index will be somewhat higher than the W-index.

Statement (II): These indices vary with initial soil moisture, changes in the depression storage and interception capacity of the area and amount of precipitation.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

• • •

94. Consider the following statements about H-flumes used for runoff measurement:

- (A) H-flumes are well suited for runoff measurement as they have a high capacity and are accurate at different rates of flow.
- (B) They are also well suited where sediment sampling of the runoff is done using automatic silt samplers.
- (C) The H-flume is useful for flows ranging from 0.009 to 0.85 cumec.
- (D) For smaller and greater flows the dimensions of the H-flume are modified and are known as HS flumes for smaller flows and HL flumes for larger flows.
- (E) H-flumes need not require calibration and the rating tables are to be used for measuring discharges.

Choose the correct answer from the options given below:

- (A) (A), (B), (C) and (D) only.
- (B) (B), (C), (D) and (E) only.
- (C) (A), (B), (D) and (E) only
- (D) (A), (C), (D) and (E) only.

• • •

95. Match List-I with List-II

List-I	List-II
--------	---------

(A) Venturimeter	(I) end of pipe
(B) Pitot tube	(II) inverted U-tube
(C) Orifice	(III) flow coefficient 0.63 to 0.83
(D) Elbow meter	(IV) discharge measurement

Choose the correct answer from the options given below:

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

• • •

96. Which instrument does not measure cumulative flow?

- (A) Propeller meter
- (B) Deathridge meter
- (C) Water meter
- (D) Venturimeter

• • •

97. Given below are two statements:

Statement (I): The gravitational potential is independent on the relative elevation and is dependent on chemical and pressure conditions of soil water.

Statement (II): Osmotic potential can be defined as the amount of work that a unit quantity of water in an equilibrium soil water system is capable of doing when it moves to another equilibrium system identical in all respects except that there are no solutes.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

• • •

98. Which parameter is not a soil moisture constant?

- (A) Saturation capacity
- (B) Field capacity
- (C) Permanent wilting percentage
- (D) Evapo-transpiration

• • •

99. Which statements are incorrect?

- (A) In the field, soil moisture content determined by the gravimetric method is used as the reference in calibrating the other soil moisture instruments.
 - (B) Resistance blocks are useful for saline soils, since the resistance reading is not affected by salt concentration.
 - (C) The principle of the neutron probe moisture meter is based on the measurement of the number of carbon nuclei that are present in a unit volume of soil.
 - (D) Tensiometer satisfactorily measures the entire range of available moisture in all soil types.
 - (E) In sprinkler irrigation the soil moisture measuring stations should be between the sprinkler heads and 3 to 4 m away from the lateral.
- Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (C), (D) and (E) only.
- (D) (A), (B) and (E) only.

• • •

100. Given below are five statements:

- (A) The process of evaporation of water in nature is one of the fundamental components of the hydrological cycle.
- (B) Transpiration is the process by which water vapour leaves the atmosphere and enters the plant body.
- (C) Potential evapo-transpiration is the evapo-transpiration from a large vegetation covered land surface with adequate moisture at all times.
- (D) The soil and crop conditions in the lysimeters should be close to the natural conditions.
- (E) Soil moisture depletion method is usually employed to determine the consumptive use of unirrigated field crops.

Choose the correct answer from the options given below:

- (A) (A), (C) and (D) only.
- (B) (A), (B) and (C) only.
- (C) (C), (D) and (E) only.
- (D) (A), (D) and (E) only.

• • •

101. Match List-I with List-II

List-I

- (A) Hygroscopic water
- (B) Capillary water

List-II

- (I) Number of hydrogen nuclei
- (II) Mean monthly temperature

List-I**List-II**

- (C) Neutron moisture meter (III) Adsorption forces
(D) Blaney-Criddle (IV) Surface tension

Choose the correct answer from the options given below:

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

• • •

102. Given below are five statements about soil pH:

- (A) Majority of red soils are loams with pH values ranging between 5.0 to 8.0.
(B) Laterite soils, which are generally acidic, have an average pH range between 6.0 to 7.0.
(C) Red and yellow soils have a pH around neutrality or else slightly on the acidic side.
(D) Desert soils have a fairly high pH and varying amounts of calcium carbonate.
(E) Alkali soils have a high pH which may range between 7.0 and 8.0.

Choose the correct answer from the options given below:

- (A) (A), (C) and (D) only.
(B) (A), (B) and (C) only.
(C) (C), (D) and (E) only.
(D) (B), (C) and (D) only.

• • •

103. Given below are two statements:

Statement (I): Penman proposed an equation for evaporation from an open water surface based on a combination of energy balance and sink strength.

Statement (II): For converting PET into ET, suitable crop coefficients should be evolved for different crops, soils and climatic conditions and also for different stages of growth for the same crop.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

• • •

104. Given below are two statements:

Statement (I): In small catchments the overland flow phase is predominant over the channel flow. Hence the land use and the intensity of rainfall have an important role on the peak flood.

Statement (II): On large catchments the effects of land use and intensity of rainfall are suppressed as the channel flow phase is more predominant.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

• • •

105. The limitations to the use of unit hydrographs are:

- (A) Snow melt runoff cannot be satisfactorily represented by unit hydrograph.
- (B) The catchment should not have unusually large storages in terms of tanks, ponds, large flood bank storages, etc. which affect the linear relationship between storage and discharge.
- (C) If the precipitation is decidedly uniform, unit hydrographs can not be expected to give good results.
- (D) The rainfall intensity is assumed constant for the duration of the rainfall excess.
- (E) The duration of rainfall should be $1/6$ to $1/2$ of the basin lag.

Choose the *correct* answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (C), (D) and (E) only.
- (D) (A), (B) and (D) only.

• • •

106. A 12-h unit hydrograph of a catchment is triangular in shape with a base width of 144h and a peak discharge of 23 cumec. This unit hydrograph refers to a catchment area of

- (A) 786 km²
- (B) 596 km²
- (C) 900 km²
- (D) 1200 km²

• • •

- 107.** (A) Floods are exceedingly complex natural events. They are resultant of a number of component parameters and are therefore very difficult to model them analytically.
- (B) In the regions having same climatological characteristics, if the available flood data are quite insufficient, the enveloping curve technique can be used to develop a relationship between the minimum flood flow and drainage area.
- (C) For design purposes, extreme rainfall situations are used to obtain the design storm.
- (D) The rational formula is found to be suitable for a peak flow prediction in small catchments upto 75 km^2 in an area.
- (E) The rational formula assumes a homogeneous catchment surface.

Choose the *correct* answer from the options given below:

- (A) (A), (C) and (E) only.
- (B) (A), (B) and (C) only.
- (C) (B), (C) and (D) only.
- (D) (C), (D) and (E) only.

• • •

108. Given below are two statements:

Statement (I): Chute spillways carry the flow down the steep slopes through a lined channel rather than by dropping the water in a free overfall.

Statement (II): On steep slopes, chutes are more economical than series of drop structures to take the flow down the slope.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

• • •

- 109.** (A) The plan inspection method of land levelling design is adapted for moderate to flat land slopes.
- (B) The profile method of land levelling design consists of plotting the profiles of the grid lines and then laying the desired grade on the profiles.
- (C) The contour adjustment method of land levelling design consists of a trial and error adjustment of the contour lines on a plan map.
- (D) The contour adjustment method is especially adapted to the smoothening of flat lands that are to be irrigated.
- (E) The plane method is rarely used for land levelling design.

Choose the *correct* answer from the options given below:

- (A) (C), (D) and (E) only.
- (B) (B), (C) and (D) only.
- (C) (A), (B) and (C) only.
- (D) (A), (B) and (E) only.

• • •

110. Given below are two statements:

Statement (I): Water storage efficiency becomes important when water supplies are limited or when excessive time is required to secure adequate penetration of water into the soil.

Statement (II): Water application efficiency decreases as the amount of water applied during each irrigation increases.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

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111. Given below are two statements:

Statement (I): Isotropic and homogeneous aquifers seldom occur in nature.

Statement (II): Water level measurements during pumping test are made in observation wells installed close to the well or at some distance away from it.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.

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112. (A) In levelling, datum surface is an arbitrary surface with reference to which the elevations of the points are measured and compared.

(B) The line of collimation or the line of sight is the line joining the intersection of the cross-hairs to the optical centre of the object glass and its continuation.

(C) A foresight is the first staff reading taken after setting up the instrument in any position.

(D) The height of instrument is the elevation of the plane of collimation when the instrument is levelled.

(E) A change point indicates the shifting of the instrument, both back sight and intermediate sight are taken on this change point.

Choose the *correct* answer from the options given below:

- (A) (A), (B) and (D) only.
- (B) (A), (B) and (C) only.
- (C) (C), (D) and (E) only.
- (D) (B), (C) and (D) only.

• • •

113. Match List-I with List-II.

List-I

List-II

- | | |
|-----------------------------|------------------------------------|
| (A) Close contour lines | (I) Foot hill |
| (B) Wider contour lines | (II) Higher contour values outside |
| (C) Depression | (III) At right angles |
| (D) Crossing of ridge lines | (IV) Top of hill |

Choose the correct answer from the options given below:

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

• • •

114. Which points should be kept in mind while selecting the stations?

- (A) The survey lines should be as few as possible.
- (B) If possible, a base line should be run roughly through the middle of the area on which the framework of triangles covering the major portions of area may be built up.
- (C) Offsets should be long particularly for locating the important features.
- (D) All the triangles should be well conditioned.
- (E) The main principle of surveying is to work from the part to the whole.

Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (A), (B) and (D) only.
- (D) (C), (D) and (E) only.

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115. The design of bench terraces consists in determining the

- (A) type of bench terraces
- (B) terrace spacing
- (C) terrace cross section
- (D) terrace length
- (E) terrace alignment

Choose the correct answer from the options given below:

- (A) (A), (B) and (C) only.
- (B) (B), (C) and (D) only.
- (C) (C), (D) and (E) only.
- (D) (A), (B) and (E) only.

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116. Which land capability classes are suitable for pastures?

- (A) class I and class II
- (B) class II and class III
- (C) class III and class IV
- (D) class V and class VI

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117. Orchard benched terraces has a width of about

- (A) 2m
- (B) 3m
- (C) 0.5m
- (D) 1m

• • •

118. A quantity of 100ml gypsum solution having 36 meq/l concentration as calcium, on reacting with 5gm of an alkali soil showed 32 meq/l of Ca+Mg concentration in the filtrate. Estimate the gypsum requirement in meq/100gm of soil.

- (A) 6
- (B) 8
- (C) 12
- (D) 16

• • •

119. Convert 1300 ppm sodium chloride salt concentration into meq/l

- (A) 22.22
- (B) 20.22
- (C) 18.75
- (D) 23.25

• • •

120. Given below are two statements:

Statement (I): The axis of the bubble tube should be perpendicular to the vertical axis in dumpy level.

Statement (II): The line of collimation of the telescope of the dumpy level should be perpendicular to the axis of the bubble tube.

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

- (A) Both Statement (I) and Statement (II) are correct.
- (B) Both Statement (I) and Statement (II) are incorrect.
- (C) Statement (I) is correct but Statement (II) is incorrect.
- (D) Statement (I) is incorrect but Statement (II) is correct.