महाराष्ट्र कृषि सेवा (मुख्य) परीक्षा - 2016
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A

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प्रश्नपुस्तिका क्रमांक
BOOKLET NO.

प्रश्नपुस्तिका-III
पेपर क्र.-2
कृषि अभियांत्रिकी

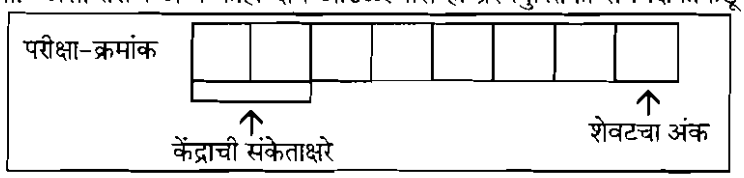
वेळ : 2 (दोन) तास

एकूण प्रश्न : 200
एकूण गुण : 400

सूचना

(1) सदर प्रश्नपुस्तिकेत 200 अनिवार्य प्रश्न आहेत. उमेदवारांनी प्रश्नांची उत्तरे लिहिण्यास सुरुवात करण्यापूर्वी या प्रश्नपुस्तिकेत सर्व प्रश्न आहेत किंवा नाहीत याची खात्री करून घ्यावी. असा तसेच अन्य काही दोष आढळल्यास ही प्रश्नपुस्तिका समवेक्षकांकडून लगेच बदलून घ्यावी.

(2) आपला परीक्षा-क्रमांक ह्या चौकोनांत **न विसरता बॉलपेनने** लिहावा.



(3) वर छापलेला प्रश्नपुस्तिका क्रमांक तुमच्या उत्तरपत्रिकेवर विशिष्ट जागी उत्तरपत्रिकेवरील सूचनेप्रमाणे **न विसरता नमूद करावा.**

(4) या प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाला 4 पर्यायी उत्तरे सुचविली असून त्यांना 1, 2, 3 आणि 4 असे क्रमांक दिलेले आहेत. त्या चार उत्तरांपैकी सर्वात योग्य उत्तराचा क्रमांक उत्तरपत्रिकेवरील सूचनेप्रमाणे तुमच्या उत्तरपत्रिकेवर नमूद करावा. अशा प्रकारे उत्तरपत्रिकेवर उत्तरक्रमांक नमूद करताना तो संबंधित प्रश्नक्रमांकासमोर छायांकित करून दर्शविला जाईल याची काळजी घ्यावी. **ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.**

(5) सर्व प्रश्नांना समान गुण आहेत. यास्तव सर्व प्रश्नांची उत्तरे द्यावीत. घाईमुळे चुका होणार नाहीत याची दक्षता घेऊनच शक्य तितक्या वेगाने प्रश्न सोडवावेत. क्रमाने प्रश्न सोडविणे श्रेयस्कर आहे पण **एखादा प्रश्न कठीण वाटल्यास त्यावर वेळ न घालविता पुढील प्रश्नाकडे वळावे.** अशा प्रकारे शेवटच्या प्रश्नापर्यंत पोहोचल्यानंतर वेळ शिल्लक राहिल्यास कठीण म्हणून वगळलेल्या प्रश्नांकडे परतणे सोईस्कर ठरेल.

(6) उत्तरपत्रिकेत एकदा नमूद केलेले उत्तर खोडता येणार नाही. नमूद केलेले उत्तर खोडून नव्याने उत्तर दिल्यास ते तपासले जाणार नाही.

(7) **प्रस्तुत परीक्षेच्या उत्तरपत्रिकांचे मूल्यांकन करताना उमेदवाराच्या उत्तरपत्रिकेतील योग्य उत्तरांनाच गुण दिले जातील. तसेच ''उमेदवाराने वस्तुनिष्ठ बहुपर्यायी स्वरूपाच्या प्रश्नांची दिलेल्या चार पर्यायांपैकी सर्वात योग्य उत्तरेच उत्तरपत्रिकेत नमूद करावीत. अन्यथा त्यांच्या उत्तरपत्रिकेत सोडविलेल्या प्रत्येक चार चुकीच्या उत्तरांसाठी एका प्रश्नाचे गुण वजा करण्यात येतील''.**

ताकीद

ह्या प्रश्नपत्रिकेसाठी आयोगाने विहित केलेल्री वेळ संपेपर्यंत ही प्रश्नपुस्तिका आयोगाची मालमत्ता असून ती परीक्षाकक्षात उमेदवारालत्र परीक्षेसाठी वापरण्यास देण्यात येत आहे. ही वेळ संपेपर्यंत सदर प्रश्नपुस्तिकेची प्रत/प्रती, किंवा सदर प्रश्नपुस्तिकेतील काही आशय कोणत्याही स्वरूपात प्रत्यक्ष वा अप्रत्यक्षपणे कोणत्याही व्यक्तीस पुरविणे, तसेच प्रसिद्ध करणे हा गुन्हा असून अशी कृती करणाऱ्या व्यक्तीवर शासनाने जारी केलेल्या ''परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचा अधिनियम-82'' यातील तरतुदीनुसार तसेच प्रचलित कायद्याच्या तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एक वर्षाच्या कारावासाच्या आणि/किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.
तसेच ह्या प्रश्नपत्रिकेसाठी विहित केलेल्री वेळ संपण्याआधी ही प्रश्नपुस्तिका अनधिकृतपणे बाळगणे हा सुद्धा गुन्हा असून तसे करणारी व्यक्ती आयोगाच्या कर्मचारीवृंदापैकी, तसेच परीक्षेच्या पर्यवेक्षकीयवृंदापैकी असल्री तरीही अशा व्यक्तीविरूद्ध उक्त अधिनियमानुसार कारवाई करण्यात येईल व दोषी व्यक्ती शिक्षेस पात्र होईल.

पुढील सूचना प्रश्नपुस्तिकेच्या अंतिम पृष्ठावर पहा

पर्यवेक्षकांच्या सूचनेविना हे सील उघडू नये

SEAL

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK

1. Soil Tillage consists of :
   (1) Breaking of Compact Earth Surface
   (2) Loosening the Soil
   (3) Only (1)
   (4) Both (1) and (2)

2. A common type of duster is used :
   (1) Plunger type (2) Knapsack type
   (3) Rotary type (4) All of the above

3. Swirl plate is a part of :
   (1) Flat fan nozzle (2) Cone nozzle
   (3) Spinning disc nozzle (4) None of these

4. In carburator type petrol engines, the fuel is ignited by :
   (1) high Compression (2) electric Spark
   (3) petrol Flame (4) all the above

5. Inertial forces perpendicular to the _____ cause the engine to shake.
   (1) camshaft (2) crankshaft (3) connecting rod (4) cylinder head

6. In disc harrow, the spacing between discs is maintained by :
   (1) Lever (2) Spool (3) Gang angle (4) Gang axle

7. In constant mesh type transmission system, the gears used are usually :
   (1) Helical type (2) Worm Gear
   (3) Bevel Gear (4) Straight edge type

8. It is the machine to cut the crops and ties them into neat and uniform sheaves :
   (1) Reaper binder (2) Reaper
   (3) Mower (4) None of these

9. In rotary dusters, the handle should be cranked for efficient performance at :
   (1) 30 to 35 rpm (2) 50 to 60 rpm (3) 40 to 50 rpm (4) 5 to 10 rpm

10. Device used to control engine speed within a specified limit, is called :
(1) choke (2) governor (3) turbocharge (4) carburator

11. As per ASAE standard, the speed of PTO when operating under load is :
(1) 540 ± 10 rpm (2) 1040 ± 10 rpm
(3) 1500 ± 10 rpm (4) 1100 ± 10 rpm

12. In cultivator with rigid tyres, the working depth is controlled by :
(1) guard rails (2) pegs (3) gauge wheel (4) spikes

13. Under tractor testing in the test of main power take off at varying load condition, the observations are taken corresponding to :
(1) 85% of the Torque (2) Maximum Power
(3) Maximum Torque (4) Both (1) and (2)

14. The ply rating of tyres, used in tractor is as :
(1) 4, 6 or 8 (2) 6, 8 or 12 (3) 2, 4 or 6 (4) 8, 10 or 12

15. A hand hoe can be attached with :
(1) Blade (2) Tyre (3) Disc (4) All of the above

16. The mechanism of a seed drill or fertilizer distributor which deliver seeds or fertilizers from the hopper at selected rates is called ?
(1) Metering mechanism (2) Boot
(3) Furrow opener (4) None of these

17. Sticky belt method is associated with _____ :
(1) testing of seed uniformity
(2) seed drill performance
(3) power consumption of seed drill
(4) seed calibration

18. The two possible firing orders of 4 - stroke, 4 - cylinder engines are :
(a) 1 - 2 - 4 - 3 (b) 1 - 2 - 3 - 4 (c) 1 - 3 - 4 - 2 (d) 4 - 3 - 2 - 1
Which of the above is/are **correct** ?
(1) (a) and (b) (2) (b) and (d) (3) (b) and (c) (4) (a) and (c)

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK

19. _____ is defined as the ratio of the tractor drawbar pull to the dynamic load on the traction device.
(1) Tractor power efficiency (2) Traction
(3) Traction efficiency (4) Coefficient of traction

20. In Diesel cycle the heat is taken in at constant :
(1) Pressure (2) Volume
(3) Temperature (4) None of the above

21. The tilt angle of the disk plow is the disk tilted backward at an angle of :
(1) 42 to 45° (2) 60 to 90° (3) 15 to 25° (4) 125 to 165°

22. There are two main parts for shelling the groundnut :
(1) two rollers having less clearance
(2) crushing plates and grate
(3) a set of rollers with varying clearance
(4) a rotary blades and plate

23. The consumption of electricity in agriculture was about _____ of the generated electric power in 1993 - 94 in India.
(1) 40 per cent (2) 30 per cent (3) 50 per cent (4) 35 per cent

24. In computation of depreciation of machine value, the salvage value, is taken as :
(1) 10% of operating cost (2) 10% of capital invested
(3) 15% of useful life of machine (4) 5% of operating cost

25. Fluted Feed type mechanism of seed drill consists of :
(1) fluted wheel (2) feed roller
(3) feed cut-off and adjustable gate (4) all above

26. The main purpose of puddling is to :
(1) reduce seepage (2) reduce leaching of water
(3) kill the weeds (4) both (2) and (3)

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK

27. A groundnut digger shaker consists of :
(1) Digging blade (2) Spike tooth conveyer
(3) Both (1) and (2) (4) None of these

28. The change of state of gas with respect to pressure and volume when temperature remains constant is called as :
(1) isothermal change (2) isobaric change
(3) adiabatic change (4) none of the above

29. When the wrist pin on the crank wheel pulls or pushes the pitman and knife to the extreme end of the in and out strokes of the knife, the center of knife section should be at the center of the guards for a pitman mower, means :
(1) Calibration (2) Registration (3) Perfection (4) Sofastication

30. Fuel Injection Pump is essential in :
(1) diesel engines (2) petrol engines
(3) (1) and (2) (4) None of the above

31. The main function of sprayer is to :
(1) break the liquid into droplets of effective size
(2) distribute them uniformly over the plants
(3) regulate the amount of liquid to avoid excessive application
(4) all of the above

32. In power tillers the pressure of tyres varies from :
(1) 2 to 2.5 kg/cm^2 (2) 1.1 to 1.4 kg/cm^2
(3) 2.5 to 3.0 kg/cm^2 (4) 4 to 5.5 kg/cm^2

33. In two stroke engines, the Top Dead Centre (TDC) is the position, when piston is at the :
(1) top of its stroke (2) bottom of its stroke
(3) middle of its stroke (4) idle condition

34. Weight transfer in the agricultural tractor is given by :
(1) $\frac{\text{Pull} \times \text{wheel base}}{\text{hitch height}}$ (2) $\frac{\text{Pull} \times \text{hitch height}}{\text{wheel track}}$
(3) $\frac{\text{Pull} \times \text{hitch height}}{\text{wheel base}}$ (4) $\frac{\text{Pull} \times \text{wheel track}}{\text{wheel base}}$

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK

35. The horizontal component of pull, perpendicular to the direction of motion is called :

(1) Lateral thrust (2) Side draft

(3) Line of force (4) Centre of resistance

36. Improved type of manually operated fruit harvester is :

(1) Bamboo cone type (2) Hold and twist type

(3) Pull and cut type (4) All of the above

37. Minimum soil manipulation, essential for tillage requirements of crop production is called _____.

(1) zero tillage (2) minimum tillage

(3) conservation tillage (4) secondary tillage

38. A semi - automatic potato planter consists of :

(1) hopper (2) metering disc (3) furrow opener (4) all of the above

39. In differential unit of tractor, the bevel pinion, drives the :

(1) Camshaft (2) Crankshaft (3) Crown gear (4) Flywheel

40. The operation of an electro-dynamic sprayer is based on the droplets emerging from the delivery gun with :

(1) an atomizer (2) better penetration

(3) extremely fine spray (4) an electric charge

41. During winter season when atmosphere is cool, moisture pick up by stored grains will be accumulated at _____ of the bin.

(1) top (2) bottom

(3) both location (4) none of these

42. In the centrifugal cream separator the cream is collected :

(1) towards centre (2) towards periphery

(3) both at centre and periphery (4) none of the above

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK

43. _____ requires relatively higher power and is more susceptible to wear than other types of conveyor.

(1) Belt conveyor (2) Screw conveyor

(3) Bucket elevator (4) Pneumatic conveyor

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44. During sensible heating or cooling of air _____ remains constant.

(1) humidity ratio (2) wet bulb temperature

(3) enthalpy (4) relative humidity

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45. _____ sorters are fast, accurate and cause little damage to the fruit.

(1) Weight (2) Roller (3) Diverging belt (4) All of the above

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46. _____ is the best type of separator to separate mustard seeds from wheat.

(1) Indented cylinder separator (2) Specific gravity separator

(3) Centrifugal separator (4) Spiral separator

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47. The relationship between thermal diffusivity (α), thermal conductivity (K), density(ρ) and specific heat (C_P) of a material is given by :

(1) $\alpha = \frac{K}{\rho \cdot C_P}$ (2) $\alpha = \frac{\rho}{K \cdot C_P}$ (3) $\alpha = \frac{K \cdot C_P}{\rho}$ (4) $\alpha = \frac{K \cdot \rho}{C_P}$

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48. _____ deflects the flow of milk back into float tank when the temperature of milk at the end of holder tube of HTST Pasteurizer is below the predetermined point.

(1) Poppet valve (2) Expansion valve

(3) Flow diversion valve (4) Flow control value

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49. $\left[\frac{M - Me}{Mo - Me}\right]$ is known as _____.

(1) Critical moisture content (2) Moisture ratio

(3) Total heat (4) Specific heat

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50. _____ spheroid is formed when an ellipse rotates about its major axis.

(1) Prolate (2) Oblate (3) Round (4) Conic

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK

51. _____ is used as a general purpose wrapping paper with good mechanical strength.
(1) Kraft paper (2) Grease paper
(3) Tissue paper (4) Sulphite paper

52. The process of dehydration in which moisture is removed by sublimation is known as :
(1) Foam mat drying (2) Spray drying
(3) Freeze drying (4) Pneumatic drying

53. Which of the following grain dryer is not a continuous flow non-mixing type ?
(1) LSU dryer (2) Recirculatory batch dryer
(3) Baffle dryer (4) All of the these

54. _____ separates the material on the basis of length of material.
(1) spiral separater (2) disk separater
(3) velvesse belt separater (4) specific gravity separater

55. _____ indicates the uniformity of grind in resultant product and is defined as the sum of the weight fractions retained above each sieve divided by 100.
(1) Dryness fraction (2) Screen effectiveness
(3) Fineness modulus (4) Mixing index

56. Centrifugal discharge type _____ is used extensively for handling small grains in elevators and processing plants.
(1) Belt Conveyor (2) Chain Conveyer
(3) Screw Conveyor (4) Bucket Elevator

57. $1 - RH = e^{-CTMen}$ is the _____ where,
RH = Relative humidity, decimal;
T = Absolute temperature, K;
Me = EMC, per cent (db);
C and n = constants;
(1) BET equation (2) Gibb's equation
(3) Henderson's equation (4) Baker and Arkema equation

58. If ρ_b and ρ_t are the bulk density and true density of the grain respectively then void fraction or packing factor in a grain bed can be expressed as :

(1) $1 - \frac{\rho_b}{\rho_t}$ (2) $\frac{\rho_b}{\rho_t}$ (3) $\frac{\rho_b}{\rho_t} - 1$ (4) $1 - \frac{\rho_t}{\rho_b}$

59. The moisture content of solid in equilibrium with the surrounding conditions is :

(1) Equilibrium moisture content (2) Moisture content wet basis
(3) Moisture content dry basis (4) None of the above

60. The Duhring plot is used to find _____.

(1) Effectiveness of evaporation
(2) Pasteurization effect
(3) Pressure difference in evaporator
(4) The boiling point elevation

61. The condition for water at which all three states exist together is called :

(1) boiling point (2) freezing point
(3) single point (4) triple point

62. Tylor series sieves used for grading of food grains should have consecutive sieves having screen opening sizes D_1 and D_2 such that :

(1) $\frac{D_1}{D_2} = 2$ (2) $\frac{D_1}{D_2} = \sqrt{2}$ (3) $\frac{D_1}{D_2} = \sqrt[3]{2}$ (4) $\frac{D_1}{D_2} = \sqrt[4]{2}$

63. Which of the following model can be used to explain rheological behaviour of biological materials ?

(1) Ficks model (2) Kelvin model (3) Planks model (4) Bonds model

64. In order to freeze an ice-cream mix its thermodynamic temperature is :

(1) higher than the freezing point of water
(2) lower than the freezing point of water
(3) equal to the freezing point of water
(4) dependent upon water content of ice-cream mix

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK

65. In Attrition mill, the material is reduced by _____.

(1) impact (2) crushing

(3) shear (4) crushing and shear

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66. When the value of n < 1 for shear. Stress-shear rate curve of fluid, the fluid is called as :

(1) Newtonian fluid (2) Pseudoplastic fluid

(3) Dilatant fluid (4) None of above

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67. _____ is a point on Force-deformation curve which shows failure in microstructure of the material.

(1) Rupture point (2) Bioyield point

(3) Creep (4) Stifness

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68. For size reduction Rittinger's Law always gives _____ value for energy requirement than Kick's Law.

(1) higher (2) lower (3) same (4) none of these

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69. The velocity at which net gravitational accelerating force equals the resisting upward drag force is called as :

(1) Critical velocity (2) Centrifuging velocity

(3) Terminal velocity (4) None of above

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70. Angle between base and slope of the cone formed on free verticle fall of the grain mass to the horizontal plane is :

(1) Triangle (2) Angle of Repose

(3) Tangent (4) Quadrangle

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71. St. Venant body represents _____.

(1) ideal plastic behaviour (2) ideal elastic behaviour

(3) ideal viscous behaviour (4) initial elastic and then plastic behaviour

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72. Homogenization causes the marked changes in milk as :

(1) reduction in curd tension (2) increase in viscosity

(3) improvement in richness of milk (4) all of these

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73. The semi impirical model for equilibrium moisture content

$(1 - Rh) = e \times p(-CT_{ob}M_e^n)$ has been developed by _____.

(1) Smith (2) Nelson
(3) Chung and Pfost (4) Henderson

74. Specific gravity seed separater is used for grading of seeds on the basis of :

(1) different size and different specific gravity
(2) same size and different specific gravity
(3) different size and same specific gravity
(4) same size and same specific gravity

75. The final weight of 2000 kg of Paddy at 25% Moisture content (db) dried to 14% moisture content (db) :

(1) 400 kg (2) 800 kg (3) 1600 kg (4) 2000 kg

76. Suitable moisture content for safe storage of paddy is in the range of :

(1) 4 - 6% (2) 10 - 12% (3) 16 - 18% (4) 22 - 24%

77. Bukhari type grain storage structure, used in rural India is made up of :

(1) wood (2) straw
(3) mud (4) galvanized iron

78. Drying of paddy at excessive high temperature causes :

(1) increases percentage of broken rice
(2) reduces quantity of rice
(3) reduces quality of rice
(4) all of the above

79. The purpose of blanching of vegetables is :

(1) to inactivate microorganisms (2) to kill selected microorganisms
(3) to inactivate enzymes (4) none of the above

80. _____ particles tends to remain near the bottom of container during a mixing operation.

(1) Light (2) Heavy (3) Dusty (4) Small

कच्च्या कामासाठी जागा /SPACE FOR ROUGH WORK

81. If fuse in power supply circuit of electric motor blows off, one should check _____.
(1) Grounded contacts (2) Shorted coil
(3) Rating of the fuse wire (4) All of the above

82. Which of the following biogas plant does not supply gas at constant pressure ?
(1) KVIC type biogas plant (2) Janta biogas plant
(3) Pragati design biogas plant (4) Ganesh biogas plant

83. If the velocity of wind at one place is doubled, the available wind power will :
(1) be doubled (2) be increased four fold
(3) be increased eight times (4) remains same

84. The optimum pH and temperature for higher biogas production are _____ and _____ respectively.
(1) 4 to 6 ; 10° to 20°C (2) 7 to 7.5 ; 35° to 38°C
(3) 9 to 10 ; 38° to 55°C (4) 8.5 to 9.5 ; 20° to 30°C

85. In dish type solar cooker the temperature achieved at the bottom of the vessel is around :
(1) 100 - 150°C (2) 151-200°C (3) 201-300°C (4) 350-400°C

86. In biogas utilization for Spark Ignition (SI) engines.
(a) SI engines can run completely on biogas.
(b) It requires modification in air inlet manifold and air cleaner pipe.
(c) It can develop 95% maximum break power.
(d) Ignition timing should be advanced to 45° BTDC.
Correct statements are :
(1) (a) and (b) only (2) (b) and (c) only
(3) (c) and (d) only (4) (a) and (d) only

87. As the number of blades (solidity) of wind mill decreases the tip-speed-ratio _____.
(1) decreases (2) increases (3) becomes one (4) none of these

88. In wind mill, about _____ additional power output can be produced by a variable speed system as compared with the constant speed system.
(1) 10 - 20% (2) 20 - 30% (3) 30 - 40% (4) 40 - 50%

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89. Bioenergy is classified into three main groups.

(a) Wood groups

(b) Agro - fuels

(c) Urban waste - based fuels

This classification is done by :

(1) UNO (2) WHO (3) FAO (4) CWO

---

90. The two safety codes consider current values up to _____ as safe.

(1) 1.002 or 1.005 amp (2) 0.003 or 0.005 amp

(3) 2.001 or 2.004 amp (4) None of the above

---

91. Electric motors operate at efficiencies ranging from _____ to _____ as against the IC engine having thermal efficiencies between _____ to _____.

(1) 40 to 80% ; 25 to 30% (2) 50 to 100% ; 26 to 30%

(3) 50 to 90% ; 28 to 30% (4) None of the above

---

92. Even during the on-period, the maximum value of the current must not exceed _____ and pulsating current of _____ is considered satisfactory.

(1) 0.008 amp ; 0.005 amp (2) 0.003 amp ; 0.002 amp

(3) 1.005 amp ; 1.002 amp (4) None of the above

---

93. The law states that the current in a d-c circuit is directly proportional to the electromotive force and inversely proportional to the resistance :

(1) Faraday's law (2) Current's law

(3) Voltage law (4) Ohm's law

---

94. (a) It is a highly inflammable liquid.

(b) It consists essentially of C_5 - C_{10} hydrocarbons.

(c) Density at 15°C ranges between 0.71 and 0.77 g/cm^3.

This is specifically **true** about :

(1) Diesel (2) Petrol (3) Kerosene (4) HSD

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95. In wind mill, micrositing and proper project formation can minimize losses due to.
(a) Air density
(b) Wake loss
(c) Blade contamination loss
(d) Wind turbine availability and loss
(e) Transformer and line loss
(f) Grid and controller loss
Answer options :
(1) (a), (b) and (c) only (2) (d) and (e) only
(3) (f) only (4) All of these

---

96. Issues with 100% extension of power to rural areas are :
(a) The use of power being small and seasonal.
(b) The rural schemes fail to yield revenues commensurate with the capital spent on taking power to the little pockets of population.
(c) To overcome the increasing costs of rural electrification schemes extensive research into cheaper methods of supplying electricity to rural areas is must.
All the statements above are :
(1) All are false (2) All are partially true
(3) All are partially false (4) All are true

---

97. In relation between earth and sun.
(a) Sun is on the average 1.5×10^8 km away from the earth.
(b) Earth has a mass of 1.989×10^{30} kg.
(c) Sun has 332150 times the mass of earth.
Choose the **correct** statements :
(1) (a) only (2) (c) only (3) (a) and (c) only (4) (b) only

---

98. In Biomass.

(a)	CHN	(i)	changes in ash melting behaviour, ash utilization
(b)	Sulphur and chlorine	(ii)	calorific value, NO_x emission
(c)	Major elements	(iii)	pollution, aerosol formation
(d)	Minor elements	(iv)	corrosion, pollution (SO_x)

Correct sequence is :

	(a)	(b)	**(c)**	**(d)**
(1)	(vi)	(ii)	(i)	(iii)
(2)	(ii)	(iv)	(i)	(iii)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(iii)	(iv)	(i)	(ii)

---

99. Electric motors can be used in farm work. Induction motors may be classified as :
(1) single phase motors and two phase motors
(2) single phase motors and three phase motors
(3) single phase motors and polyphase motors
(4) none of the above

100. In briquetting process.
(a) Biomass densification is carried out
(b) Binder can be used
(c) Loose biomass energy is 100 - 200 kg/m^3
Answer options :
(1) (a) and (c) True (2) (b) and (c) True
(3) (a) and (b) True (4) (a) and (c) False

101. Factors to be considered in the location of windows are :
(1) Distribution of light (2) Prevalent direction of wind
(3) Control of ventilation (4) All of the above

102. The density index of most of the building material is :
(1) Less than unity (2) More than unity
(3) Unity (4) None of the above

103. An uneven span type green house is constructed on _____ .
(1) plain surface (2) hilly terrain
(3) sandy surface (4) all of the above

104. The earthing of electric fencing is done by placing a metal rod to a depth below ground level about :
(1) 15 cm (2) 30 cm (3) 45 cm (4) 60 cm

105. Built up covered area measured at the floor level of the basement or any storey of a building is generally known as :
(1) Carpet area (2) Plinth area
(3) Floor area (4) None of the above

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106. A couple - close roof can be adopted economically upto a span of _____ .

(1) 3.50 m (2) 4.20 m (3) 4.20 cm (4) 5.50 m

107. For keeping door in position generally a mild steel flat bars of section 300 mm × 6mm are provided on each side of door frame is known as :

(1) Hold fast (2) Jamb (3) Still (4) Head

108. The bearing capacity of soil in kN/m^2 is the ratio of ____ .

(1) maximum load to area of steel plate

(2) area of steel plate to maximum load

(3) factor of safety to bearing capacity of soil

(4) soil load to factor of safety

109. In electric fencing from safety point of view, the circuit may be kept on for about _____ of a second and off for about _____ of a second.

(1) $\frac{1}{6}, \frac{1}{8}$ (2) $\frac{1}{5}, \frac{1}{10}$ (3) $\frac{4}{5}, \frac{3}{10}$ (4) $\frac{1}{10}, \frac{4}{5}$

110. A king post truss is suitable for roofs of span varying from _____ .

(1) 5 - 8 m (2) 2 - 6 m (3) 4 - 9 m (4) 5 - 10 m

111. What is the vertical interval between contour bund using C.E. Ramser formula for land slope 6 per cent ?

(1) 1.0 m (2) 1.1 m (3) 1.2 m (4) 1.3 m

112. Maximum angle or slope at which the soil remains stable is called as :

(1) angle of repose (2) angle of inclination

(3) angle of tilt (4) angle of sublimation

113. Hypsometric curve shows the relationship between :

(1) relative gradient and relative area of drainage basin

(2) relative relief and relative height

(3) relative height and relative area of drainage basin

(4) relative stream length and relative area of drainage basin

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114. Which type of run-off harvesting method is mainly done for building a big water stock for various purposes ?

(1) Short term (2) Long term

(3) Roof top (4) None of the above

---

115. In the rational method for prediction of peak rate of run-off, the rainfall intensity is taken as which of the following ?

(1) As equal to infiltration rate of soil

(2) As equal to ϕ index of soil

(3) For a duration equal to the time of concentration

(4) As unity

---

116. During a particular growing season, when a soil moisture and rainfall are indequate to support the healthy crop growth, it is said to _____ .

(1) Vegetative drought (2) Hydrological drought

(3) Agricultural drought (4) Meteorological drought

---

117. What is the relation of erosive power of water flow and velocity of run-off ?

(1) Square of velocity (2) Cube of velocity

(3) Equal to velocity (4) $\sqrt{\text{Velocity}}$

---

118. What is the sampling efficiency of VUN bed load samples ?

(1) 60% (2) 65% (3) 70% (4) 75%

---

119. Which is the alternate name for rising limb of hydrograph ?

(1) Reverse curve (2) Concentration curve

(3) Straight curve (4) S - curve

---

120. Recommended safe velocity of channel flow with good vegetative cover is :

(1) 1.20 m/sec (2) 1.50 m/sec (3) 0.90 m/sec (4) 0.60 m/sec

---

121. The material bouncing along the bed is named by which load ?

(1) Contact (2) Saltation (3) Suspended (4) Bed

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122. In gully control structure design, the flow velocity is reduced by :

(1) By providing longitudinal sills

(2) By providing stone pitching of downstream channel

(3) By creating hydraulic jump

(4) By providing designed side walls

---

123. Graphical representation of rainfall parameters as :

X axis - cumulative time

Y axis - cummulative rainfall is titled as

(1) Mass rainfall curve (2) Rainfall Intensity Histograph

(3) Rainfall Intensity - Hytograph (4) Unit Hydrograph

---

124. What is the design depth of parabolic shaped waterway having hydraulic radius 2.0 m ?

(1) 2.5 m (2) 3.0 m (3) 3.5 m (4) 4.0 m

---

125. What is the horizontal distance in metre between two terraces having land slope of 4 per cent ?

(1) 24 m (2) 25 m (3) 26 m (4) 60 m

126.

	Set 'A'		Set 'B'
(a)	Envelope curve	(i)	Stream discharge versus percent time
(b)	S-curve	(ii)	Flood peak-area relation
(c)	Double mass curve	(iii)	Unit hydrograph
(d)	Flow-duration curve	(iv)	Change in region of raingauge station
		(v)	Stream flow versus time

The **correct** sequence is :

	(a)	(b)	(c)	(d)
(1)	(ii)	(iii)	(iv)	(v)
(2)	(v)	(i)	(ii)	(iii)
(3)	(iii)	(i)	(iv)	(ii)
(4)	(i)	(iv)	(ii)	(v)

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127. State the characteristic on which the nature of hydrograph is dependent :

(1) Rainfall characteristics (2) Watershed characteristics

(3) Both (1) and (2) (4) None of the above

128. Hydraulic radius is rate of :

(1) rainfall : run-off

(2) volume : area

(3) cross sectional area : wetted perimeter

(4) wetted perimeter : cross sectional area

129. Which amongst the following is the ratio of soil loss from land cropped under specified conditions to corresponding soil loss from continuous flow on identical soil, slope and rainfall condition ?

(1) Land management factor (2) The slope length factor

(3) Crop management factor (4) Conservation practice factor

130. Which of the following conservation measures is **not** advisable either technically or economically on the soils exceeding 20% slope ?

(1) Bench terraces (2) Stone terraces

(3) Rock bolts (4) Contour trenching

131. The protection of downstream side of earth dam against water erosion is achieved through the use of _____.

(1) rock pitching (2) concrete slab

(3) berms (4) chimney drain

132. The delineation of priority area can be performed to some extent by :

(a) Reconnaissance survey

(b) Study of topo-sheet

(c) L-section of drainage line

(d) Coding of watershed

Answer options :

(1) (a) and (c) (2) (b) and (d) (3) (a) and (b) (4) (c) and (d)

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133. Which design consists of determining the dimensions of different components of the structure ?

(1) Hydrologic design (2) Hydraulic design

(3) Structural design (4) Stability design

134. What is the limit for watershed area to compute the direct run-off, from unit hydrograph method ?

(1) 5000 sq.km (2) 8000 sq.km

(3) 10,000 sq.km (4) 12,000 sq.km

135. What are derived for ungauged watersheds by computing various coefficients expressing physical features of the watershed ?

(1) Synthetic unit hydrograph (2) S-curve

(3) Run-off hydrograph (4) S-hydrograph

136. The function of core wall in dam section is to :

(1) control seepage and thus to check piping action

(2) control cracking of dam section

(3) increase vertical downward pressure

(4) deflect the seepage line within base of dam

137. Where the stream takes to meandering and eroding the banks and where the cuts are vertical, which measure is effective amongst following ?

(1) Spurs (2) Gabions (3) Retaining wall (4) Culverts

138. What is the value of direct run-off from peak flow rate (Qp) 300 m^3/s and base flow 25 m^3/s ?

(1) 12 m^3/s (2) 275 m^3/s (3) 325 m^3/s (4) 7500 m^3/s

139. The line on a map, joining places with equal evapotranspiration is referred as :

(1) Isochrone (2) Isopleths (3) Isobar (4) Isohyet

140. Bifurcation ratio of watershed is determined by using the formula :

(1) $Rb = Nu \times (Nu + 1)$ (2) $Rb = Nu/(Nu + 1)$

(3) $Rb = (Nu)^{(k-u)}$ (4) None of the above

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141. While developing Unit Hydrograph for a particular catchment, its duration should :

(1) be equal to basin lag
(2) not be more than $\frac{1}{5}$ to $\frac{1}{3}$ of basin lag
(3) be less than $\frac{1}{10}$ of basin lag
(4) be 10 hours

142. From contour plan of the site, the capacity of the farm pond is calculated for different stages by which of the following rule/formula ?

(1) Chezy's formula
(2) Manning's formula
(3) Simpson's rule
(4) Kutter's formula

143. How much per cent space occupied by floor blocks to width of stilling basin of drop spillway ?

(1) 10 - 20 per cent
(2) 20 - 30 per cent
(3) 30 - 40 per cent
(4) 50 - 60 per cent

144. What is the length of contour bund per hectare area of land having horizontal interval of 20 m ?

(1) 5000 m (2) 200 m (3) 50 m (4) 500 m

145. Which type of terrace is required to facilitate uniform impounding of water ?

(1) Strip terrace
(2) Level bench terrace
(3) Sloping outwardly bench terrace
(4) Sloping inwardly bench terrace

146. Circulatory ratio of watershed is the ratio of :

(1) Number of streams to area of watershed
(2) Axile width of basin to axile length of basin
(3) Area of watershed to area of circle whose radius is equivalent to radius of equivalent perimeter of watershed/basin
(4) Perimeter of basin to circumference of circle whose area is equivalent to area of watershed

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147. For providing a uniformity and fixing the identity to each and every watershed, which operation is done on watershed ?

(1) Delineation (2) Coding

(3) Reconnaissance (4) Areal photography

148. In medium rainfall zone, what will be the vertical interval between the contour bunds for the 3 per cent soil slope ?

(1) 30 cm (2) 60 cm (3) 90 cm (4) 120 cm

149. A full receiving bottle indicates _____ rainfall depth, at a time for Symon type rain gauge :

(1) 1.25 cm (2) 1.25 mm (3) 1.05 m (4) 1.20 cm

150. The peak discharge portion of hydrograph is known as :

(1) Rising limb (2) Tip

(3) Crest (4) None of the above

151. If 'v' is the flow velocity and 'R' is the hydraulic radius, the satisfactory index of channel retardance, considered in design of waterways is :

(1) vR (2) v^2/R (3) R/v^2 (4) R^2/v

152. On which theory/formula/law the settling of suspended material in the water is based ?

(1) Strickler's formula (2) Shield's formula

(3) Bligh's theory (4) Stoke's law

153. The following table shows rainfall recorded (mm) and area attributed in Thiessen's polygon method for the respective raingauge :

Station	Rainfall (mm)	Area (Ha)
A1	15	30
A2	12	25
A3	20	32

What will be the average rainfall (mm) by Thiessen's polygon method ?

(1) 15.67 mm (2) 15.98 mm (3) 29.00 mm (4) None of above

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154. How many watershed characteristics will be evaluated in cook's method for determination of runoff ?

(1) Two (2) Three (3) Four (4) Five

155. Determine total loss of rainwater due to infiltration from the watershed, if Φ index is 1.5 cm/h and duration of storm to cause effective rainfall is 8 h.

(1) 6 cm (2) 8 cm (3) 12 cm (4) 10 cm

156. Determine the value of form factor for watershed having 50 sq.km. area having 10,000 m length of drainage basin :

(1) 0.10 (2) 0.20 (3) 0.40 (4) 0.50

157. Which method is most suitable for computing mean areal precipitation for the watershed area of 4000 sq. km ?

(1) Arithmetic mean (2) Isohyetal

(3) Theissen Polygon (4) None of these

158. For mountaneous regions of temperate, mediterranean and tropical zone, there should be one hydrometry station for _____ area.

(1) 300 to 1000 km^2 (2) 1000 to 5000 km^2

(3) 5000 to 20000 km^2 (4) 20000 to 25000 km^2

159. Field measurement of channel flow as below :

(a) Average velocity of flow = 1.50 m/sec

(b) Average cross section = 1.20 m^2 of channel upto flow level

What was run off rate ? What would be run-off volume if flow time is one minute ?

(1) 1.80 m^3/sec and 108 m^3 (2) 1.08 m^3/sec and 10.8 m^3

(3) 1.25 m^3/sec and 75 m^3 (4) 0.80 m^3/sec and 48 m^3

160. Which of the following soil profile character is **not** required for land capability classification ?

(1) Soil texture (2) Soil depth

(3) Infiltration rate of soil (4) Availability of nutrients

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161. Which type of spillway plays an important role to protect the embankment from overtopping due to unexpected inflows into the farm pond ?

(1) Mechanical (2) Chute (3) Pipe (4) Emergency

162. Over a catchment area of 1 km^2, volume of water due to 1 cm rainfall will be represented as :

(1) 10^3 litres (2) 10^4 litres

(3) 10^7 litres (4) None of the above

163. What is the rainfall amount in excess of ϕ - index is referred ?

(1) Infiltration (2) W - index (3) Rainfall excess (4) Percolation

164. Purpose of underground dams is to :

(1) to control sub surface soil movement

(2) to control deep percolation

(3) to control sub surface run-off and water harvesting

(4) to enhance soil infiltration

165. Which structure is used to make run-off water to trickle rather than to rush out ?

(1) Chute spillway (2) Drop spillway

(3) Pipe spillway (4) Graded bund

166. Which instrument is used to record the head over crest of run-off measuring device continuously ?

(1) Self Recording Raingauge (2) Velocity meter

(3) Anemometer (4) Automatic water stage Level Recorder

167. Dug'out farm ponds are generally :

(1) On stream ponds (2) Embankment type ponds

(3) Off stream ponds (4) Sunken ponds

168. Free board is provided, above the depth of flowing water through emergency spillway, to safeguard the earthen embankment against :

(1) Sliding (2) Overturning

(3) Overtopping (4) Uplift pressure

169. Which term is used for failure in hydraulic structure takes place, in which there is removal of materials from the foundation by flow of seepage water ?

(1) Sliding (2) Compression (3) Crushing (4) Piping

---

170. The temporary structures are constructed where :

(a) Soil of the gulley is found unstable in nature

(b) Collection of sufficient amount of soil on their upstream portion is pre-requisite.

(c) The area is in remote

(d) Checking the gulley erosion until sufficient vegetation has been established.

Answer options :

(1) Only (a) (2) (b) and (d) (3) Only (c) (4) (a) and (c)

---

171. Reynolds number is used to determine :

(1) Hydraulic conductivity of soil

(2) Seepage flow from earthen dam

(3) Whether the flow is laminar or turbulent

(4) Hydraulic resistance of flow

---

172. Using the criteria of best economical section, the bottom width of trapezoidal channel in black soil for flow depth of 0.30 m would be _____.

(Given, $\tan(45) = 1$, $\tan(60) = 1.73$ $\tan(90) = \infty$, $\tan\left(\frac{45}{2}\right) = 0.41$)

(1) 0.25 m (2) 0.30 m (3) 0.45 m (4) 0.60 m

---

173. A higher operating pressure at the sprinkler nozzle yields :

(1) larger drops falling away from the sprinkler nozzle

(2) larger drops falling close to the sprinkler nozzle

(3) very fine drops falling close to the sprinkler nozzle

(4) very fine drops falling away from the sprinkler nozzle

---

174. The width of a border usually varies from _____.

(1) 3 to 15 m (2) 2 to 8 m (3) 4 to 20 m (4) 5 to 10 m

---

175. The recommended safe limits of land slope (longitudinal) for efficient irrigation in heavy (clay) soils range from :

(1) 0.05 to 0.20% (2) 0.20 to 0.40% (3) 0.25 to 0.65% (4) 0.65 to 0.85%

176. Cavitation is referred to as formation of :

(1) cavities filled with soil due to local pressure drop
(2) cavities filled with liquid vapour due to local pressure drop
(3) release of entrapped air
(4) none of above

177. Which component of canal system is supposed to be maintained by the farmer ?

(1) Distributory (2) Water course (3) Minor (4) Branch canal

178. The orifices are classified as :

(a) circular orifice (b) trangular orifice
(c) rectangular orifice (d) square orifice

Answer options :

(1) only (a) (2) only (a) , (b) and (d)
(3) only (a), (c) (4) all (a), (b), (c) and (d)

179. A precise method of computing the volume of earthwork in land levelling is :

(1) four point method (2) prismoidal method
(3) end area method (4) none of these

180. The centre of pressure for a plane vertical immersed surface lies at :

(a) the top of the immersed surface
(b) the bottom of the immersed surface
(c) a depth of one-third the height of the immersed surface
(d) a depth of two-third the height of the immersed surface

Answer options :

(1) only (a) (2) only (a) and (b) (3) only (c) (4) only (d)

181. What will be the value of centroid of rectangular field having 20 stake points and sum of elevation of all these points is 198.0 m.

(1) 09.90 m (2) 19.80 m (3) 00.99 m (4) 00.09 m

182. In case of land grading with modern heavy earth moving equipment, the cut fill ratio should be :

(1) zero (2) one

(3) greater than one (4) less than one

---

183. Which of the term in general form of Hooghoudt's equation is the drainage criterion for steady state ground water conditions ?

(1) $\frac{h}{q}$ (2) $\frac{t}{\ln (1.16\, h_o/h_t)}$

(3) KD (4) $\frac{Kd}{\mu}$

---

184. Ten meter vertical column of oil whose specific gravity is 1.23 will exert the pressure at bottom equivalent to :

(1) 1.23 m of water column (2) 12.30 m of water column

(3) 8.13 m of water column (4) None of above

---

185. In saline soils :

(a) pH is less than 8.5

(b) ESP is less than 15

(c) ECe is more than 4 dS/m

(d) ECe is less than 4 dS/m

(e) pH is more than 8.5

Answer options :

(1) only (a), (b) and (d) (2) only (b), (c) and (e)

(3) only (a), (b) and (c) (4) only (b), (d) and (e)

---

186. The cut-back stream concept of furrow irrigation cannot be used in :

(1) graded furrows laid along the slope

(2) contour furrows laid on gently sloping grade

(3) level furrows on heavy soils

(4) corrugated furrows

---

187. Wheat requires 60 cm of water during 120 days. In this case an average outlet factor in hectares/cumec is :

(1) 864 (2) 1728 (3) 432 (4) None of above

188. Coefficient of storage is the property of :

(a) Confined aquifer

(b) Unconfined aquifer

(c) Semi confined aquifer

Answer options :

(1) all (a), (b) and (c) (2) only (b) and (c)

(3) only (a) and (c) (4) only (a) and (b)

189. On the basis of the entry of water into the well, tube wells are classified as :

(1) Screen wells and cavity wells (2) Shallow wells and deep wells

(3) Drilled wells and driven wells (4) Water table wells and artesian wells

190. Following criteria should be used while deciding horizontal distance between two adjacent wells.

(1) The wells should not be of same depth.

(2) The pumping of one well should not affect the cone of depression of water table of adjacent well.

(3) Both wells should yield same discharge.

(4) Water from one well can be released easily to other well during acute shortage period.

191. The basic methods of land levelling design are :

(a) Plane method

(b) Profile method

(c) Plan inspection method

(d) Contour adjustment method

Answer options :

(1) only (a) and (b) (2) only (c) and (d)

(3) all of above (a), (b), (c) and (d) (4) none of the above

192. If the hydraulic conductivity is same in all directions, the soil is said to be :

(1) anisotropic soil (2) heterogeneous soil

(3) isotropic soil (4) none of these

193. Leaching requirement means :

(1) supply of additional water with irrigation water

(2) supply of additional fertilizers with irrigation water

(3) supply of additional amendments with irrigation water

(4) supply of additional micro nutrients with irrigation water

194. The interrelationship between the depth of the subsurface drain and spacing between subsurface drain is characterised below.

(a) More the depth, more is the spacing

(b) More the depth, less is the spacing

(c) There is no influence of depth on spacing

Answer options :

(1) (a) only (2) (b) only (3) (c) only (4) (a) and (c) only

195. In case of lift irrigation scheme, the term used when the pump house is located directly over the well.

(a) jack well

(b) sump well

Answer options :

(1) (a) only (2) (b) only

(3) both (a) and (b) (4) none of (a) and (b)

196. The following efficiency is the ratio between water stored in the root zone during irrigation and the water needed in the root zone prior to irrigation.

(1) water application (2) water storage

(3) water distribution (4) water conveyance

197. Which one of the following amendments is not added in alkali soils to dissolve calcium carbonate for its reclaimation ?

(1) Gypsum (2) Single super phosphate

(3) Sulphur (4) Sulphuric acid

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198. The field drainage system may consist of :

(a) open drains (b) mole drains

(c) pipe drains (d) cross drains

Answer options :

(1) only (a), (b) and (c) (2) only (a), (b) and (d)

(3) only (b), (c) and (d) (4) only (a), (c) and (d)

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199. When speed of pump is varied from n_1 to n_2, the head H_1 will vary to :

(1) $H_2 = H_1 \left(\frac{n_1}{n_2}\right)^3$ (2) $H_2 = H_1 \sqrt{n_1 n_2}$

(3) $H_2 = H_1 \left(\frac{n_1}{n_2}\right)^2$ (4) $H_2 = H_1 \left(\frac{n_2}{n_1}\right)^2$

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200. Which of the following method is not a land levelling design method ?

(1) contour adjustment method (2) profile method

(3) cut and fill method (4) plan inspection method

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सूचना — (पृष्ठ 1 वरून पुढे....)

(8) प्रश्नपुस्तिकेमध्ये विहित केलेल्या विशिष्ट जागीच कच्चे काम (रफ वर्क) करावे. प्रश्नपुस्तिकेव्यतिरिक्त उत्तरपत्रिकेवर वा इतर कागदावर कच्चे काम केल्यास ते कॉपी करण्याच्या उद्देशाने केले आहे, असे मानले जाईल व त्यानुसार उमेदवारावर शासनाने जारी केलेल्या "परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचे अधिनियम-82" यातील तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एक वर्षाच्या कारावासाच्या आणि/किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.

(9) सदर प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपल्यानंतर उमेदवाराला ही प्रश्नपुस्तिका स्वत:बरोबर परीक्षाकक्षाबाहेर घेऊन जाण्यास परवानगी आहे. **मात्र परीक्षा कक्षाबाहेर जाण्यापूर्वी उमेदवाराने आपल्या उत्तरपत्रिकेचा भाग-1 समवेक्षकाकडे न विसरता परत करणे आवश्यक आहे.**

नमुना प्रश्न

Pick out the correct word to fill in the blank :

प्र. क्र. 201. I congratulate you _____ your grand success.

(1) for (2) at

(3) on (4) about

ह्या प्रश्नाचे योग्य उत्तर "(3) on" असे आहे. त्यामुळे या प्रश्नाचे उत्तर "(3)" होईल, यास्तव खालीलप्रमाणे प्रश्न क्र. 201 समोरील उत्तर-क्रमांक "③" हे बर्तुळ पूर्णपणे छायांकित करून दाखविणे आवश्यक आहे.

प्र. क्र. 201. ① ② ● ④

अशा पद्धतीने प्रस्तुत प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाचा तुमचा उत्तरक्रमांक हा तुम्हाला स्वतंत्ररीत्या पुरविलेल्या उत्तरपत्रिकेवरील त्या त्या प्रश्नक्रमांकासमोरील संबंधित वर्तुळ पूर्णपणे छायांकित करून दाखवावा. **ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.**

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