पुस्तिका में पृष्ठों की संख्या–16
No. of pages in Booklet -16
पुस्तिका में प्रश्नों की संख्या–100
No. of Questions in Booklet -100
Subject Code – 05
विषय / SUBJECT : **Agricultural Engineering**

Question Paper Booklet No. प्रश्न-पत्र पुस्तिका संख्या

5000553

NEAP-81

PAPER-II

समय : 2.00 घण्टे
Time: 2.00 Hours

अधिकतम अंक : 200
Maximum Marks: 200

प्रश्न–पत्र पुस्तिका एवं उत्तर पत्रक के पेपर सील / पॉलिथीन वैग को खोलने पर परीक्षार्थी यह सुनिश्चित कर ले कि उसके प्रश्न–पत्र पुस्तिका पर वही प्रश्न–पत्र पुस्तिका संख्या अंकित है जो उत्तर पत्रक पर अंकित है। इसमें कोई भिन्नता हो तो वीक्षक से दूसरा प्रश्न–पत्र प्राप्त कर ले। ऐसा न करने पर जिम्मेदारी अभ्यर्थी की होगी।

The candidate should ensure that Question Paper Booklet No. of the Question Paper Booklet and Answer Sheet must be same after opening the Paper Seal/ polythene bag. In case they are different, a candidate must obtain another Question Paper from the Invigilator. Candidate himself shall be responsible for ensuring this.

परीक्षार्थियों के लिए निर्देश

1. सभी प्रश्नों के उत्तर दीजिए।
2. सभी प्रश्नों के अंक समान हैं।
3. प्रत्येक प्रश्न का केवल एक ही उत्तर दीजिए।
4. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
5. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर पत्रक पर नीले बॉल प्वॉइंट पेन से गहरा करना है।
6. OMR उत्तर पत्रक इस परीक्षा पुस्तिका के साथ रखा है। जब आपको परीक्षा पुस्तिका खोलने को कहा जाए, तो उत्तर पत्रक निकाल कर ध्यान से केवल नीले बॉल प्वॉइंट पेन से विवरण भरें। OMR उत्तर पत्रक पर प्रश्न–पत्र पुस्तिका संख्या ध्यानपूर्वक भरें।
7. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। (गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है। किसी भी प्रश्न से संबंधित गोले या बबल को खाली छोड़ना गलत उत्तर नहीं माना जायेगा।)
8. मोबाइल फोन अथवा इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है, तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
9. कृपया अपना रोल नम्बर ओ.एम.आर. पत्रक पर सावधानीपूर्वक सही भरें। गलत अथवा अपूर्ण रोल नम्बर भरने पर 5 अंक कुल प्राप्तांकों में से काटे जा सकते हैं।
10. यदि किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो तो प्रश्न के हिन्दी तथा अंग्रेजी रूपान्तरों में से अंग्रेजी रूपान्तर मान्य होगा।

चेतावनी: अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराते हुए विविध नियमों–प्रावधानों के तहत कार्यवाही की जाएगी। साथ ही विभाग ऐसे अभ्यर्थी को भविष्य में होने वाली विभाग की समस्त परीक्षाओं से विवर्जित कर सकता है।

INSTRUCTIONS FOR CANDIDATES

1. Answer **all** questions.
2. **All** questions carry equal marks.
3. Only **one** answer is to be given for each question.
4. If more than one answers are marked, it would be treated as wrong answer.
5. Each question has four alternative responses marked serially as **1, 2, 3, 4**. You have to darken only one circle or bubble indicating the correct answer on the Answer Sheet using **BLUE BALL POINT PEN.**
6. The OMR Answer Sheet is kept with this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully with **blue** ball point pen only. **Please fill the Question Paper Booklet no. on the OMR Answer Sheet carefully.**
7. **1/3 part of the mark(s) of each question will be deducted for each wrong answer.** (A wrong answer means an incorrect answer or more than one answers for any question. Leaving all the relevant circles or bubbles of any question blank will not be considered as wrong answer.)
8. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable materials with him/her will be strictly dealt as per rules.
9. Please correctly fill your Roll Number in O.M.R. Sheet. **5 Marks** can be deducted for filling wrong or incomplete Roll Number.
10. If there is any sort of ambiguity/mistake either of printing or factual nature then out of Hindi and English Version of the question, the English Version will be treated as standard.

Warning : *If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would be liable to be prosecuted. Department may also debar him/her permanently from all future examinations.*

इस परीक्षा पुस्तिका को तब तक न खोलें जब तक कहा न जाए।
Do not open this Test Booklet until you are asked to do so.

AGRICULTURAL ENGINEERING

1. Levels and theodolites are usually equipped with two horizontal cross hairs which are called -

   (1) Horizontal cross hairs
   (2) Vertical cross hairs
   (3) Stadia hairs
   (4) Principal cross hairs

2. The volume of earthwork in land levelling can be computed by -

   (1) Volumetric method
   (2) Prismoidal method
   (3) End-area method
   (4) Arithmetic mean method

3. The ratio of the map distance to the corresponding distance of the ground is called as -

   (1) Scale
   (2) Unit fraction
   (3) Plan factor
   (4) Representative factor

4. Which method of survey is the most accurate?

   (1) Plane table method
   (2) Grid method
   (3) Transit method
   (4) Chain survey method

5. The accuracy of measurement in chain surveying does not depend upon -

   (1) Length of the offset
   (2) Scale of the plotting
   (3) Importance of the features
   (4) General layout of the chain lines

6. An ideal vertical curve to join two gradients is -

   (1) Circular
   (2) Parabolic
   (3) Elliptical
   (4) Hyperbolic

7. If a 30m chain diverges by a perpendicular distance 'd' from its correct alignment, the error in measured length is -

   (1) $d \times d/60$ m
   (2) $d \times d/30$ m
   (3) $d \times d/40$ m
   (4) $d/30$ m

8. The current sequence of water erosion is -

(1) Splash, Sheet, Rill, Gully   (2) Sheet, Gully, Rill, Splash

(3) Rill, Splash, Sheet, Gully   (4) Gully, Splash, Sheet, Rill

9. The thermal efficiency of diesel engine varies as -

(1) 28-32%   (2) 32-38%

(3) 38-42%   (4) 42-52%

10. The line which separates the catchment basin from the rest of the area is -

(1) Ridge line   (2) Dam line

(3) Catchment line   (4) Watershed line

11. A combination of contouring and crop rotation, in which alternate rows are constructed perpendicular to the direction of wind and water flow, to prevent soil erosion, is called -

(1) Strip cropping   (2) Mulching

(3) Vegetated waterways   (4) Terracing

12. Water gas is a mixture of -

(1) CO_2 and O_2 (2) O_2 and H_2

(3) H_2, N_2 and O_2 (4) CO, N_2 and H_2

13. What will be the height of an overflow spillway section for a design discharge of $1500 m^3/s$, given that the upstream water surface level is at elevation of 240 m and the upstream channel floor is at 200 m; the spillway, having a vertical face, is 50 m long.

(1) 3.45 m   (2) 4.55 m

(3) 5.00 m   (4) 5.76 m

14. Which of the following does not constitute 90% of dry weight of any food?

(1) Carbohydrates   (2) Fibres

(3) Proteins   (4) Fats

15. Heating value of coal is approximately-

   (1) 1000-2000 kcal/kg
   (2) 2000-4000 kcal/kg
   (3) 5000-6500 kcal/kg
   (4) 9000-10,500 kcal/kg

16. In which decade wind-generated electricity was first sold to the public?

   (1) 1940s
   (2) 1960s
   (3) 1980s
   (4) 2000s

17. A meter suitable for total flow measurement is -

   (1) Turbine flow meter
   (2) Venturimeter
   (3) Rotameter
   (4) Orifice meter

18. The Water Horse Power (WHP) for centrifugal water pump for given flow rate of 4500 liter/h and 10 m head added to the flow is -

   (1) 14.26
   (2) 16.26
   (3) 18.26
   (4) 12.26

19. Calculate the discharge of reciprocating pump (single cutting) if area of cylinder is 0.25 m^2, length of stroke is 0.15m, number of cylinder = 1 and speed of pump is 50 rpm.

   (1) 0.01125 m^3/s
   (2) 0.02125 m^3/s
   (3) 0.03125 m^3/s
   (4) 0.04125 m^3/s

20. Pulverized coal is -

   (1) Coal free from ash
   (2) Non-smoking coal
   (3) Coal which burns for long time
   (4) Coal broken into fine particles

21. Most of the solar radiation received on earth's surface lies within the range of -

   (1) 0.2 to 0.4 microns
   (2) 0.38 to 0.78 microns
   (3) 0 to 0.38 microns
   (4) 0.5 to 0.8 microns

22. A spillway has been designed for a head of 2.80 m with a length 200 m. The discharge coefficient is C = 049. The discharge for this head will be -

    (1) 2034 m³/s   (2) 2234 m³/s

    (3) 2434 m³/s   (4) 2634 m³/s

23. In which collector air flows without any obstruction -

    (1) Porous absorber plate   (2) Non-porous absorber plate

    (3) Over-lapped glass absorber   (4) Finned absorber

24. Which types of biogas plant are fed and emptied regularly?

    (1) Batch type   (2) Continuous type

    (3) Dome type   (4) Drum type

25. Reflecting mirrors used for harnessing solar energy are called -

    (1) Mantle   (2) Ponds

    (3) Diffusers   (4) Heliostats

26. The Mould Board Plough absorbs side forces mainly through the -

    (1) Share   (2) Mould board

    (3) Land disc   (4) Frog

27. The energy sources which produce no net energy are-

    (1) Secondary energy sources   (2) Primary energy sources

    (3) Commercial energy sources   (4) Non-commercial energy sources

28. Heavy smoking in an engine during operation may be due to-

    (1) Rich mixture   (2) Overloading

    (3) Late injection   (4) All of the above

29. The voltage generated in spark plug at the time of spark is -

    (1) 300-400 V   (2) 100-200 V

    (3) 1000-5000 V   (4) 20,000 V

30. Disc angle of standard disc plough varies between –

    (1) 15-25°   **(2)** 25-35°

    (3) 35-42°   **(4)** 42-45°

31. When an incandescent light bulb is turned on, what percent of the electricity is converted into light energy?

    (1) 10%   **(2)** 30%

    (3) 50%   **(4)** 70%

32. What percent of the average home's electric bill is for lighting?

    (1) About 10%   **(2)** About 20%

    (3) About 30%   **(4)** About 40%

33. Which one of the following pair is not correctly matched?

    (1) Solidity – Wind Machine   **(2)** Anaerobic digestion of Organic matter – Bio gas generation

    (3) Destructive distillation – Charcoal Production   **(4)** Complete Combustion – Producer gas

34. Which one of the following statement is correct?

    (1) Surge irrigation is used along with center pivot swing arm to provide more uniform irrigation.   **(2)** The lateral carries water from pump to mainline.

    (3) Organic matter percentage and soil texture affect infiltration rate of water.   **(4)** If water is applied to soil in excess of infiltration rate even runoff will not occur.

35. From the hydraulic efficiency point of view, the most efficient cross-section of an open channel is -

    (1) Parabolic   **(2)** Trapezoidal

    (3) Semi-circular   **(4)** Rectangular

36. Watershed is a -

(1) Hydrological entity contributing runoff to a common point.
(2) Hydrological entity receiving runoff to a single point.

(3) Hydrological entity receiving runoff from multi-inlet.
(4) Hydrological entity distributing runoff from common inlet.

37. The depth of flow over a sharp crested rectangular weir should not be more than about -

(1) half the crest width
(2) two-third of the crest width

(3) three-fourth of the crest width
(4) the width of the weir

38. The term Tons of refrigeration is used in cold storage unit to measure -

(1) mass of fruits held
(2) mass of refrigerant

(3) mass of compressor
(4) capacity of compressor

39. Which of the following instrument is used for measurement of specific heat?

(1) Micrometer
(2) Calorimeter

(3) Thermometer
(4) Current meter

40. The ratio of force of inertia and friction force in a flow may be characterized by -

(1) Nusselt number
(2) Reynolds number

(3) Rayleigh number
(4) Peclet number

41. The mass of water vapour per unit mass of dry air is -

(1) Specific humidity
(2) Percentage humidity

(3) Relative humidity
(4) Equilibrium relative humidity

42. If the number of microbes in a process has to be reduced from an initial load of 10^6 to a final 10^4, the required thermal death time (D Value) will be -

(1) 10D
(2) 4D

(3) 5D
(4) 20D

43. Water horse power of centrifugal pump of 15 liters/sec capacity and 30m total head will be equal to -

    (1) 3.0   (2) 4.0

    (3) 5.0   (4) 6.0

44. Interceptor drain helps to control water logging by -

    (1) Lowering the water table   (2) Preventing subsoil water from reaching the area

    (3) Allowing vertical drainage   (4) Draining out excess water to the natural drain

45. The actual area irrigated in a year from an outlet is -

    (1) Irrigation period   (2) Intensity of irrigation

    (3) Irrigation frequency   (4) Irrigation efficiency

46. The minimum side slope of an earth channel for polyethylene lining is -

    (1) 1.5:1   (2) 2:1

    (3) 2.5:1   (4) 3:1

47. Which type of cultivating tool is extensively used for weed control?

    (1) Furrower type   (2) Sweep type

    (3) Slip nose type   (4) Double point shovel type

48. A wheel of an implement to maintain a uniform depth of working in soil is known as -

    (1) Rear furrow wheel   (2) Land wheel

    (3) Front furrow wheel   (4) Gauge wheel

49. For the farm area of 40 ha followed under single cropping pattern, the suitable size of tractor is-

    (1) 10 to 20 HP   (2) 50 HP

    (3) 20 to 25 HP   (4) 35 HP

50. The ratio of total force output of the traction device in the direction of travel to the dynamic weight on the traction device is called-

(1) Rolling resistance
(2) Coefficient of traction
(3) Tractive efficiency
(4) Coefficient of friction

51. When the speed of a centrifugal pump is changed the head varies as -

(1) The speed
(2) Square of the speed
(3) Square root of the speed
(4) Cube of the speed

52. The Cetane rating of commercial diesel fuel is between -

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

53. Ditch conduit formula is used for -

(1) Sand bearing test
(2) Size of tile drain
(3) Grade of tile drain
(4) Loads on drain pipes

54. Cavitation is formation of cavity in flow due to -

(1) Negative pressure as a result of high velocity
(2) Positive pressure as a result of high velocity
(3) Reduction in pressure as a result of high velocity of water
(4) None of the above

55. What is the side draft of a tillage implement?

(1) Horizontal component of pull, parallel to the line of motion
(2) Vertical component of pull
(3) Horizontal component of pull, perpendicular to the line of motion
(4) Pull divided by the furrow cross section area

56. An aquifer which is bounded by an impermeable layer at the bottom and semi-pervious layer at the top is known as-

(1) Artesian aquifer
(2) Confined aquifer
(3) Semi-confined aquifer
(4) Unconfined aquifer

57. Cutter bar is a component of -

(1) Seed drill

(2) Flail mower

(3) Vertical conveyor reaper

(4) Hand hoe

58. A furrow cross-section in a country plough is commonly -

(1) Circular

(2) Parabolic

(3) Rectangular

(4) Trapezoidal

59. Spiked tooth type threshing cylinder are generally used in -

(1) Rice threshers

(2) Wheat threshers

(3) Maize threshers

(4) Mustard threshers

60. The crank shaft and rear axle of tractor are attached at an angle of -

(1) 30°

(2) 60°

(3) 90°

(4) 120°

61. The drainage density is -

(1) Length of streams per drainage area within basin

(2) Stream discharge per unit drainage area

(3) Drainage area per unit stream length

(4) Number of streams per unit drainage area

62. Value of Drainage coefficient for small drainage projects is taken as -

(1) 10 to 15 mm/day

(2) 5 to 10 mm/day

(3) 6 to 25 mm/day

(4) 15 to 20 mm/day

63. The ratio of the partial pressure of moisture of the food to vapour pressure of the water at the same temperature is called-

(1) Moisture content

(2) Water activity

(3) Dry bulb temperature

(4) Wet bulb temperature

64. Methane (CH_4) content in producer gas obtained from biomass gasification is -

(1) 60%

(2) 1-5%

(3) 6-10%

(4) 11-20%

65. High solidity wind rotor works on -

(1) Drag force

(2) Lift force

(3) Both Lift and Drag force

(4) Gravity force

66. Calorific value of biogas (60% CH₄) is -

   (1) 5713 kcal/kg (2) 4713 kcal/m³

   (3) 4200 kcal/m³ (4) 3713 kcal/m³

67. Which one among these will be the most suitable dryer for drying liquid foods?

   (1) Dielectic dryer (2) Spin flash dryer

   (3) Tunnel dryer (4) Trough dryer

68. The crawler tractor have ……………type of brake.

   (1) Hydraulic (2) Internal expanding shoe

   (3) Disc (4)   External contracting shoe

69. The problem of "back logging" occurs in -

   (1) Belt conveyor (2) Screw conveyor

   (3) Bucket elevator (4) Pneumatic conveyor

70. The term "mesh" refers to the number of openings per linear -

   (1) Decimeter (2) Millimeter

   (3) Centimeter (4) Inch

71. The type of the induction motors having variable speed characteristics is -

   (1) Split phase (2) Capacitor

   (3) Universal (4) Three phase

72. Water mist polishing machine is used for the milling of -

   (1) Wheat (2) Maize

   (3) Rice (4) Barley

73. The specifications of the wire for transmission of electrical energy should be selected such that -

(1) Low current flow and the resistance of the cable is small

(2) Low current flow and the resistance of the cable is high

(3) High current flow and the resistance of the cable is small

(4) High current flow and the resistance of the cable is high

74. Which one is the most suitable method of drying for fruit juice?

(1) Solar drying

(2) Fluidized bed drying

(3) Tray drying

(4) Spray drying

75. Table separators work on the basis of -

(1) Size

(2) Shape

(3) Specific gravity

(4) Terminal velocity

76. Which of the erosion is extremely harmful for the land?

(1) Raindrop erosion

(2) Sheet erosion

(3) Rill erosion

(4) Gully erosion

77. The glazing which limits the radiation and convection heat losses is -

(1) Absorber plate

(2) Selective surface

(3) Insulation

(4) Transparent cover

78. In a hydro-electric plant, spillways are used -

(1) To discharge all surplus water

(2) To discharge surplus water on the downstream side of dam

(3) When water is not available in sufficient quantity

(4) None of the above

79. Which one of the following pairs is not correctly matched?

(1) Well log – The practice of making a detailed record of the geologic formations penetrated by a borehole.

(2) Propeller – A type of fan that transmits power by converting rotational motion into thrust.

(3) Turbine pump – Pump used for electricity generation

(4) Sprinkler irrigation – Modern irrigation technique

80. The commonly used square sizes for contouring is -

(1) 10m × 10m to 5m × 5m

(2) 10m × 10m to 15m × 15m

(3) 5m × 5m to 20m × 20m

(4) 5m × 5m to 10m × 15m

81. The length of a line measured with 20m chain was found to be 500m. It was subsequently found that the chain was longer by 0.04m. What is the correct length of line?

(1) 500 m

(2) 501 m

(3) 502 m

(4) 503 m

82. The equation for curve number is given as -

(1) $CN = \dfrac{2540}{25.4 + S}$

(2) $CN = \dfrac{25.4 + S}{2540}$

(3) $CN = \dfrac{2500}{25.0 + S}$

(4) $CN = \dfrac{2540 + S}{25.4}$

83. The main function of crank shaft in an engine is -

(1) To convert reciprocating motion into rotary motion

(2) To operate engine valves

(3) To operate fuel injection pump

(4) To increase engine efficiency

84. Value of Betz's coefficient is -

(1) 0.562

(2) 0.593

(3) 0.621

(4) 0.657

85. The time of retardation in case of creep test is -

   (1) 36.7% of the time for total strain
   (2) 63.2% of the time for total strain
   (3) 76.3% of the time for total strain
   (4) 83.2% of the time for total strain

86. Thermostat valve is a component of -

   (1) Engine fuel system
   (2) Exhaust system
   (3) Cooling system
   (4) Hydraulic system

87. The ratio between the molecular diffusivity of momentum to the molecular diffusivity of heat is -

   (1) Nusselt number
   (2) Prandtl number
   (3) Rayleigh number
   (4) Peclet number

88. The time of concentration of a watershed is proportional to -

   (1) $L^{1.77}$
   (2) $S^{-0.385}$
   (3) $L^{1.77} S^{0.385}$
   (4) $S^{1.77}$

89. Hydrographic Survey deals with the mapping of -

   (1) Large water bodies
   (2) Watershed
   (3) Canal system
   (4) Movements of clouds

90. The grazing animals can change the type of Vegetation by-

   (1) Cross pollination
   (2) Selective grazing
   (3) Bringing in plant pathogens
   (4) Bringing the seeds of other plants

91. Contour bunding is done to check-

   (1) Sheet erosion
   (2) Rill erosion
   (3) Gully erosion
   (4) Ravine formation

92. Interception loss is-

   (1) High in the beginning of storm and gradually decreases
   (2) Low in the beginning of storm and gradually decreases
   (3) High in the ending of storm and gradually decreases
   (4) High in the beginning of storm and gradually increases

93. The heat transfer rate in solid agricultural products of any shape is called-

   (1) Mass density
   (2) True Density
   (3) Bulk density
   (4) Mass diffusivity

94. Octane number for regular petrol fuel varies as -

(1) 95-98

(2) 85-90

(3) 70-80

(4) 60-65

95. Critical pressure of water is -

(1) 1 kg/cm^2

(2) 100 kg/cm^2

(3) 155 kg/cm^2

(4) 213.8 kg/cm^2

96. Which of the following countries is <u>not</u> in the list of top 3 consumers of energy in the world?

(1) China

(2) India

(3) Russia

(4) United States

97. Which one is a false statement?

(1) Magnets are used to generate electricity.

(2) Using hydropower does not impact the environment.

(3) Propane comes from oil and natural gas wells.

(4) Electricity is a renewable resource.

98. A 1cm^2 silicon solar cell has a saturation current of 10 -12 A and is illuminated with sunlight yielding a short – circuit photocurrent of 25 mA. Calculate the solar cell efficiency.

(1) 13%

(2) 14%

(3) 15%

(4) 16%

99. The maximum size of the raindrop is -

(1) 6 mm

(2) 10 mm

(3) 2 mm

(4) 0.5 mm

100. In the Universal Soil Loss Equation (USLE), the soil erodability factor K is ……………..

(1) Measure of the susceptibility of soil particles to detachment and transport

(2) Slope length gradient factor

(3) Crop management factor

(4) Rainfall-runoff factor

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Space for Rough Work