

MAC (Ag) in soils & water conservation
Code No. (702)

17P/305/25

Question Booklet No

(To be filled up by the candidate by blue/black ball-point pen)

Roll No.

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Roll No.

(Write the digits in words)

207

207

Serial No. of OMR Answer Sheet

Day and Date

(Signature of Invigilator)

INSTRUCTIONS TO CANDIDATES

(Use only blue/black ball-point pen in the space above and on both sides of the Answer Sheet)

1. Within 30 minutes of the issue of the Question Booklet, check the Question Booklet to ensure that it contains all the pages in correct sequence and that no page/question is missing. In case of faulty Question Booklet bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.
2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope.*
3. A separate Answer Sheet is given. *It should not be folded or mutilated. A second Answer Sheet shall not be provided. Only the Answer Sheet will be evaluated.*
4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.
5. On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.
6. No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR sheet and also Roll No. and OMR sheet No. on the Question Booklet.
7. Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.
8. Each question in this Booklet is followed by four alternative answers. For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by ball-point pen as mentioned in the guidelines given on the first page of the Answer Sheet.
9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.
10. Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero mark).
11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.
12. Deposit only the OMR Answer Sheet at the end of the Test.
13. You are not permitted to leave the Examination Hall until the end of the Test.
14. If a candidate attempts to leave the Examination Hall before the end of the Test, he/she shall be liable to such punishment as the University may determine.

[उपर्युक्त निर्देश हिन्दी में अन्तिम आवरण-पृष्ठ पर दिये गए हैं]

Total No. of Printed Pages : 21

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ROUGH WORK
रफ़ कार्य

-FSE

M.Sc. (Ag) in Soil & Water Conservation code no
(702)

17P/305/25

2017

No. of Questions : 120

Time : 2 Hours]

[Full Marks : 360

Note : (i) Attempt as many questions as you can. Each question carries 3 (Three) marks. **One mark will be deducted for each incorrect answer. Zero mark will be awarded for each unattempted question.**

(ii) If more than one alternative answers seem to be approximate to the correct answer, choose the closest one.

1. The micro-organism that is considered most important as an indicator of soil quality is :
(1) Bacteria (2) Fungi (3) Actinomycetes (4) Algae
2. Among the four which is an essential micronutrient required for plant growth ?
(1) Aluminium (2) Cobalt (3) Nickel (4) Copper
3. On an average, the nitrogen content of well decomposed FYM in India is :
(1) 0.3 p.c. (2) 0.5 p.c. (3) 0.7 p.c. (4) 0.9 p.c.
4. The volumetric moisture content of soil can be computed by multiplying the gravimetric moisture content with :
(1) Particle density (2) Bulk density
(3) Porosity (4) Void ratio

(1)

(Turn Over)

12. Mycorrhiza is associated with :
- (1) Stem (2) Leaf (3) Root (4) Flower
13. Which of the following is an active factor of soil formation ?
- (1) Parent material (2) Climate
(3) Time (4) Relief
14. Which of the following elements has highest concentration in earth's crust ?
- (1) Iron (2) Silicon (3) Magnesium (4) Calcium
15. Sticking of two different nature of particles is called :
- (1) Flocculation (2) Cohesion
(3) Deflocculation (4) Adhesion
16. Which of the following soil order is not found in India ?
- (1) Mollisol (2) Vertisol (3) Gellisol (4) Inceptisol
17. The size of silt particles in ISSS system is :
- (1) 2 mm to 0.2 mm (2) 0.2 mm to 0.02 mm
(3) 0.02 mm to 0.002 mm (4) ≤ 0.002 mm
18. Which of the following is a metamorphic rock ?
- (1) Sandstone (2) Dolomite (3) Granite (4) Gneiss

(3)

(Turn Over)

26. Plant available water in soil is :
- (1) 0 to -20 bar (2) -1/3 to -15 bar
 (3) -1 to -15 bar (4) -1/3 to -20 bar
27. Lime is used as an amendment to reclaim :
- (1) sodic soils (2) acid soils
 (3) calcareous soils (4) saline soils
28. The smallest volume of soil that can be recognized as a soil individual is called as :
- (1) Pedon (2) Polypedon (3) Soil Profile (4) Soil Horizon
29. Phosphorus is taken by plants in the form of :
- (1) H_3PO_4 (2) PO_4^{3-} (3) $H_2PO_4^-$ (4) P^{3-}
30. The logarithm of the negative pressure head in centimeter height of water is :
- (1) pF (2) pH (3) Eh (4) Gh
31. The process of biological conversion of ammonia into nitrate is known as :
- (1) ammonification (2) nitrification
 (3) humification (4) denitrification
32. Ammonia is transformed to nitrate in the soil by :
- (1) fungi (2) algae (3) bacteria (4) earthworms
 (5)

(Turn Over)



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33. The C : N ratio of a normal mineral cultivated soil is :

- (1) 6 to 8 (2) 10 to 12 (3) 14 to 16 (4) 18 to 20

34. The ESP of sodic soil is :

- (1) less than 15 (2) more than 10
(3) more than 5 (4) more than 15

35. The 2 : 2 type of mineral is the characteristics of :

- (1) Vermiculite (2) Chlorite
(3) Montmorillonite (4) Illite

36. Gypsum is used as amendment for the reclamation of :

- (1) saline soil (2) sodic soil
(3) calcareous soil (4) acid sulphate soil

37. Saline soils have the characteristics of :

- (1) $EC > 4$ mmhos/cm, $pH > 8.5$ and $ESP > 15$
(2) $EC < 4$ mmhos/cm, $pH > 8.5$ and $ESP > 15$
(3) $EC > 4$ mmhos/cm, $pH < 8.5$ and $ESP < 15$
(4) $EC < 4$ mmhos/cm, $pH < 8.5$ and $ESP < 15$.

(6)

(Continued)

38. The working range of soil tensiometer is :
- (1) 0-1.0 bar (2) 0-0.85 bar (3) 0-1.85 bar (4) 0-1.5 bar
39. The Rhizobium is :
- (1) known to fix nitrogen in cereals
- (2) a fungus that symbiotically fixes nitrogen in legumes
- (3) a bacteria found in roots of sugarcane
- (4) known to fix nitrogen in roots of legumes
40. Which of the following is not essential for plants ?
- (1) Calcium (2) Molybdenum (3) Iodine (4) Chlorine
41. Soils containing high organic matter normally have :
- (1) light colour (2) red colour
- (3) dark-brown colour (4) yellow colour
42. Sandstone and limestone are examples of :
- (1) sedimentary rocks (2) igneous rocks
- (3) metamorphic rocks (4) mixed rocks
43. The highest unit of soil classification in soil taxonomy is :
- (1) Order (2) Great group (3) Family (4) Series

(17)
(Turn Over)



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44. Major plant usable water in soils is :

- (1) capillary (2) gravitational water
(3) hygroscopic water (4) lattice water

45. A soil having available P of 30 kg/ha will be rated as :

- (1) high (2) medium (3) low (4) very low

46. Content of organic matter in a typical mineral soil on volume basis :

- (1) 2% (2) 10% (3) 15% (4) 5%

47. The property that is not affected by the amount of organic matter in the soil is :

- (1) Cation exchange capacity (2) Soil texture
(3) Biological activity (4) Soil structure

48. Percentage of nitrogen in diammonium phosphate (DAP) is :

- (1) 21% (2) 18% (3) 46% (4) 60%

49. Neutron moisture meter is not suitable in :

- (1) waterlogged soil (2) acid soil
(3) alkaline soil (4) organic soil

(8)

(Continued)

50. Micronutrient contents in soils are measured by which instrument ?

- (1) Atomic absorption spectrophotometer
- (2) Flame photometer
- (3) Colorimeter
- (4) Conductivity meter

51. Which of the following element helps to prevent lodging in plants ?

- (1) Nitrogen
- (2) Phosphorus
- (3) Sulphur
- (4) Potassium

52. Which of the following is most popular zinc fertilizer ?

- (1) zinc sulphate
- (2) zinc carbonate
- (3) zinc chloride
- (4) zinc EDTA

53. Factor for converting organic carbon into organic matter is :

- (1) 1.724
- (2) 1.921
- (3) 2.724
- (4) 2.921

54. High analysis fertilizers are those :

- (1) which require high cost of analysis
- (2) which require high level analysis procedure
- (3) which contain high percentage of nutrient element
- (4) whose analysis show higher percentage of nutrient than actual content

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55. Which chemicals are not used as amendments for reclaiming the alkali soils ?

- (1) Gypsum (2) Pyrites (3) Sulphur (4) Limestone

56. Under what condition denitrification is a major mechanism of nitrogen loss from soil ?

- (1) Well drained soil (2) Fallow land
(3) Submerged soil (4) Pasture land

57. The Indian Institute of Soil Science is situated at :

- (1) New Delhi (2) Bangaluru (3) Bhopal (4) Ahmedabad

58. Dispersing agent used in particle size analysis of soil is :

- (1) Sodium carbonate (2) Sodium hexametaphosphate
(3) Sodium thiosulphate (4) Sodium phosphate

59. Fick's law govern the mechanism of :

- (1) mass flow (2) capillary movement
(3) diffusion (4) laminar flow

60. How many number of classes consist in land capability classification ?

- (1) 8 (2) 4 (3) 6 (4) 10

(10)

(Continued)

61. Which of the following is an acid igneous rock ?
(1) Basalt (2) Graphite (3) Granite (4) Gypsum
62. In land capability classification, land suitable for cultivation are from class :
(1) I to III (2) I to V (3) I to IV (4) I to II
63. Diethylene triamine penta acetic acid (DTPA) is used for estimation of :
(1) Ca, Mg and S (2) N, P and K
(3) Fe, Mn, Cu and Zn (4) B, Mo and Cl
64. Under normal field condition, the soil water potential is :
(1) Positive (2) Negative
(3) Zero (4) Unity
65. Pressure plate apparatus is used for measurement of soil moisture tension up to :
(1) 0.33 bars (2) 31 bars
(3) 4.2 bars (4) 15 bars
66. Water tightly held in thin films around soil particles is :
(1) Hygroscopic water (2) Gravitational water
(3) Capillary water (4) Heavy water

(11)

(Turn Over)



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67. Per cent solid space in soil is expressed by :

- (1) Bulk density/Particle density \times 100
- (2) Particle density/Bulk density \times 100
- (3) (Particle density – Bulk density) \times 100
- (4) (Bulk density – Particle density) \times 100

68. Tensiometer is used to measure :

- (1) gravitational potential
- (2) matric potential
- (3) osmotic potential
- (4) pressure potential

69. The conversion factor to convert % P to % P_2O_5 is :

- (1) 1.29
- (2) 2.90
- (3) 2.29
- (4) 0.4

70. Net mineralization of soil nitrogen occurs when C : N ratio of organic matter is :

- (1) < 20:1
- (2) 20-30:1
- (3) > 30:1
- (4) > 300:1

71. Soil horizons A, B and C (A + B + C) are collectively called as :

- (1) Pedon
- (2) Soil profile
- (3) Soil regolith
- (4) Soil solum

72. Which fertilizer is not produced in the country ?

- (1) Urea
- (2) DAP
- (3) CAN
- (4) MOP

73. Soil compaction, increases the :

- (1) Bulk density (2) Hydraulic conductivity
(3) Macrospores (4) Water intake rate

74. Total pore space of a soil gives an idea about :

- (1) Maximum water holding capacity (2) Field capacity
(3) Capillary water (4) Gravitational water

75. Of the following humic substances, which is insoluble in both acid and alkali ?

- (1) Humic acids (2) Fulvic acids (3) Humin (4) All

76. Which element imparts red colour to the soil ?

- (1) Ca (2) Mg (3) Fe (4) S

77. The most productive soil of India is :

- (1) Alluvial soil (2) Laterite soil (3) Black soil (4) Saline soil

78. Scattering of detached soil particles by the impact of rain drops is called :

- (1) Splash erosion (2) Sheet erosion
(3) Gully erosion (4) Ravines



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79. In Universal soil loss equation, $A = RKLSCP$, K denotes :

- (1) Soil conservation practices
- (2) Soil roughness
- (3) Soil erodability
- (4) Rainfall factor

80. Biofertilisers are :

- (1) products contain living cells of different types of micro-organism
- (2) mixture of vermicomposts and inorganic fertilisers
- (3) mixture of vermicomposts and farm yard manures
- (4) mixture of organic manures and inorganic fertilizers

81. Flame photometer is used in the determination of :

- (1) P
- (2) K
- (3) S
- (4) Zn

82. Of the following, which one is important with regards to soil erosion by water ?

- (1) Intensity of rainfall
- (2) Duration of rainfall
- (3) Amount of rainfall
- (4) Frequency of rainfall

83. Which type of erosion is the most highly visible ?

- (1) Gully erosion
- (2) Wind erosion
- (3) Sheet erosion
- (4) Splash erosion

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(Continued)

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90. Rocks formed by cooling of molten materials (magma) is called as :

- | | |
|-----------------------|---------------------|
| (1) Metamorphic rocks | (2) Igneous rocks |
| (3) Sedimentary rocks | (4) Secondary rocks |

91. Materials transported and deposited by water are called as :

- | | |
|--------------|---------------|
| (1) Alluvium | (2) Colluvium |
| (3) Loess | (4) Aeolian |

92. Leaching of soluble salts from either by irrigation water or rain water is called as :

- | | |
|--------------------|------------------|
| (1) Alkalization | (2) Salinization |
| (3) Desalinization | (4) Solodization |

93. Soil order that is dominantly organic in nature is :

- | | |
|---------------|---------------|
| (1) Mollisols | (2) Spodosols |
| (3) Histosols | (4) Andosols |

94. Argillic subsurface diagnostic horizon is a diagnostic feature of :

- | | |
|----------------------------------|--------------------|
| (1) Black soils | (2) Red soils |
| (3) Laterite and lateritic soils | (4) Alluvial soils |

95. Organic matter in soil can be decomposed by :

- (1) Hydrogen peroxide (2) Sodium carbonates
 (3) Sodium hydroxide (4) Sulphuric acid

96. More accurate analysis of soil texture can be done by :

- (1) Hydrometer method (2) International pipette method
 (3) Aggregate method (4) Yoder method

97. In Stocks' law ' η ' denotes :

- (1) Density (2) Gravity (3) Viscosity (4) Velocity

98. Neutron moisture probe estimates moisture in soil by detecting molecules of :

- (1) Water (2) Oxygen (3) Hydrogen (4) Carbon

99. The arrangement of primary and secondary soil particles is called as :

- (1) Soil structure (2) Soil texture
 (3) Soil consistency (4) Soil plasticity

100. Particle density (g cm^{-3}) =

- (1) ~~Weight of moist soil/volume of soil~~
 (2) ~~Weight of dry soil/volume of soil~~
 (3) ~~Weight of dry soil/volume of soil particles~~
 (4) ~~Volume of soil/weight of moist soil~~

(17)

(Turn Over)



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101. The method of soil structure characterization and evaluation that was described by Yodder is :

- | | |
|---------------------|--------------------------|
| (1) Stability index | (2) Wet sieving |
| (3) Dry sieving | (4) Mean weight diameter |

102. Anion responsible for soil aggregation is :

- | | |
|--------------|---------------|
| (1) Nitrate | (2) Phosphate |
| (3) Sulphate | (4) Molybdate |

103. Crops conducive for the formation of well structured soils :

- | | |
|-------------|--------------|
| (1) Grasses | (2) Cereals |
| (3) Millets | (4) Oilseeds |

104. The process of water entry into soil through the surface may be either downward or lateral or both is called as :

- | | |
|-----------------|------------------|
| (1) Percolation | (2) Infiltration |
| (3) Seepage | (4) Leaching |

105. The formula $q = k \Delta H/L$ is :

- | | |
|------------------|------------------------|
| (1) Darcy's law | (2) Hydraulic gradient |
| (3) Flux density | (4) Fick's law |

106. What is the unit of hydraulic conductivity ?

- (1) cm sec^{-2} (2) m sec^{-1} (3) cm sec^{-1} (4) m sec^{-2}

107. The potential results from the presence of solutes in soil water is called as :

- (1) Pressure potential (2) Osmotic potential
(3) Metric potential (4) Gravitational potential

108. In saturated soil, the value of metric potential is :

- (1) Unity (2) Zero (3) Positive (4) Negative

109. What is the soil water potential at plant available water ?

- (1) 10 kPa-30 kPa (2) 33 kPa
(3) 1500 kPa (4) 33 kPa-1500 kPa

110. The pF scale was given by :

- (1) Sorenson (2) Atterberg
(3) White and Beckett (4) Schofield

111. Arrange the following soil texture in the order of decreasing water retention capacity :

- (1) Loam > Clay > Sandy (2) Sandy > Loam > Clay
(3) Clay > Loam > Sandy (4) Sandy > Clay > Loam



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112. Identify particle sizes by least to greatest or fine to coarse :

- (1) Sand, Silt, Clay (2) Clay, Sand, Silt
(3) Silt, Sand, Clay (4) Clay, Silt, Sand

113. Which one of the following is responsible for the dispersion of soil particles ?

- (1) Exchangeable calcium (2) Exchangeable magnesium
(3) Exchangeable sodium (4) Exchangeable potassium

114. Volume of soil under the influence of roots of growing plants is known as :

- (1) surface soil (2) sub-surface soil
(3) rhizosphere (4) solum

115. Humic acids are soluble in :

- (1) Alkali (2) Acid (3) Alcohol (4) Water

116. Alkaline permanganate method is used for the estimation of :

- (1) Total nitrogen (2) Available nitrogen
(3) Nitrate nitrogen (4) Ammonical nitrogen

117. Which nutrient is a constituent of chlorophyll and chromosomes ?

- (1) Mg (2) Fe (3) P (4) Ca

(20)

(Continued)

118. What is the optimum pH for the availability of most of the plant nutrients ?

- (1) 5.0-6.0 (2) 6.0-7.0 (3) 6.5-7.5 (4) 6.0-8.0

119. Critical soil test level approach was given by :

- (1) Cate and Nelson (2) Arnon and Stout
(3) Larsen (4) Bray

120. The science of soil where attention is given to the soil-plant relationship would be known as :

- (1) Geology (2) Petrology
(3) Edaphology (4) Pedology

ROUGH WORK
रफ़ कार्य

अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण-पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली या काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 30 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।
2. परीक्षा भवन में लिफाफा रहित प्रवेश-पत्र के अतिरिक्त, लिखा या सादा कोई भी खुला कागज साथ में न लायें।
3. उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा, केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।
4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।
5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।
6. ओ. एम. आर. पत्र पर अनुक्रमांक संख्या, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक संख्या और ओ. एम. आर. पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।
7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।
8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिये आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।
9. प्रत्येक प्रश्न के उत्तर के लिये केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।
10. ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो सम्बन्धित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ़ कार्य के लिये प्रश्न-पुस्तिका के मुखपृष्ठ के अन्दर वाले पृष्ठ तथा अंतिम पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त केवल ओ. एम. आर. उत्तर-पत्र परीक्षा भवन में जमा कर दें।
13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।
14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की, भागी होगा/होगी।

