

RET/15/Test B**750****Soil Sc. & Agricultural Chem.****100**

Question Booklet No.

(To be filled up by the candidate by **blue/black ballpoint pen**)

Roll No.

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Roll No. (Write the digits in words)

Serial No. of OMR Answer Sheet

Day and Date

(Signature of Invigilator)

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

1. Within 10 minutes of the issue of the Question Booklet, Please ensure that you have got the correct booklet and it contains all the pages in correct sequence and 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.*
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 Roll No. and OMR sheet No. on the Question Booklet.*
7. *Any changes in the aforesaid-entries is to be verified by the invigilator, otherwise it will be taken as unfair means.*
8. *This Booklet contains 40 multiple choice questions followed by 10 short answer questions. For each MCQ, 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 pen as mentioned in the guidelines given on the first page of the Answer Sheet. For answering any five short Answer Questions use five Blank pages attached at the end of this Question Booklet.*
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 marks).*
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 both OMR Answer Sheet and Question Booklet 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 use any form of unfair means he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 15

FOR ROUGH WORK



Research Entrance Test – 2015

No. of Questions : 50

Time : 2 Hours

Full Marks : 200

- Note :** (i) This Question Booklet contains **40** Multiple Choice Questions followed by **10** Short Answer Questions.
- (ii) Attempt as many MCQs as you can. Each MCQ carries **3 (Three)** marks. **1 (One)** mark will be deducted for each incorrect answer. **Zero** mark will be awarded for each unattempted question. If more than **one** alternative answers of MCQs seem to be **approximate** to the correct answer, choose the closest one.
- (iii) Answer only **5** Short Answer Questions. Each question carries **16 (Sixteen)** marks and should be answered in **150-200** words. **Blank 5 (Five)** pages attached with this booklet shall only be used for the purpose. Answer each question on separate page, after writing Question No.

1. "Fluid mosaic model" relates to the structure of :
(1) Cell wall (2) Protoplasm
(3) Plasma membrane (4) Nucleic acid
2. Spongy tissue of mango is a :
(1) Bacterial disease (2) Physiological disease
(3) Viral disease (4) Fungal disease
3. A purpose of initiating a conscious and purposeful action is called :
(1) Education (2) Motivation (3) Action (4) Coordination
4. Yellow colour of egg is due to :
(1) Carotene (2) Xanthophyll (3) Anthocyanin (4) Vitamin B
5. During prophase-I of meiosis crossing over occurs at :
(1) Zygotene (2) Pachytene (3) Diplotene (4) Diakinesis
6. In which crop the use of Blue-Green Algae as a bio-fertilizer will be most useful ?
(1) Maize (2) Potato (3) Rice (4) Sugarcane
7. Lycopene pigment is present in :
(1) Beetroot (2) Tomato (3) Radish (4) Chilli
8. Ooze test is done to detect :
(1) Bacterial disease (2) Fungal disease
(3) Viral disease (4) All of these
9. Number of chromosome in wheat endosperm is :
(1) 21 (2) 42 (3) 63 (4) 14
10. Acridine orange is used for inducing :
(1) DNA denaturation (2) Mutagenesis
(3) Chiasma formation (4) Bacterial transduction

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11. Clay mineral that has lowest CEC is :
- (1) Kaolinite (2) Illite
(3) Montmorillonite (4) Nontronite
12. The size of clay particles in ISSS system is :
- (1) 2 mm to 0.2 mm (2) 0.2 to 0.02 mm
(3) 0.02 to 0.002 mm (4) Less than 0.002 mm
13. The most abundant element in the earth's crust is :
- (1) Mn (2) O
(3) Fe (4) Al
14. Water held at 33 kPa suction is called :
- (1) Partially available water (2) Field capacity water
(3) Drainage water (4) Soil Moisture
15. Marble is a metamorphic rock that has originated from :
- (1) Limestone (2) Coal
(3) Granite (4) Shale
16. Which of the soil order is not found in India :
- (1) Mollisol (2) Vertisol
(3) Gellisol (4) Inceptisol
17. An example of 2:1:1 type of clay mineral is :
- (1) Chlorite (2) Mica
(3) Smectite (4) Illite
18. The highest buffering capacity of soils is generally observed at :
- (1) 100% base saturation (2) 50% base saturation
(3) 25% base saturation (4) 0% base saturation

19. What will happen if water is added to a salt solution containing cations of different valencies and in equilibrium with a soil :
- (1) Some of the higher valency cations present on soil surface will be released into solution
 - (2) Some of the higher valency cations present in solution will be taken up by the soil
 - (3) This will affect only monovalent cations
 - (4) This will not affect the equilibrium at all
20. The phosphate ion may replace a structural hydroxyl of oxides of iron or aluminium to form :
- (1) Inner sphere complex
 - (2) Outer sphere complex
 - (3) Occluded P
 - (4) Water soluble complex
21. 20 g of a soil with CEC 15 C mol kg^{-1} was leached with ammonium acetate solution. If the extract contained 0.02 g Ca, 0.006 g Mg, 0.0115 g Na and 0.0195 g K, the percent base saturation of the soil will be :
- (1) 100
 - (2) 83.3
 - (3) 75.5
 - (4) 50
22. Those metals which volatilize and move to atmosphere through methylation are :
- (1) Cd, Cr & Se
 - (2) Hg, As & Se
 - (3) Ni, Cd & Hg
 - (4) Zn, Cd & Ni
23. Chromium is phytotoxic in the form of :
- (1) Metal (o)
 - (2) Divalent
 - (3) Trivalent
 - (4) Hexavalent
24. The unit of expression of the dehydrogenase activity in soil is :
- (1) $\mu\text{gTPFg}^{-1}\text{day}^{-1}$
 - (2) $\mu\text{gTTCg}^{-1}\text{h}^{-1}$
 - (3) $\mu\text{gTPFg}^{-1}\text{h}^{-1}$
 - (4) $\mu\text{gTTCg}^{-1}\text{day}^{-1}$

25. Na-EDTA forms complex with $\text{Ca}^{2+} + \text{Mg}^{2+}$ at :
- (1) pH 7 (2) pH 5.5
(3) pH 10 (4) pH 6.5
26. Hydride generator is needed in AAS for the analysis of :
- (1) As & Se (2) Zn & Fe
(3) Cr & Ni (4) Mn & Cu
27. Nessler's reagent is composed of :
- (1) HgI + KOH (2) HgI + KI
(3) HgI + KI + KOH (4) HgI
28. *Deraxia* is a :
- (1) Aerobic bacteria (2) Anaerobic bacteria
(3) Facultative anaerobic bacteria (4) Facultative aerobic bacteria
29. Lichen is an association of :
- (1) Algae and Fern (2) Fungi and plant roots
(3) Legume- *Rhizobium* (4) Algae and Fungi
30. Grams' reaction of bacteria is mostly governed by the content of :
- (1) Chitin (2) Peptidoglycan
(3) Nucleic acids (4) Cellulose
31. Soil viruses are :
- (1) Obligate parasite (2) Facultative parasite
(3) Saprophyte (4) Facultative saprophyte
32. Harting net is formed by :
- (1) N_2 -fixing *Rhizobium* (2) Ectotrophic mycorrhiza
(3) N_2 -fixing *Frankia* (4) P-solubilizers

33. Cryoturbation is evident in :
- (1) Vertisols (2) Histosols
(3) Fluvisols (4) Gelisols
34. Horizons dominated by Properties of one master horizon but having subordinate properties of another is referred as :
- (1) Combination horizons (2) Transitional horizons
(3) Illuvial horizons (4) Eluvial horizons
35. Slickensides reveal following soil character :
- (1) Relief of soil surface (2) Wedge shaped ped faces
(3) Policed and groved ped faces (4) Broken ped faces
36. Which of the following subordinate distinction is used as suffix with master horizons to express accumulation of salt :
- (1) s (2) ss (3) z (4) y
37. Most important feature of soil taxonomy is :
- (1) Its Nomenclature system (2) It is based on properties of soil
(3) It is a flexible system (4) It provides place to all soils
38. DRIS approach was given by :
- (1) Bray (2) Jackson (3) Beaufils (4) Nelson
39. Anion exchange capacity is highest in :
- (1) Illite (2) Kaolinite
(3) Montmorillonite (4) Vermicullite
40. Acid sulphate soils are formed due to :
- (1) Reduction of sulphates
(2) Oxidation of sulphides
(3) Evolution of H_2S
(4) Use of ammonium sulphate fertilizers

Attempt any five questions. Write answer in 150-200 words. Each question carries 16 marks. Answer each question on separate page, after writing Question Number.

1. What are the factors that determine the total amount of nitrogen in a place ? What happens when a material of high C/N ratio is added to a soil just before planting of crops ?
2. Why is the phosphorus use efficiency of phosphatic fertilizers always low ? Discuss the factors that influence the soil solution phosphorus concentration.
3. Classify the types of soil clay and give the salient characteristics of each class of clay.
4. What happens when a soil is submerged ? Discuss the sequence of changes that occurs on soil submergence.
5. What is Bragg's Law ? How will you identify a clay mineral using x-ray diffraction technique ?
6. Give an account of merits and demerits associated with the application of the following waste materials to soil :
 - (a) Sewage and sludge
 - (b) Fly ash and
 - (c) Distillery effluents
7. What is cross inoculation group ? State significance of cross inoculation groups in cultivation of legume crops.
8. Classify the bacteria on basis of their mode of nutrition and describe in brief the role of chemoautotrophs in transformation of nitrogen.
9. Describe the concept of pedon and polypedon. How pedons differ from soil profile ? Explain the role of leaching of water in soil horizon development.
10. Draw a typical soil-moisture characteristic curve and briefly explain the physical and biological classification of soil water.

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