

Set No. : 1

RET/14/TEST-B

Question Booklet No.

750

Soil Sc. & Ag. Chem.

(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)

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 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 change 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 pages 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 : 16

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ROUGH WORK
रफ़ कार्य

No. of Questions : 50

Time : 2 Hours

Full Marks : 200

- Note:** (1) This Question Booklet contains **40** Multiple Choice Questions followed by **10** Short Answer Questions.
- (2) 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.
- (3) 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.

- 01.** Which one of the following is **not** a kharif crop :
- (1) Paddy (2) Maize
(3) Mustard (4) Arhar
- 02.** Select the crop, which is used for green manuring :
- (1) Daincha (sunhemp) (2) Sugarcane
(3) Tobacco (4) Onion
- 03.** Panama wilt disease is found in :
- (1) Papaya (2) Mango
(3) Peach (4) Banana
- 04.** Osmotic expansion of a cell kept in water is chiefly regulated by :
- (1) Ribosomes (2) Mitochondria
(3) Plastids (4) Vacuoles
- 05.** Community Development Programme was started in :
- (1) 1952 (2) 1965
(3) 1957 (4) 1960
- 06.** Food grains have :
- (1) Inelastic demand (2) Elastic demand
(3) Perfectly elastic demand (4) Perfectly inelastic demand
- 07.** The disease "rickets" in animal is caused due to deficiency of :
- (1) Vitamin A (2) Vitamin B
(3) Vitamin C (4) Vitamin D
- 08.** For comparing the variability of the two series, which one of the following measures is used :
- (1) Standard Deviation (2) Mean Deviation
(3) Range (4) Coefficient of Variation

- 09.** Which one of the following is an anticoagulant ?
- (1) Heparin (2) Interleukin
(3) Plasmin (4) Lymphokine
- 10.** The fertility of soil is reduced by :
- (1) Alternate cropping (2) Intensive cropping
(3) Nitrogen fixing bacteria (4) None of the above
- 11.** Itai-itai disease of human is linked with the toxicity of :
- (1) Cl (2) Co (3) Cu (4) Cd
- 12.** Most important parameter for judging suitability of proper operation of sewage treatment plant is :
- (1) DO (2) BOD
(3) COD (4) Turbidity
- 13.** Which of the following pesticides is adsorbed in highest amount on soil surface ?
- (1) Paraquat (2) 2,4-D
(3) Lindane (4) Fenitrothion
- 14.** The principle that governs sharing of corners/edges/ faces of tetrahedral/ octahedral units is :
- (1) Pauling's rules (2) Goldschmith's law
(3) Keppler's law (4) Mitscherlich's law
- 15.** A 2:1 clay mineral with no charge is :
- (1) Talc (2) Mica
(3) Smectite (4) Vermiculite

16. The acid soluble component of humus is :
- (1) Humic acid (2) Fulvic acid
(3) Humin (4) Hymatomelanic acid
17. ZPC of SiO_2 is around :
- (1) 2 (2) 6.5 (3) 8 (4) 9.5
18. Al(OH)_3^0 species of Al is present in soil at the following pH :
- (1) <4.7 (2) 4.7 - 6.5
(3) 6.5 - 8 (4) >8
19. Shelter belt is used for the control of :
- (1) Water erosion (2) Wind erosion
(3) Glacial erosion (4) Gully erosion
20. 'White bud disease' of maize is caused by the deficiency of :
- (1) B (2) Mo (3) Cu (4) Zn
21. Which of the following is a beneficial element ?
- (1) Zn (2) B (3) Ni (4) Si
22. Microbes involved in nitrification process are known as :
- (1) Phototrophs (2) Heterotrophs
(3) Chemo-autotrophs (4) Organotrophs
23. 2-chloro-6 trichloromethyl-pyridine is the formula of which one of the following nitrification inhibitors :
- (1) N-serve (2) AM
(3) Pyridine (4) Pyrimidine

24. Bacteria useful to generate biogas are known as :
- | | |
|-----------------|------------------|
| (1) PGPR | (2) Methanotrops |
| (3) Methanogens | (4) Nitrifiers |
25. How many electrons are released during bio-oxidation of NH_4^+ to NO_3^- :
- | | | | |
|-------|-------|-------|-------|
| (1) 5 | (2) 6 | (3) 7 | (4) 8 |
|-------|-------|-------|-------|
26. Nature of *azospirillum* is :
- | | |
|---------------------|--------------------------|
| (1) Aerobic | (2) Anaerobic |
| (3) Microaerophilic | (4) Facultative anaerobe |
27. The lower limit of soil for soil classification is arbitrarily set at :
- | | | | |
|-----------|------------|--------------|------------|
| (1) 200 m | (2) 200 cm | (3) 200 inch | (4) 200 km |
|-----------|------------|--------------|------------|
28. Horizon dominated by the properties of one master horizon but having subordinate properties of another is called :
- | | |
|-------------------------|--------------------------|
| (1) Combination horizon | (2) Diagnostic horizon |
| (3) Genetic horizon | (4) Transitional horizon |
29. Which of the following designation indicates the evidence of cryoturbation ?
- | | | | |
|-------|--------|--------|--------|
| (1) k | (2) ff | (3) jj | (4) ss |
|-------|--------|--------|--------|
30. Which of the following is not a category of soil taxonomy ?
- | | |
|---------------|---------------|
| (1) Sub group | (2) Series |
| (3) Phase | (4) Sub order |
31. Which of the following minerals is dominant in oxisols ?
- | | |
|---------------|---------------------|
| (1) Illite | (2) Chlorite |
| (3) Kaolinite | (4) Montmorillonite |

32. In Munsell colour system the relative purity of spectral colour is referred by :
- | | |
|------------|-------------|
| (1) Hue | (2) Value |
| (3) Chroma | (4) Neutral |
33. If bulk density of a soil is 1.5 Mg/m^3 then the weight of 0.1m depth of 1 hectare soil is :
- | | |
|----------------------------------|---------------------------------|
| (1) $7.5 \times 10^5 \text{ Kg}$ | (2) $10 \times 10^5 \text{ Kg}$ |
| (3) $15 \times 10^5 \text{ Kg}$ | (4) $20 \times 10^5 \text{ Kg}$ |
34. The porosity of a soil mass is 32.10%. What is its void ratio expressed in percent ?
- | | |
|-----------|-----------|
| (1) 47.28 | (2) 52.38 |
| (3) 67.90 | (4) 72.80 |
35. The equation representing the flow of water in saturated soil is :
- | | |
|---------------------------|------------------------------|
| (1) Poiseuille's equation | (2) Bernoulli's equation |
| (3) Darcy's equation | (4) Navier - Stokes equation |
36. In the formation of organo metallic complex, metal ion acts as :
- | | |
|-----------------------|--------------------|
| (1) Ligand | (2) Electron donor |
| (3) Electron acceptor | (4) Inertion |
37. Methanogenesis in water logged soil takes place at Eh of :
- | | |
|----------------------------|----------------------------|
| (1) $< - 200 \text{ mV}$ | (2) $200 - 300 \text{ mV}$ |
| (3) $300 - 400 \text{ mV}$ | (4) $> 400 \text{ mV}$ |
38. Methyl orange indicator is used for titration of :
- | | |
|-------------------------------|-----------------------------|
| (1) strong acid - strong base | (2) Strong acid - weak base |
| (3) Weak acid - strong base | (4) Weak acid - weak base |

- 39.** Which chemical is not a constituent of Nessler's reagent ?
- (1) HgI (2) KI
(3) KOH (4) KCl
- 40.** The extractant for Zn, Fe, Cu, Mn (DTPA+TEA+CaCl₂) is buffered at pH of :
- (1) 6.5 (2) 7.0 (3) 8.0 (4) 7.3

Short Answer Questions

Note : 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.

01. Give an account of green house gases and global warming. Discuss the management practices adopted to minimize generation of green house gases and global warming.
02. Discuss the mechanism of the functioning of the following instruments :
(A) Flame photometer (B) AAS (C) Neutron probe
03. How does charge develop in a clay crystal ? Explain the factors on which the width of diffuse double layer depends ?
04. Discuss the mechanism of potassium fixation in soil. What is step k and constant rate K ? How can potassium fixation be minimized ?
05. What do you mean by geologic and accelerated soil erosion ? Discuss the various measures adopted for the control of water erosion.
06. What are the problems associated with the use of nitrogenous fertilizers in water logged soils ? Discuss the ways and means to minimize the losses under these situations.
07. What is site specific nutrient management ? How is precision agriculture helpful in enhancing site specific application of nutrients ?
08. How do ectomycorrhizal fungi nourish symbiont plants with phosphorus ?

09. Write in brief about the following :

- (A) Gilgai micro relief
- (B) Haplization
- (C) Slickensides
- (D) Redoximorphic features

10. What do you mean by degradation of soil structure ? Discuss the causes of soil degradation.

Question No.

प्रश्न संख्या

Page for Short Answer

लघु उत्तरीय के लिए पृष्ठ

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750/Soil Sc. & Ag. Chem.

Question No.
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Page for Short Answer
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अभ्यर्थियों के लिए निर्देश

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

1. प्रश्न पुस्तिका मिलने के 10 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. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमांक और ओ० एम० आर० 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 लिए 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 लिए 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 संबंधित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ कार्य के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के 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।