

Question Booklet No.

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

Roll No.

--	--	--	--	--	--	--	--	--	--

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 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.

FOR ROUGH WORK

Research Entrance Test – 2013

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. One Horse Power (HP) is expressed in term of watt which is
(1) 720 (2) 786 (3) 746 (4) None of these
2. Number of segments present in insect head is :
(1) Two (2) Four (3) Six (4) Seven
3. Deficiency symptom of sulphur first appears an :
(1) Younger leaves (2) Older leaves
(3) Middle leaves (4) None of these
4. Protein content in lentil is :
(1) 18% (2) 25% (3) 16% (4) 20%
5. Demonstration showing how to do things is called
(1) Method demonstration (2) Result demonstration
(3) Training (4) Frontline demonstration
6. Dithane M-45 is a :
(1) Bactericide (2) Insecticide (3) Fungicide (4) Nematicide
7. Jamunapari is a breed of :
(1) Cow (2) Goat
(3) Buffalo (4) None of the above
8. Select the correct formula of urea
(1) $H_2NCO_2NH_2$ (2) $HNCONH$
(3) H_2NCONH_2 (4) H_4NCONH_4
9. The measure of central tendency is
(1) Median (2) Mode
(3) Mean (4) All of the above
10. On which of the following plant Gregor Mendal perform his classical experiment ?
(1) Gram (2) Maize (3) Pea (4) Rice

11. Value of $1/n$ in Langmuir type adsorption of pesticide on soil surface is :
 (1) >1.0 (2) <1.0 (3) 1.0 (4) 0.1
12. Which element is not methylated in environment ?
 (1) Hg (2) As
 (3) Se (4) Zn
13. Eutrophication is linked with the element :
 (1) P (2) Zn (3) As (4) K
14. β -Glucosidases are responsible for the degradation of :
 (1) Cellulose (2) Cellobiose
 (3) Hemicellulose (4) Maltose
15. The chemical composition of Bray P_1 differs from Bray P_2 extractant in respect of concentration of :
 (1) Ammonium fluoride (2) Hydrochloric acid
 (3) Ammonium oxalate (4) Orthophosphoric acid
16. The critical limit of two micronutrients in soil are same. These nutrients are :
 (1) Copper & Molybdenum (2) Boron & Iron
 (3) Zinc & Molybdenum (4) Manganese and Boron
17. Which one of the following laws is followed by mobile nutrient elements ?
 (1) Liebig's law (2) Mitscherlich's equation
 (3) Baule concept (4) Spillman's equation
18. The redox potential of well aerated soil is in the range of :
 (1) +700 to +400 (2) +300 to +200
 (3) +100 to -100 (4) -100 to -300

19. Which of the following crops does not respond to liming in acid soils ?
 (1) Maize (2) Groundnut
 (3) Black gram (4) Transplanted rice
20. Which of the following is a combination horizon ?
 (1) EB (2) E/B (3) B (4) C
21. Slickensides are found in soil order :
 (1) Gelisol (2) Andisol
 (3) Vertisol (4) Histosol
22. Availability of micro nutrients in soil increases with decrease in pH of soil except :
 (1) Cu (2) Mo (3) Zn (4) Fe
23. Plant available water in soil is held between potential of :
 (1) 0 to -20 bar (2) -1 to -15 bar
 (3) -1/3 to -15 bar (4) -5 to -20 bar
24. In soil taxonomy 'Tarai Soils' are kept in the order :
 (1) Histosols (2) Vertisols
 (3) Mollisols (4) Andiosols
25. Which one of the following cations is known to cause deflocculation of soil ?
 (1) Ca^{2+} (2) Mn^{2+}
 (3) Na^+ (4) Fe^{2+}
26. A root-limiting sub soil layer consisting of nearly continuous, horizontally oriented, human manufactured material is designated by symbol :
 (1) M (2) W (3) L (4) B
27. Azola is :
 (1) Algae (2) Fungi
 (3) Fern (4) Bacteria

28. The sequence of colour variable in Munsell soil colour chart is :
- (1) Value, hue, chroma (2) Hue, value, chroma
(3) Chroma, hue, value (4) Chroma, value, hue
29. Which one of the following soil has highest porosity :
- (1) Clayey Soil (2) Sandy Soil
(3) Loam Soil (4) Silty Soil
30. Atomic absorption spectrophotometer is used for the estimation of :
- (1) Fe, Zn, Cu (2) C, N, S
(3) C, O, S (4) C, H, O
31. Biofertilizers are :
- (1) Organic substances
(2) Biochemically produced mineral fertilizers
(3) Fertilizers produced from dead biomass
(4) Living useful micro-organisms augmenting the supply of nutrients to plants
32. The most abundant element on the earth's crust is :
- (1) Aluminium (2) Silicon
(3) Oxygen (4) Iron
33. pH of an acid soil on submergence will :
- (1) Increase (2) Decrease
(3) Remains the same (4) Decrease and then increase
34. Zero point of charge of goethite is around pH value :
- (1) 2.0 (2) 8.5
(3) 10.0 (4) 6.2

35. A saline soil will have :
- (1) pH>8.5, EC>4dS/m (2) pH<8.5, EC>4dS/m
 (3) pH>8.5, EC<4dS/m (4) pH<8.5, EC<4dS/m
36. The most resistant mineral among the following is :
- (1) Olivine (2) Apatite
 (3) Titanite (4) Zircon
37. Blue colour of which dye is retained by the bacterial cells during gram staining :
- (1) Safranin (2) Iodine
 (3) Crystal violet (4) None of these
38. Which one of the following is the appropriate mode of nutrition of fungi ?
- (1) Heterotrophic (2) Autotrophic
 (3) Phototrophic (4) None of these
39. Which one of the following microorganisms is involved in oxidation of sulphur ?
- (1) *Pseudomonas* (2) *Thiobacillus*
 (3) *Achromobacter* (4) *Micrococcus*
40. *Azorhizobium* is responsible for stem and root nodulation in :
- (1) *Sesbania rostrata* (2) *Phaseolus vulgaris*
 (3) *Medicago sativa* (4) *Vicia faba*

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. Discuss the functions and basic components of the following analytical instruments :
- (a) Spectrophotometer
 (b) Flame photometer
 (c) Atomic absorption spectrophotometer
 (d) Gas liquid chromatography

2. What are the conceptual changes in definition of soil ? Critically discuss how these changes led to inclusion of Gelisol order in soil taxonomy.
3. Describe in brief about the pedogenic process which operates under the following set of conditions alongwith a suitable profile sketch :
 - (a) Climate-cold humid
 - (b) Parent material-sandy
 - (c) Vegetation-coniferous
4. Describe the working principle of neutron probe and gypsum block methods used for determination of soil moisture.
5. Discuss various diagnostic techniques employed in assessing nutrient status of soils in India.
6. Explain why :
 - (a) Imbalanced fertilization is the main cause for nutrient mining under irrigated and rainfed conditions.
 - (b) Alluvial Gangetic soils of Varanasi region are rich in fertility status.
7. How does charge originate in clay minerals ? How is a diffuse double layer formed around a clay mineral ? What are the factors on which the thickness of diffuse double layer depend ? Give some practical examples of double layer modifications.
8. What is meant by fixation of a nutrient ? Discuss the mechanism of potassium fixation in soil. What can be done to reduce potassium fixation ? How does potassium fixation differ from phosphate fixation ?
9. Discuss the potential and constraints of agricultural use of municipal soil waste.
10. Discuss the importance of the following in soil fertility :
 - (a) Vermicompost
 - (b) PGPR
 - (c) Biochar
 - (d) C:N ratio

Roll No. :

Q. No. :

Roll No. :

Q. No. :

Roll No. :

Q. No. :

Roll No. :

Q. No. :

Roll No. :

Q. No. :

FOR ROUGH WORK

