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.

**Total No. of Printed Pages : 15**

**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.

## Soil & Water Conservation Engineering

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. Shallow tubewells and deep tubewells are differentiated on the basis of :

   (1) Depth of the tubewell      (2) Position of the water table

   (3) Type of aquifer            (4) Depth of aquifer

12. Porosity of a formation having wider range of particle size is :

   (1) high     (2) medium     (3) low     (4) zero

13. In square packed geological formation the porosity is as high as :

   (1) 40%     (2) 48%     (3) 35%     (4) 55%

14. The application of non-equilibrium equation to unconfined aquifer has the limitation that observation well should be located at a distance of :

   (1) 0.2 to 0.6 times saturated thickness of aquifer

   (2) 0.3 to 0.5 times the saturated aquifer thickness

   (3) 0.4 to 0.7 times the saturated thickness of the aquifer

   (4) 0.5 to 0.9 times the saturated thickness of the aquifer

15. With 'm' constraints and 'n' variable the maximum number of basic solutions to standard linear programming problem is given by :

   (1) $n!/m!$                (2) $n!/(n-m)!\,m!$

   (3) $m!/(m-n)!\,n!$       (4) $n!/(n-m)!$

16. In project network finding the critical path is equivalent to finding the :

   (1) Shortest Path        (2) Medium Path

   (3) longest path          (4) Safest path

17. All the objects available on the earth's surface are represented in GIS by :

   (1) Point, line and square      (2) Point, line and triangle

   (3) Point, line and polygon     (4) Point, circle, line and polygon

18. Soil moisture content :

    (1) Decreases with increasing soil moisture tension

    (2) Increases with increasing soil moisture tension

    (3) Does not change with soil moisture content

    (4) First decreases and then increases with soil moisture tension

19. In a well screen the friction losses and corrosion will be negligible if the screen entrance velocity is less than or equal to :

    (1) 1 cm/s          (2) 2 cm/s          (3) 3 cm/s          (4) 4 cm/s

20. If the particle density be 200 kg/m³ and the porosity of the aquifer 30%, the bulk density of the soil would be :

    (1) 1200 kg/m³     (2) 1250 kg/m³     (3) 1400 kg/m³     (4) 1450 kg/m³

21. Uniformity coefficient for a well graded aquifer material is :

    (1) More than 1                        (2) Equal to 1

    (3) Less than 2                         (4) More than 3

22. A semi-pervious layer has a thickness of 5 m and it offers a hydraulic resistance of $5 \times 10^3$ m/day. The hydraulic conductivity of the semi-pervious layer will be :

    (1) $25 \times 10^3$ m/day            (2) $10^{-3}$ m/day

    (3) $10^3$ m/day                       (4) $7.5 \times 10^3$ m/day

23. A watershed of 1500 ha is discharging through a drain at an average rate of 1.5 m³/sec, the drainage coefficient is :

    (1) 8.64 mm        (2) 8.64 cm        (3) 4.32 mm        (4) 4.32 cm

24. Piezometer is used to measure :

    (1) Static pressure of flowing liquid

    (2) Dynamic pressure of flowing liquid

    (3) Total pressure of flowing liquid

    (4) Static and dynamic pressure of flowing liquid

**25.** The discharge rate of drip emitter usually ranges from :

(1) 2-10 litres/day

(2) 2-10 litres/hr

(3) 2-10 litres/min

(4) 2-10 litres/sec

**26.** The pressure drop usually allowed in a media filter is :

(1) 0.5 m     (2) 2 m     (3) 4 m     (4) 6 m

**27.** 8 g of Sodium Chloride is dissolved in 2 litres of water, the salt concentration in ppm is :

(1) 4000     (2) 8000     (3) 2000     (4) 16000

**28.** Subsurface drains remove :

(1) Excess surface water

(2) Capillary subsurface water

(3) Subsurface gravitational water

(4) Excess surface runoff

**29.** Soil strength is determined by :

(1) Dynamometer

(2) Tensiometer

(3) Micrometer

(4) Penetrometer

**30.** Sprinkler irrigation system performance is considered satisfactory when the minimum value of the uniformity coefficient is :

(1) 65%     (2) 75%     (3) 85%     (4) 95%

**31.** The overland flow in an irrigation border strip is a case of :

(1) Steady flow

(2) Steady flow with decreasing discharge

(3) Unsteady flow

(4) Unsteady flow with decreasing discharge

**32.** If w is the width of a bench terrace constructed on a land of slope $S$, then the drop (D) between two consecutive bench terraces for a riser slope of ½ : 1 is given by :

(1) $D = WS / (100-S)$

(2) $D = WS / (200-S)$

(3) $D = 2WS / (200-S)$

(4) $D = 2WS / (100-S)$

33. Capillary water is held in the soil due to :

    (1) Absorption force           (2) Surface tension force

    (3) Gravitational force         (4) Osmotic force

34. The soil erodibility factor needs to be determine for use in the Universal Soil loss equation. The length, in m and slope, in % of the experimental plot to be used for this purpose respectively are :

    (1) 19, 12       (2) 21, 11       (3) 22, 9       (4) 23, 8

35. Chute spillways are used for a drop of :

    (1) Less than 1 metre

    (2) More than 3 metre but less than 6 metre

    (3) More than 6 metre

    (4) Less than 2 metre

36. Stepped spillway is a modified form of :

    (1) Drop inlet spillway       (2) Inclined spillway

    (3) Straight drop spillway     (4) Chute spillway

37. The useful limit to measure the matric or capillary potential by tensiometer is :

    (1) 0.85 Centibar        (2) 85 Centibar

    (3) 1 Centibar          (4) 100 Centibar

38. To ensure safety of spillway against sliding, the sum of all resisting force should be equal to :

    (1) 0.75 times the sum of horizontal forces

    (2) 1.5 times the sum of horizontal forces

    (3) Weight of structure

    (4) 2 times the

**39.** If two drainage basins having different sizes but same shape are :

(1) Geometrically similar      (2) Morphologically similar

(3) Dimensionally similar      (4) None of the above

**40.** In India, a meteorological subdivision is considered to be affected by moderate drought if it receives a total seasonal rainfall which is :

(1) less than 25% of normal value

(2) Between 25% to 49% of normal value

(3) Between 50% to 74% of normal value

(4) Between 75% to 99% of normal value

*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 is a unit hydrograph? List the assumption and limitations of a unit hydrograph theory.

**2.** Describe the characteristics of a watershed.

**3.** Enumerate the steps involved in hydrologic and hydraulic design of permanent structures.

**4.** Derive that half a square is the best discharging rectangular open channel, i.e., when depth of flow = half of the breadth.

**5.** Derive the Hooghoudt's equation for computation of drain spacing between two parallel drains.

**6.** Describe in brief the steps for design of drip irrigation system.

**7.** Describe the design parameters for mole drainage system.

**8.** How do you ensure that the tubewell construction has been satisfactory ? Describe any test you would conduct for this purpose.

**9.** Distinguish between ground surface contours and water table contours. Explain how the water table contours are prepared and state their uses.

**10.** Discuss the concept and components of GIS. Explain how GIS is helpful in mapping real world features ?

*Roll No. :* ..............................................

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**FOR ROUGH WORK**