

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) .....

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 – 2014

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. Which of the following is *not* a greenhouse gas ?
  - (1) Carbon dioxide
  - (2) Methane
  - (3) Sulphur dioxide
  - (4) Nitrogen
2. The saliva of mammals contains starch splitting enzyme. The name of that enzyme is :
  - (1) Amylase (Ptyalin)
  - (2) Secretin
  - (3) Lysozyme
  - (4) Mucin
3. Cytosine in DNA combines with :
  - (1) Adenosine
  - (2) Uracil
  - (3) Guanine
  - (4) Thiamine
4. If Vectors  $2i - j + k$ ,  $i + 2j - 3k$ ,  $3i + \lambda j + 5k$  are coplanar, then the value of  $\lambda$  is :
  - (1) -2
  - (2) -3
  - (3) -4
  - (4) -5
5. The value of  $(-1 + i\sqrt{3})^{3/2}$  is :
  - (1)  $\sqrt{2}$
  - (2)  $2\sqrt{2}$
  - (3)  $2 + \sqrt{2}$
  - (4)  $2 - \sqrt{2}$
6. The number of electrons contained in 1 Coulomb of charge equals to :
  - (1)  $6.25 \times 10^{17}$
  - (2)  $6.25 \times 10^{18}$
  - (3)  $6.25 \times 10^{19}$
  - (4)  $1.6 \times 10^{19}$
7. A unit mass of solid is converted to liquid at its melting ; the heat required for this process is the :
  - (1) Specific heat
  - (2) Latent heat of vaporization
  - (3) Latent heat of fusion
  - (4) External latent heat
8. Granite is :
  - (1) a sedimentary rock
  - (2) a metamorphic rock
  - (3) a volcanic rock
  - (4) a plutonic igneous rock
9. Coal is a :
  - (1) Sedimentary rock
  - (2) Hydrothermal deposit
  - (3) Low-grade metamorphic rock
  - (4) High-grade metamorphic rock
10. Which one of the following gases is present in the stratosphere that filters out some of the sun's ultraviolet light and provides an effective shield against radiation damage to living things ?
  - (1) Oxygen
  - (2) Methane
  - (3) Ozone
  - (4) Helium

11. Coarse-grained sediments are transported by :
- (1) Traction Process (2) Saltation Process  
(3) Suspension Process (4) None
12. Ripple marks occur on the :
- (1) Lower surface (2) Upper surface  
(3) Internal structure (4) None
13. Sole marks occur on the :
- (1) Lower surface (2) Upper surface  
(3) internal structure (4) None
14. Particle size range of arenaceous rocks is :
- (1) 2-4 mm (2) 1/16-2 mm  
(3) 1/256-1/16 mm (4) <1/256 mm
15. The fold in which the axes plunges directly down the dip of the axial surface is termed as :
- (1) Normal folds (2) Reclined fold (3) Cascade fold (4) Drag fold
16. A series of high angled reverse faults developed between two thrust planes is known as :
- (1) Schuppen structure (2) Syntectic pluton  
(3) Syntaxial bend (4) None of the above
17. Schist represents a material which has mechanical properties as :
- (1) Homogeneous and isotropic (2) Homogeneous and anisotropic  
(3) Inhomogeneous and anisotropic (4) Inhomogeneous and isotropic
18. Mid-oceanic ridges are :
- (1) Divergent plate boundaries (2) Convergent plate boundaries  
(3) Transform plate boundaries (4) None of the above

19. Granophyric texture is :

- (1) Micrographic intergrowth of quartz and plagioclase feldspar
- (2) Micrographic intergrowth of mica and alkali feldspar
- (3) Micrographic intergrowth of quartz and alkali feldspar
- (4) Micrographic intergrowth of quartz and pyroxene

20. Boninite is volcanic equivalent of :

- (1) Gabbro                      (2) Syenite                      (3) Granite                      (4) Norite

21. Peralkaline igneous rocks are defined as :

- (1) If  $(\text{Na}_2\text{O} + \text{K}_2\text{O}) / \text{Al}_2\text{O}_3$  equal to 1      (2) If  $(\text{Na}_2\text{O} + \text{K}_2\text{O}) / \text{Al}_2\text{O}_3$  greater than 1  
(3) If  $(\text{Na}_2\text{O} + \text{K}_2\text{O}) / \text{Al}_2\text{O}_3$  less than 1      (4) If  $\text{Al}_2\text{O}_3 / (\text{Na}_2\text{O} + \text{K}_2\text{O})$  greater than 1

22. Stable isotope (e.g. oxygen) ratio is expressed as :

$$(1) \delta^{18}\text{O}^{0/00} = \left[ \frac{{}^{18}\text{O}/{}^{16}\text{O}(\text{sample}) - {}^{18}\text{O}/{}^{16}\text{O}(\text{standard})}{{}^{18}\text{O}/{}^{16}\text{O}(\text{standard})} \right] \times 1000$$

$$(2) \delta^{16}\text{O}^{0/00} = \left[ \frac{{}^{16}\text{O}/{}^{18}\text{O}(\text{sample}) - {}^{16}\text{O}/{}^{18}\text{O}(\text{standard})}{{}^{16}\text{O}/{}^{18}\text{O}(\text{standard})} \right] \times 1000$$

$$(3) \delta^{18}\text{O}^{0/00} = \left[ \frac{{}^{18}\text{O}/{}^{16}\text{O}(\text{sample}) - {}^{18}\text{O}/{}^{16}\text{O}(\text{standard})}{{}^{16}\text{O}/{}^{18}\text{O}(\text{standard})} \right] \times 100$$

$$(4) \delta^{18}\text{O}^{0/00} = \left[ \frac{{}^{18}\text{O}/{}^{16}\text{O}(\text{sample}) - {}^{18}\text{O}/{}^{16}\text{O}(\text{standard})}{{}^{16}\text{O}/{}^{18}\text{O}(\text{standard})} \right] \times 10$$

23. What is an isochron diagram ?

- (1) An isochron diagram is a bivariate plot of measured daughter-parent isotope ratios for a suite of cogenetic samples.
- (2) An isochron diagram is a bivariate plot of measured parent-daughter isotope ratios for samples of different origin.
- (3) An isochron diagram is a trivariate plot of measured parent-daughter isotope ratios for a suite of cogenetic samples.
- (4) An isochron diagram is a bivariate plot of measured parent-daughter isotope ratios for a suite of cogenetic samples.

24. Which of the following is not a mantle reservoir ?

- (1) Depleted mantle
- (2) HIMU mantle
- (3) Enriched mantle
- (4) Continental crust

25. The facies of low pressure that occupies the maximum extent in the outcrops is :

- (1) Albite-epidote-hornfels facies
- (2) Hornblende-hornfels facies
- (3) Pyroxene-hornfels facies
- (4) Sanidinite facies

26. The general metamorphic regime of low pressure facies is generally :

- (1) P, commonly 2kbar, generally < 3kbar and T, ~ 300-750°C
- (2) P, 4kbar and T, 500-800°C
- (3) P, commonly 2kbar, generally < 3kbar) and T, ~ 500-750°C
- (4) P, commonly 2kbar, generally < 3kbar and T, ~ 200-500°C

27. What is a metamorphic Field Gradient ?

- 1) Line joining  $T_{Max}$  of various P-T loops of crustal segments at different depths
- 2) Increasing grade of metamorphism in a terrain
- 3) Decreasing grade of metamorphism in a terrain
- 4) Slope of a metamorphic terrain in field

28. The distinction between hornblende hornfels facies and amphibolite facies at their interface can be made on the basis of :

- (1) mineral assemblages
- (2) texture
- (3) sequence of recrystallization of minerals
- (4) on the basis of the occurrence of one specific mineral

29. The skeleton of entire coral colony is termed as :

- (1) Corralite
- (2) Corralium
- (3) Collumella
- (4) Rhabdosome

30. The tooth like phosphatic microfossils are :

- (1) Conodonts
- (2) Thecodont
- (3) Bathydont
- (4) Coprolites





40. Analysis of stratigraphic thickness is carried out with the help of :

- |                     |                             |
|---------------------|-----------------------------|
| (1) Geological maps | (2) Lithostratigraphic maps |
| (3) Isobach Maps    | (4) Structural maps         |

*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 differences between brachiopods and bivalves.
2. Explain, in brief, how trace elements are useful in interpreting petrogenesis of rocks ?
3. Write a note on the decay scheme of Rb-Sr and Sm-Nd.
4. What is the role of CO<sub>2</sub> in the formation of charnockites ?
5. How reaction isograds are different from conventional isograds ?
6. What are the reasons for formation of zoning in plagioclase ?
7. What is an unconformity ? Give the geological significance of unconformity ?  
What are the criteria for distinguishing a fault and an unconformity ?
8. With the help of sketch discuss the strain distribution in buckle folds.
9. Discuss the Bouma cycle.
10. What do you understand by biostratigraphic correlation ?

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**Q. No. :**

**FOR ROUGH WORK**

