

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.

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

**FOR ROUGH WORK**

# Research Entrance Test – 2014

No. of Questions : 50

Time : 2 Hours

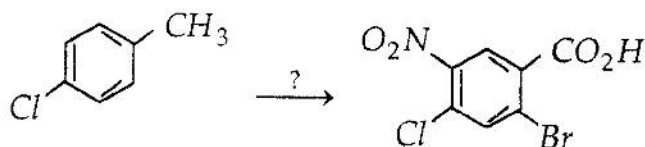
Full Marks : 200

- 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. The foremost expounder of Ayurveda is :  
(1) Indra                      (2) Brahma                      (3) Agnivesha                      (4) Dhanvantari
2. Ayurveda is the upaveda of which veda :  
(1) Rigveda    (2) Samaveda  
(3) Atharvaveda    (4) Yajurveda
3. Which is not a type of Sharirika Dosha :  
(1) Vata                      (2) Tama                      (3) Kapha                      (4) Pitta
4. The latin name of Amla is :  
(1) Emblica ribes    (2) Embelia officinalis  
(3) Embelia ribes    (4) Emblica officinalis
5. The sixth step of Ashtanga Yoga is-  
(1) Pratyahara                      (2) Dhyana                      (3) Dharana                      (4) Samadhi
6. World Health Organization day is celebrated on :  
(1) 1st March                      (2) 7th April                      (3) 1st April                      (4) 7th March
7. DOTs strategy is related with management of which disease :  
(1) Leprosy    (2) Tuberculosis  
(3) Bronchial asthma    (4) Whooping Cough
8. The recommended daily intake of Vitamin A for an adult man is-  
(1) 800 micrograms    (2) 600 micrograms  
(3) 950 micrograms    (4) 900 micrograms
9. The vitamin involved in blood clotting process is :  
(1) Vitamin B                      (2) Vitamin K                      (3) Vitamin E                      (4) Vitamin A



17. Sanger's reagent, 2,4-dinitrofluorobenzene, reacts with which functional groups in a peptide ?
- (1) Free amino groups
  - (2) Phenolic hydroxyl group in tyrosine
  - (3) The aromatic heterocyclic groups in histidine and tryptophan
  - (4) The sulfide group of methionine
18. What reagent is used in the Edman degradation for N-terminal group analysis of peptides?
- (1) Phenyl isothiocyanate
  - (2) Di-t-butyl dicarbonate
  - (3) Dicyclohexylcarbodiimide
  - (4) Benzyl chloroformate
19. Which of the following compounds reacts rapidly with  $\text{Br}_2$  in the dark ?
- (1) Benzene
  - (2) Anisole
  - (3) Acetophenone
  - (4) None of above
20. Which of the following procedures would be best for achieving the following reaction ?



- (1) (i)  $\text{Br}_2 + \text{FeBr}_3$  (ii)  $\text{KMnO}_4$  & heat (iii)  $\text{HNO}_3$  &  $\text{H}_2\text{SO}_4$
  - (2) (i)  $\text{KMnO}_4$  & heat (ii)  $\text{Br}_2 + \text{FeBr}_3$  (iii)  $\text{HNO}_3$  &  $\text{H}_2\text{SO}_4$
  - (3) (i) NBS in  $\text{CCl}_4$  & heat (ii)  $\text{KMnO}_4$  & heat (iii)  $\text{HNO}_3$  &  $\text{H}_2\text{SO}_4$
  - (4) (i) NBS in  $\text{CCl}_4$  & heat (ii)  $\text{NaNO}_2$  (iii)  $\text{KMnO}_4$  & heat
21. Which of the following isomeric chlorides will undergo  $\text{SN}_2$  substitution most readily ?
- (1) 4-Chloro-1-butene
  - (2) 1-Chloro-1-butene (cis or trans)
  - (3) 1-Chloro-2-butene (cis or trans)
  - (4) 2-Chloro-1-butene
22. Which of the following substituents on a benzene ring is ortho-para directing?
- (1)  $-\text{OCOCH}_3$
  - (2)  $-\text{COCH}_3$
  - (3)  $-\text{CO}_2\text{H}$
  - (4)  $-\text{CN}$
23. The rate of a chemical reaction is determined by :
- (1) Primary process
  - (2) Slowest step
  - (3) Over all reaction
  - (4) Mechanism of reaction
24. To prevent corrosion of iron, it is coated with the following :
- (1) Magnesium
  - (2) Zinc
  - (3) Tin
  - (4) Lead

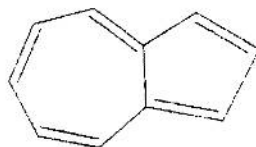
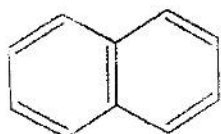
25. Brass is an alloy of the following :  
 (1) Cu - Zn      (2) Cu - Sn      (3) Cu - Te      (4) Zn - Sn
26. Which one of the following is *correct* ?  
 (1)  $H = U + PV$       (2)  $H = U - PL$       (3)  $H = U - TS$       (4)  $H = U + TS$
27. Vitamin C is :  
 (1) Citric Acid      (2) Acetic Acid      (3) Formic Acid      (4) Ascorbic acid
28. T. N. T. is used as :  
 (1) Medicine      (2) Fertilizer      (3) Explosive      (4) Insecticide
29. Which metal is employed in preparation of a "Grignard Reagents" ?  
 (1) Mg      (2) Zn      (3) Cu      (4) Fe
30. Usual number of bonds found in unchanged carbon is :  
 (1) 2      (2) 3      (3) 1      (4) 4
31. Which of the following statements is most likely *true* concerning the binding of 3H-hormone ?  
 (1) The total amount of radioactivity bound in absence of unlabeled hormone represents the amount bound by the receptors.  
 (2) Most of the label is bound nonspecifically  
 (3) The unlabeled hormone competes with 3H-hormone for binding to the receptors.  
 (4) The cpm bound in the absence of unlabeled hormone minus the cpm bound in the presence of unlabeled hormone is a measure of nonspecific binding.
32. Which of the following statements is *not* supported by the data :  
 (1) The bacterial CAT gene requires eukaryotic regulatory elements for expression in mammalian cells.  
 (2) Hormone-independent regulatory elements lie downstream of - 315.  
 (3) Hormone-independent regulatory elements lie upstream of - 315.  
 (4) Regulatory elements probably do not lie upstream of - 742.
33. The initial increase in the concentration of fructose-1,6-bisphosphate is most likely due to :  
 (1) Activation of gluconeogenesis  
 (2) Activation of phosphofructokinase  
 (3) Inhibition of the citric acid (Krebs) cycle  
 (4) Inhibition of aldolase

34. Cultured fibroblasts were labeled with  $^{32}\text{P}$ -ortho-phosphate. Subsequent EGF treatment increased the radioactivity detected in a small subset of total cell proteins. Which of the following best explains this finding ?
- (1) EGF acts as a protein phosphatase    (2) EGF activates a protein kinase  
 (3) EGF activates an ATPase                (4) EGF is phosphorylated
35. All of the following are known to involve a  $\text{Ca}^{2+}$ -activated, vesicle-mediated secretory event EXCEPT
- (1) Synaptic transmission  
 (2) Release of histamine from mast cells  
 (3) Sperm acrosomal reaction  
 (4) Constitutive secretion of collagen
36. Two-dimensional (2-D) gel electrophoresis performed under denaturing conditions can be used to separate proteins according to which of the following characteristics ?
- |                            |                              |
|----------------------------|------------------------------|
| 1 <sup>st</sup> dimension  | 2 <sup>nd</sup> dimension    |
| (1) Density                | (1) Density                  |
| (2) Amino acid composition | (2) Charge                   |
| (3) Isoelectric point (pI) | (3) Subunit molecular weight |
| (4) Hydrophobicity         | (4) Subunit molecular weight |
37. Which of the following is *not* involved in the processing of mRNA precursors in eukaryotic cells ?
- (1) Capping of the 5'-end  
 (2) Addition of poly-A  
 (3) Splicing of exons  
 (4) Transport of the pre-mRNA to the cytoplasm
38. Indole group of tryptophan responds positively to :
- (1) Glyoxylic acid                                (2) Schiff's reagent  
 (3) Biuret test                                    (4) Resorcinol test
39. Serotonin is derived in the body from the following amino acid :
- (1) Phenylalanine    (2) Histidine            (3) Tryptophan    (4) Serine
40. Methionine is synthesized in human body from :
- (1) Cysteine and homoserine                (2) Homocysteine and serine  
 (3) Cysteine and serine                        (4) None of these



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. Explain why electrophilic addition of propene with HBr in presence of aqueous NaCl gives 2-chloropropane and propan-2-ol with 2-bromopropane ?
2. Compound with M.F.  $C_3H_{10}$  has four structural isomers - A, B, C and D. Upon nitration, A & B give three mononitro derivatives while C & D give two and one mononitro derivatives, respectively. On treatment with alkaline  $KMnO_4$ , A gives a monocarboxylic acid whereas B, C and D give isomeric dicarboxylic acids. Assign A, B, C & D .
3. Explain why naphthalene is white in color while azulene is blue in color although both have same molecular formula ?



4. Why cyclopentadiene is more acidic than cyclohexa-1,3-diene ?
5. (a) How you will distinguish all the isomers of  $C_5H_{12}$  with the help of PMR spectroscopy ?  
(b) Deduce the structure of compound,  $C_4H_6O_3$  which gives only one signal in PMR spectrum.
6. Explain why the position-2 is favorable for nucleophilic substitution whereas position-3 is more favorable for electrophilic substitution reactions.
7. A Compound with M.F.  $C_4H_8O_3$  showed following PMR signals :  
 $\delta$  11.0 (s, 1H) ;  $\delta$  4.13 (s, 2H) ;  $\delta$  3.66 (d, 2H) and  $\delta$  1.27 (t, 3H). Deduce the structure of compound.
8. How nerve toxins perform their functions? Which substances are used to counter this toxic effect ?
9. What is the role of glycine in neurotransmission? What will happen if its action is antagonized?
10. Describe the pathogenesis of sickle cell anemia.

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**FOR ROUGH WORK**

