

अन्न व प्रशासकीय सेवा मुख्य परीक्षा- 2023 पेपर-I

दि. 10/02/2024 2023

U18

BOOKLET NO.

702276

**Food and Drugs Administrative Services  
Paper - I**

**Time Allowed : Three Hours**

**Maximum Marks : 200**

**Medium : English**

**Type of Paper : Conventional**

**Question Paper Specific Instructions**

**Please read each of the following instructions carefully before attempting questions :**

1. There are **EIGHT** questions divided in two Sections, out of which **FIVE** are to be attempted.
2. Questions no. 1 and 5 are compulsory. Out of the remaining questions, **THREE** are to be attempted choosing at least **ONE** question from each Section.
3. The number of marks carried by a question/sub-question is indicated against it.
4. Keep in mind the word limit indicated in the question if any.
5. Wherever option has been given, only the required number of responses in the serial order attempted shall be assessed. Unless struck off, attempt of a question shall be counted even if attempted partly. Excess responses shall not be assessed and shall be ignored.
6. Candidates are expected to answer all the sub-questions of a question together. If sub-question of a question is attempted elsewhere (after leaving a few page or after attempting another question) the later sub-question shall be overlooked.
7. Any page or portion of the page left blank in the Answer Booklet must be clearly struck off.
8. Unless otherwise mentioned, symbol and notation have their usual standard meanings. Assume suitable data, if necessary and indicate the same clearly.
9. Neat sketches may be drawn, wherever required.
10. The medium of answer should be mentioned on the answer book as claimed in the application and printed on admission card. The answers written in medium other than the authorized medium will not be assessed and no marks will be assigned to them.

**Note** - 1. Candidates will be allowed to use Scientific (Non-programmable type) calculators.

**P.T.O.**

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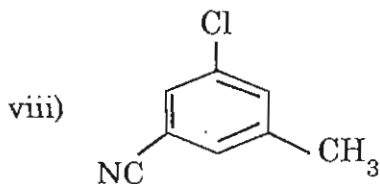
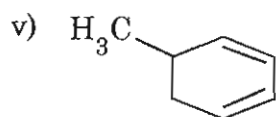
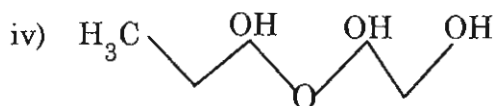
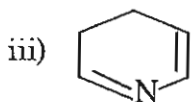
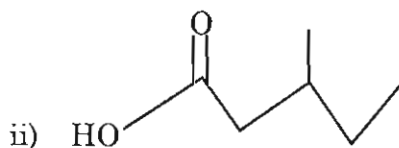


## SECTION - A

Q1. Write short notes on **any five** of the following :

(a) Explain classification of the elements on the basis of completely filled and partially filled shells. 8

(b) Give the IUPAC nomenclature of the following compounds : 8



(c) Explain  $S_Ni$  reaction of pyridine. 8

(d) Calculate amount of  $KMnO_4$  required to prepare  $500\text{ cm}^3$  of the following concentrations. (Molecular weight of  $KMnO_4 = 158$ , Atomic weight of  $K = 39$ )

i)  $0.005\text{ M}$

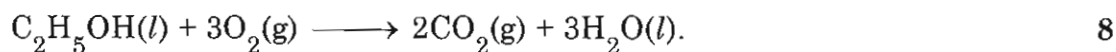
ii)  $0.005\text{ N}$

iii)  $10\text{ ppm of }K^+$

iv)  $10\text{ ppm of }KMnO_4$ . 8

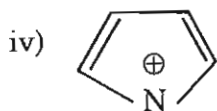
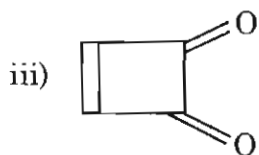
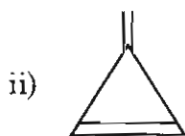
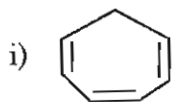


- (e) Prove the Kirchoff's relation  $\Delta H_2 - \Delta H_1 = \Delta C_P (T_2 - T_1)$ . The standard heat of formation of  $C_2H_5OH(l)$ ,  $CO_2(g)$  and  $H_2O(l)$  are 277, 414.6 and  $-283.3 \text{ JK}^{-1} \text{ mol}^{-1}$ . Calculate the standard heat of reaction.

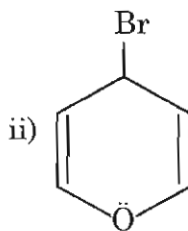
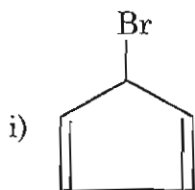


- (f) Explain acidity of phenol. How will you prepare Phenol from Aniline and Benzene ? 8

- (g) D) Classify following compounds as aromatic, antiaromatic, quasi-aromatic and non-aromatic. 4



- II) Which of the following compound undergo solvolysis ? Justify your answer. 4



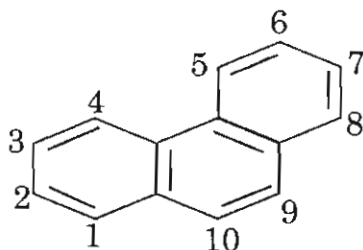


- Q2. (a) Derive mathematical expression for Beer's law and explain three types deviations from Beer-Lambert's Law. 15
- (b) Using first law of thermodynamics, derive the equation  $\Delta V = q + W$  and state its limitations. 15
- (c) i) Explain Haber's process of ammonia synthesis.  
ii) How will you prepare polyvinyl chloride (PVC)? 10
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- Q3. (a) What is homopolymers and copolymers? Explain cationic and anionic polymerisation with suitable examples. 15
- (b) Explain hybridization of following compounds :  
i) Methane  
ii) Ethylene  
iii) Acetylene. 15
- (c) What is Saytzeff rule? Illustrate with suitable examples. How will you bring the following conversion? 10



- Q4. (a) Explain Pauling method for determination of univalent radii. Calculate univalent radii of  $\text{Na}^+$  and  $\text{F}^-$  ions if internuclear distance between  $\text{Na}^+$  and  $\text{F}^-$  ions in  $\text{Na}^+ \text{F}^-$  ionic crystal is equal to 231 pm. 15
- (b) Explain concept of heat capacity. Calculate  $q$ ,  $w$  and  $\Delta v$  for 2.5 moles of ideal gas at 2 atm. expands isothermally to 2.5 times of its initial volume against external pressure of 1 atm. at 300 K. 15
- (c) Explain Frost Musulin method for aromaticity with example. Which bond is more active in the following compound? Justify your answer. 10





## SECTION – B

**Q5.** Write short notes on **any five** of the following :

- |   |   |
|---|---|
| (a) Properties of starches                                      | 8 |
| (b) Food and energy   | 8 |
| (c) Food hazards  | 8 |
| (d) Role of food additives used in foods                        | 8 |
| (e) Modified atmosphere packaging for minimally processed foods | 8 |
| (f) Properties of fats  | 8 |
| (g) Additional role of carbohydrates, proteins and fats.        | 8 |
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- Q6.** (a) Explain the various toxins in foods. 15
- (b) Give the classifications of food additives. Explain
- i) Antioxidants;
  - ii) Food flavours;
  - iii) Sequestrants. 15
- (c) Discuss the labelling requirement of foods. 10
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- Q7.** (a) What is fiber ? Give the classification of fibers and state its physicochemical and functional properties. 15
- (b) Enlist the various vitamins, minerals and other minor trace elements available in foods. Explain the source of availability and function of
- i) Vitamin A;
  - ii) Vitamin C;
  - iii) Calcium;
  - iv) Phosphorus. 15
-



(c) What is food adulteration ? Discuss the adulterants found in

i) Milk;

ii) Edible fats and oil;

iii) Spices.

10

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**Q8.** (a) Enlist the functional classes of food additives for labelling purpose. Give the functional role of different food additives, classified as per Codex Alimentarius (any twelve). 15

(b) Explain the various testing parameters of various packaging materials (any five). 15

(c) Explain the role of proteins in foods. 10

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