

7394950

LAACH



Test Booklet Code

QQ

This Booklet contains 24 pages.

Do not open this Test Booklet until you are asked to do so.

Read carefully the Instructions on the Back Cover of this Test Booklet.

Important Instructions :

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on **Side-1** and **Side-2** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours** duration and this Test Booklet contains **180** questions. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**
6. The CODE for this Booklet is **QQ**. Make sure that the CODE printed on **Side-2** of the Answer Sheet is the same as that on this Test Booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
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Name of the Candidate (in Capitals) : MOKINI RAJHOWANSHI

Roll Number : in figures 311206970

: in words fifty one crores two lakhs eight thousand nine hundred seventy

Centre of Examination (in Capitals) : SR. Public SR. sec. School

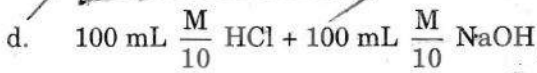
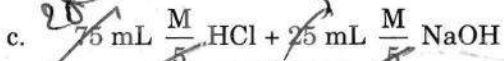
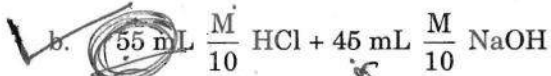
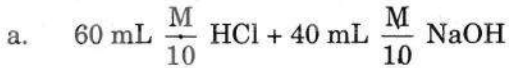
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1. Which of the following statements is **not** true for halogens ?
- All form monobasic oxyacids.
 - Chlorine has the highest electron-gain enthalpy.
 - All but fluorine show positive oxidation states.
 - All are oxidizing agents.
2. The correct order of atomic radii in group 13 elements is
- $B < Al < In < Ga < Tl$
 - $B < Ga < Al < In < Tl$
 - $B < Ga < Al < Tl < In$
 - $B < Al < Ga < In < Tl$
3. In the structure of ClF_3 , the number of lone pairs of electrons on central atom 'Cl' is
- one
 - three
 - four
 - two
4. The correct order of N-compounds in its decreasing order of oxidation states is
- HNO_3, NO, N_2, NH_4Cl
 - NH_4Cl, N_2, NO, HNO_3
 - HNO_3, NH_4Cl, NO, N_2
 - HNO_3, NO, NH_4Cl, N_2
5. Which one of the following elements is unable to form MF_6^{3-} ion ?
- Ga
 - In
 - B
 - Al
6. Considering Ellingham diagram, which of the following metals can be used to reduce alumina ?
- Fe
 - Cu
 - Mg
 - Zn
7. The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give diethyl ether. A, B and C are in the order
- $C_2H_5OH, C_2H_6, C_2H_5Cl$
 - $C_2H_5OH, C_2H_5ONa, C_2H_5Cl$
 - $C_2H_5Cl, C_2H_6, C_2H_5OH$
 - $C_2H_5OH, C_2H_5Cl, C_2H_5ONa$
8. Hydrocarbon (A) reacts with bromine by substitution to form an alkyl bromide which by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms. (A) is
- $CH \equiv CH$
 - CH_4
 - $CH_3 - CH_3$
 - $CH_2 = CH_2$
9. The compound C_7H_8 undergoes the following reactions :
- $$C_7H_8 \xrightarrow{3 Cl_2 / \Delta} A \xrightarrow{Br_2 / Fe} B \xrightarrow{Zn / HCl} C$$
- The product 'C' is
- m*-bromotoluene
 - p*-bromotoluene
 - 3-bromo-2,4,6-trichlorotoluene
 - o*-bromotoluene
10. Which oxide of nitrogen is **not** a common pollutant introduced into the atmosphere both due to natural and human activity ?
- N_2O_5
 - NO
 - N_2O
 - NO_2

11. Following solutions were prepared by mixing different volumes of NaOH and HCl of different concentrations :



pH of which one of them will be equal to 1

- (1) b
(2) c
(3) d
(4) a

12. On which of the following properties does the coagulating power of an ion depend ?

- (1) The magnitude of the charge on the ion alone
(2) The sign of charge on the ion alone
 (3) Both magnitude and sign of the charge on the ion
(4) Size of the ion alone

13. The solubility of BaSO_4 in water is $2.42 \times 10^{-3} \text{ (g/L)}$ at 298 K. The value of its solubility product (K_{sp}) will be

(Given molar mass of $\text{BaSO}_4 = 233 \text{ g mol}^{-1}$)

- (1) $1.08 \times 10^{-10} \text{ mol}^2 \text{ L}^{-2}$
(2) $1.08 \times 10^{-8} \text{ mol}^2 \text{ L}^{-2}$
(3) $1.08 \times 10^{-14} \text{ mol}^2 \text{ L}^{-2}$
(4) $1.08 \times 10^{-12} \text{ mol}^2 \text{ L}^{-2}$

14. Given van der Waals constant for NH_3 , H_2 , O_2 and CO_2 are respectively 4.17, 0.244, 1.36 and 3.59, which one of the following gases is most easily liquefied ?

- (1) NH_3
(2) CO_2
(3) O_2
(4) H_2

15. Match the metal ions given in Column I with the spin magnetic moments of the ions given in Column II and assign the correct code :

Column I	Column II
a. Co^{3+}	i. $\sqrt{8}$ B.M.
b. Cr^{3+}	ii. $\sqrt{35}$ B.M.
c. Fe^{3+}	iii. $\sqrt{3}$ B.M.
d. Ni^{2+}	iv. $\sqrt{24}$ B.M.
	v. $\sqrt{15}$ B.M.

- | a | b | c | d |
|---------|----|-----|-----|
| (1) iv | v | ii | i |
| (2) iii | v | i | ii |
| (3) iv | i | ii | iii |
| (4) i | ii | iii | iv |

16. Iron carbonyl, $\text{Fe}(\text{CO})_5$ is

- (1) tetranuclear
(2) dinuclear
(3) trinuclear
(4) mononuclear

17. The geometry and magnetic behaviour of the complex $[\text{Ni}(\text{CO})_4]$ are

- (1) square planar geometry and diamagnetic
(2) tetrahedral geometry and paramagnetic
(3) square planar geometry and paramagnetic
 (4) tetrahedral geometry and diamagnetic

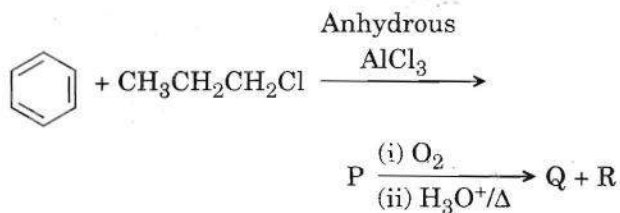
18. Which one of the following ions exhibits d-d transition and paramagnetism as well ?

- (1) CrO_4^{2-}
 (2) MnO_4^{2-}
(3) MnO_4^-
(4) $\text{Cr}_2\text{O}_7^{2-}$

19. The type of isomerism shown by the complex $[\text{CoCl}_2(\text{en})_2]$ is

- (1) Geometrical isomerism
(2) Linkage isomerism
(3) Ionization isomerism
(4) Coordination isomerism

20. Identify the major products P, Q and R in the following sequence of reactions :



- | | P | Q | R |
|-----|---|---|--|
| (1) | | | $\text{CH}_3\text{CH}_2 - \text{OH}$ |
| (2) | | | $\text{CH}_3 - \text{CO} - \text{CH}_3$ |
| (3) | | | $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ |
| (4) | | | |

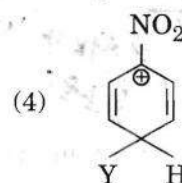
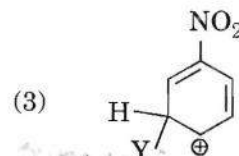
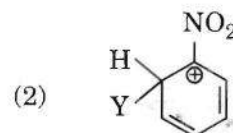
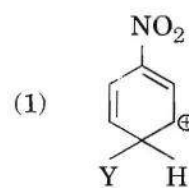
21. Which of the following compounds can form a zwitterion ?

- (1) Aniline
 (2) Glycine
 (3) Benzoic acid
 (4) Acetanilide

22. Which of the following molecules represents the order of hybridisation sp^2 , sp^2 , sp , sp from left to right atoms ?

- (1) $\text{HC} \equiv \text{C} - \text{C} \equiv \text{CH}$
 (2) $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$
 (3) $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$
 (4) $\text{CH}_2 = \text{CH} - \text{C} \equiv \text{CH}$

23. Which of the following carbocations is expected to be most stable ?



24. Which of the following is correct with respect to -I effect of the substituents ? (R = alkyl)

- (1) $-\text{NH}_2 < -\text{OR} < -\text{F}$
 (2) $-\text{NR}_2 > -\text{OR} > -\text{F}$
 (3) $-\text{NH}_2 > -\text{OR} > -\text{F}$
 (4) $-\text{NR}_2 < -\text{OR} < -\text{F}$

25. Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is $1s^2 2s^2 2p^3$ the simplest formula for this compound is

- (1) Mg_2X_3
 (2) Mg_3X_2 ✓
 (3) Mg_2X
 (4) MgX_2

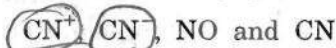
26. Iron exhibits bcc structure at room temperature. Above $900^\circ C$, it transforms to fcc structure. The ratio of density of iron at room temperature to that at $900^\circ C$ (assuming molar mass and atomic radii of iron remains constant with temperature) is

- (1) $\frac{\sqrt{3}}{\sqrt{2}}$
 (2) $\frac{1}{2}$
 (3) $\frac{3\sqrt{3}}{4\sqrt{2}}$ ✓
 (4) $\frac{4\sqrt{3}}{3\sqrt{2}}$

27. Which one is a *wrong* statement?

- (1) Total orbital angular momentum of electron in 's' orbital is equal to zero.
 (2) The value of m for d_{z^2} is zero.
 (3) The electronic configuration of N atom is
- | | | | | |
|--------|--------|----------|----------|----------|
| $1s^2$ | $2s^2$ | $2p_x^1$ | $2p_y^1$ | $2p_z^1$ |
| ↑↓ | ↑↓ | ↑ | ↑ | ↓ |
- (4) An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum numbers.

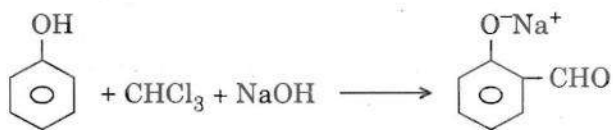
28. Consider the following species :



Which one of these will have the highest bond order?

- (1) NO
 (2) CN
 (3) CN^+
 (4) CN^- ✓

29. In the reaction



the electrophile involved is

- (1) dichloromethyl cation (CHCl_2^+)
 (2) dichlorocarbene ($:\text{CCl}_2$)
 (3) dichloromethyl anion (CHCl_2^-)
 (4) formyl cation (CHO^+) ✓

30. Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their

- (1) formation of intramolecular H-bonding
 (2) formation of intermolecular H-bonding
 (3) more extensive association of carboxylic acid via van der Waals force of attraction
 (4) formation of carboxylate ion ✓

31. Compound A, $C_8H_{10}O$, is found to react with NaOI (produced by reacting Y with NaOH) and yields a yellow precipitate with characteristic smell.

A and Y are respectively

- (1) $\text{H}_3\text{C}-\text{C}_6\text{H}_4-\text{CH}_2-\text{OH}$ and I_2
 (2) $\text{CH}_3-\text{C}_6\text{H}_3(\text{OH})-\text{CH}_3$ and I_2
 (3) $\text{C}_6\text{H}_5-\text{CH}(\text{OH})-\text{CH}_3$ and I_2
 (4) $\text{C}_6\text{H}_5-\text{CH}_2-\text{CH}_2-\text{OH}$ and I_2

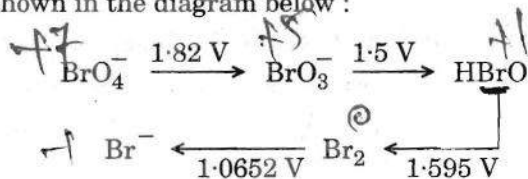
32. The correct difference between first- and second-order reactions is that

- (1) the rate of a first-order reaction does not depend on reactant concentrations; the rate of a second-order reaction does depend on reactant concentrations
- (2) the rate of a first-order reaction does depend on reactant concentrations; the rate of a second-order reaction does not depend on reactant concentrations
- (3) a first-order reaction can be catalyzed; a second-order reaction cannot be catalyzed
- ✓ (4) the half-life of a first-order reaction does not depend on $[A]_0$; the half-life of a second-order reaction does depend on $[A]_0$

33. Among CaH_2 , BeH_2 , BaH_2 , the order of ionic character is

- (1) $\text{BeH}_2 < \text{CaH}_2 < \text{BaH}_2$
- (2) $\text{BaH}_2 < \text{BeH}_2 < \text{CaH}_2$
- ✓ (3) $\text{BeH}_2 < \text{BaH}_2 < \text{CaH}_2$
- (4) $\text{CaH}_2 < \text{BeH}_2 < \text{BaH}_2$

34. Consider the change in oxidation state of Bromine corresponding to different emf values as shown in the diagram below :



Then the species undergoing disproportionation is

- (1) BrO_3^-
- (2) HBrO
- (3) Br_2
- (4) BrO_4^-

35. In which case is the number of molecules of water maximum ?

- ✓ (1) 18 ml of water 180
- (2) 10^{-3} mol of water
- (3) 0.00224 L of water vapours at 1 atm and 273 K
- (4) 0.18 g of water 22.4

36. Regarding cross-linked or network polymers which of the following statements is *incorrect* ?

- (1) They contain covalent bonds between various linear polymer chains.
- (2) They contain strong covalent bonds in their polymer chains.
- (3) Examples are bakelite and melamine.
- (4) They are formed from bi- and tri-functional monomers.

37. Nitration of aniline in strong acidic medium also gives m-nitroaniline because

- (1) In spite of substituents nitro group always goes to only m-position.
- (2) In acidic (strong) medium aniline is present as anilinium ion.
- (3) In absence of substituents nitro group always goes to m-position.
- (4) In electrophilic substitution reactions amino group is meta directive.

38. Which of the following oxides is most acidic in nature ?

- (1) MgO
- (2) CaO
- (3) BaO
- ✓ (4) BeO

39. The difference between amylose and amylopectin is

- (1) Amylopectin have 1 → 4 α-linkage and 1 → 6 α-linkage
- (2) Amylose is made up of glucose and galactose
- (3) Amylopectin have 1 → 4 α-linkage and 1 → 6 β-linkage
- (4) Amylose have 1 → 4 α-linkage and 1 → 6 β-linkage

40. A mixture of 2.3 g formic acid and 4.5 g oxalic acid is treated with conc. H_2SO_4 . The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be

- (1) 1.4
- (2) 4.4
- (3) 2.8
- (4) 3.0

41. For the redox reaction
 $MnO_4^- + C_2O_4^{2-} + H^+ \longrightarrow Mn^{2+} + CO_2 + H_2O$
 the correct coefficients of the reactants for the balanced equation are

	MnO_4^-	$C_2O_4^{2-}$	H^+
(1)	16	5	2
(2)	5	16	2
(3)	2	16	5
(4)	2	5	16

42. The correction factor 'a' to the ideal gas equation corresponds to

- (1) density of the gas molecules
- (2) forces of attraction between the gas molecules
- (3) electric field present between the gas molecules
- ✓ (4) volume of the gas molecules

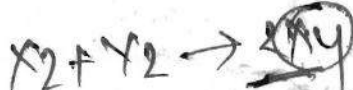
43. Which one of the following conditions will favour maximum formation of the product in the reaction



- ✓ (1) Low temperature and high pressure
- (2) High temperature and low pressure
- (3) High temperature and high pressure
- (4) Low temperature and low pressure

44. The bond dissociation energies of X_2 , Y_2 and XY are in the ratio of 1 : 0.5 : 1. ΔH for the formation of XY is -200 kJ mol^{-1} . The bond dissociation energy of X_2 will be

- (1) 200 kJ mol^{-1}
- (2) 400 kJ mol^{-1}
- ✓ (3) 800 kJ mol^{-1}
- (4) 100 kJ mol^{-1}



$2(-200) = 2(X) - [X + 0.5X]$

45. When initial concentration of the reactant is doubled, the half-life period of a zero order reaction

- (1) is halved
- (2) remains unchanged
- (3) is tripled
- ✓ (4) is doubled

9

$0.5X = \frac{400}{2}$

46. Which of the following is an occupational respiratory disorder ?

- (1) Anthraxis
- (2) Emphysema
- (3) Botulism
- ✓ (4) Silicosis

47. Calcium is important in skeletal muscle contraction because it

- ✓ (1) binds to troponin to remove the masking of active sites on actin for myosin.
- (2) prevents the formation of bonds between the myosin cross bridges and the actin filament.
- (3) detaches the myosin head from the actin filament.
- (4) activates the myosin ATPase by binding to it.

48. Which of the following gastric cells indirectly help in erythropoiesis ?

- (1) Chief cells
- ✓ (2) Parietal cells
- (3) Goblet cells
- (4) Mucous cells

49. Match the items given in Column I with those in Column II and select the correct option given below :

	Column I	Column II
a.	Fibrinogen	i. Osmotic balance
b.	Globulin	ii. <u>Blood clotting</u>
c.	Albumin	iii. Defence mechanism

	a	b	c
(1)	iii	ii	i
(2)	ii	iii	i
(3)	i	iii	ii
(4)	i	ii	iii

$X : 0.5X : X$

$X = \frac{4000}{8} = 500$

50. Which of the following hormones can play a significant role in osteoporosis ?
- (1) Aldosterone and Prolactin
 - (2) Parathyroid hormone and Prolactin
 - ✓ (3) Estrogen and Parathyroid hormone
 - (4) Progesterone and Aldosterone
51. Which of the following is an amino acid derived hormone ?
- ✓ (1) Epinephrine
 - (2) Estriol
 - (3) Estradiol
 - (4) Ecdysone
52. Which of the following structures or regions is *incorrectly* paired with its function ?
- (1) Medulla oblongata : controls respiration and cardiovascular reflexes.
 - (2) Corpus callosum : band of fibers connecting left and right cerebral hemispheres.
 - (3) Hypothalamus : production of releasing hormones and regulation of temperature, hunger and thirst.
 - ✓ (4) Limbic system : consists of fibre tracts that interconnect different regions of brain; controls movement.
53. The transparent lens in the human eye is held in its place by
- (1) ligaments attached to the ciliary body
 - (2) smooth muscles attached to the ciliary body
 - (3) smooth muscles attached to the iris
 - (4) ligaments attached to the iris
54. Among the following sets of examples for divergent evolution, select the *incorrect* option :
- ✓ (1) Forelimbs of man, bat and cheetah
 - (2) Eye of octopus, bat and man
 - (3) Brain of bat, man and cheetah
 - (4) Heart of bat, man and cheetah
55. In which disease does mosquito transmitted pathogen cause chronic inflammation of lymphatic vessels ?
- ✓ (1) Elephantiasis
 - (2) Amoebiasis
 - (3) Ringworm disease
 - (4) Ascariasis
56. Which of the following is *not* an autoimmune disease ?
- (1) Psoriasis
 - (2) Vitiligo
 - ✓ (3) Alzheimer's disease
 - (4) Rheumatoid arthritis
57. Conversion of milk to curd improves its nutritional value by increasing the amount of
- (1) Vitamin D
 - (2) Vitamin E
 - ✓ (3) Vitamin B₁₂
 - (4) Vitamin A
58. Which of the following characteristics represent 'Inheritance of blood groups' in humans ?
- a. Dominance
 - b. Co-dominance
 - c. Multiple allele
 - d. Incomplete dominance
 - e. Polygenic inheritance
- (2) a, c and e
(3) b, d and e
✓ (4) a, b and c
59. The similarity of bone structure in the forelimbs of many vertebrates is an example of
- ✓ (1) Homology
 - (2) Adaptive radiation
 - (3) Convergent evolution
 - (4) Analogy

60. Which of the following animals does **not** undergo metamorphosis?

- (1) Earthworm
- (2) Starfish
- (3) ~~Moth~~
- (4) Tunicate

61. Which one of these animals is **not** a homeotherm?

- (1) *Macropus*
- (2) *Psittacula*
- (3) *Camelus*
- (4) *Chelone*

62. Which of the following features is used to identify a male cockroach from a female cockroach?

- (1) Presence of a boat shaped sternum on the 9th abdominal segment
- (2) Presence of anal cerci
- (3) Forewings with darker tegmina
- (4) Presence of caudal styles

63. Which of the following organisms are known as chief producers in the oceans?

- (1) Dinoflagellates
- (2) Euglenoids
- (3) Cyanobacteria
- (4) Diatoms

Ciliates differ from all other protozoans in

- (1) using flagella for locomotion
- (2) having two types of nuclei
- (3) using pseudopodia for capturing prey
- (4) having a contractile vacuole for removing excess water

65. Identify the vertebrate group of animals characterized by crop and gizzard in its digestive system.

- (1) Amphibia
- (2) Osteichthyes
- (3) Aves
- (4) Reptilia

66. The amnion of mammalian embryo is derived from

- (1) ectoderm and mesoderm
- (2) ectoderm and endoderm
- (3) mesoderm and trophoblast
- (4) endoderm and mesoderm

Hormones secreted by the placenta to maintain pregnancy are

- (1) hCG, hPL, progesterone, prolactin
- (2) hCG, progesterone, estrogens, glucocorticoids
- (3) hCG, hPL, progesterone, estrogens
- (4) hCG, hPL, estrogens, relaxin, oxytocin

68. The contraceptive 'SAHELI'

- (1) blocks estrogen receptors in the uterus, preventing eggs from getting implanted.
- (2) is a post-coital contraceptive.
- (3) is an IUD.
- (4) increases the concentration of estrogen and prevents ovulation in females.

69. The difference between spermiogenesis and spermiation is

- (1) In spermiogenesis spermatids are formed, while in spermiation spermatozoa are formed.
- (2) In spermiogenesis spermatozoa are formed, while in spermiation spermatozoa are released from sertoli cells into the cavity of seminiferous tubules.
- (3) In spermiogenesis spermatozoa from sertoli cells are released into the cavity of seminiferous tubules, while in spermiation spermatozoa are formed.
- (4) In spermiogenesis spermatozoa are formed, while in spermiation spermatids are formed.

70. In a growing population of a country,
- (1) pre-reproductive individuals are more than the reproductive individuals.
 - (2) pre-reproductive individuals are less than the reproductive individuals.
 - (3) reproductive and pre-reproductive individuals are equal in number.
 - (4) reproductive individuals are less than the post-reproductive individuals.

71. Match the items given in Column I with those in Column II and select the **correct** option given below :

Column I		Column II	
a. Eutrophication		i. UV-B radiation	
b. Sanitary landfill		ii. Deforestation	
c. Snow blindness		iii. Nutrient enrichment	
d. Jhum cultivation		iv. Waste disposal	
	a	b	c
(1)	ii	i	iii
(2)	i	ii	iv
(3)	iii	iv	i
(4)	i	iii	iv

72. Which part of poppy plant is used to obtain the drug "Smack" ?

- (1) Flowers
- (2) Leaves
- (3) Roots
- (4) Latex

73. Which one of the following population interactions is widely used in medical science for the production of antibiotics ?

- (1) Commensalism
- (2) Amensalism
- (3) Parasitism
- (4) Mutualism

74. All of the following are included in 'Ex-situ conservation' *except*

- (1) Wildlife safari parks
- (2) Seed banks
- (3) Botanical gardens
- (4) Sacred groves

75. Match the items given in Column I with those in Column II and select the **correct** option given below :

Column I		Column II	
a. <u>Glycosuria</u>		i. Accumulation of uric acid in joints	
b. Gout		ii. Mass of crystallised salts within the kidney	
c. Renal calculi		iii. Inflammation in glomeruli	
d. Glomerular nephritis		iv. Presence of glucose in urine	
	a	b	c
(1)	iii	ii	iv
(2)	iv	i	iii
(3)	ii	iii	i
(4)	i	ii	iii

76. Match the items given in Column I with those in Column II and select the **correct** option given below :

Column I (Function)		Column II (Part of Excretory System)	
a. Ultrafiltration		i. <u>Henle's loop</u>	
b. <u>Concentration of urine</u>		ii. Ureter	
c. Transport of urine		iii. Urinary bladder	
d. Storage of urine		iv. Malpighian corpuscle	
	a	b	c
(1)	iv	v	ii
(2)	v	iv	i
(3)	v	iv	i
(4)	iv	i	iii