

AIPMT PRE- EXAMINATION PAPER 2012

Code-A

CHEMISTRY

Time : - 3 Hours

Date : 01/04/12

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 Test Booklet contains 200 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 800.
3. Use Blue/Black Ball Point Pen only for writing particulars on this pagel 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 handover the Answer Sheet to the invigilator in the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
6. The CODE for this Booklet is A. Make sure that the CODE printed on Side-2 of the Answer Sheet is the same as that on this Booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of-both the Test Booklets and the Answer Sheets.
7. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet- Do not write your roll no. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
8. Use of white fluid for correction is NOT permissible on the Answer Sheet.
9. Each candidate must show on demand his/her Admission Card to the Invigilator.
10. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.
11. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign the Attendance Sheet twice. Cases where a candidate has not signed the Attendance Sheet the second time will be deemed not to have handed over Answer Sheet and dealt with as an unfair means case.
12. Use of Electronic/Manual Calculator is prohibited.
13. The candidates are governed by all Rules and regulation of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
14. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
15. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/ Answer Sheet in the Attendance Sheet.

PART A — CHEMISTRY

51. In a zero-order reaction for every 10° rise of temperature, the rate is doubled. If the temperature is increased from 10°C to 100°C , the rate of the reaction will become:

- (1) 64 times (2) 128 times
 (3) 256 times (4) 512 times

Ans. [4]

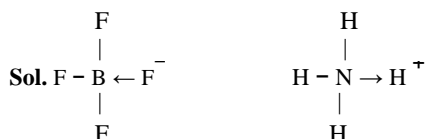
Sol.

$$2^9 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 512 \text{ times}$$

52. Which one of the following pairs is isostructural (i.e. having the same shape and hybridization) ?

- (1) $[\text{NF}_3 \text{ and } \text{BF}_3]$ (2) $[\text{BF}_4^- \text{ and } \text{NH}_4^+]$
 (3) $[\text{BCl}_3 \text{ and } \text{BrCl}_3]$ (4) $[\text{NH}_3 \text{ and } \text{NO}_3^-]$

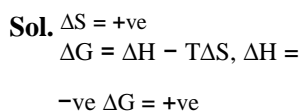
Ans. [2]



53. In which of the following reactions, standard reaction entropy change (ΔS°) is positive and standard gibb's energy change (ΔG°) decreases sharply with increasing temperature ?

- (1) $\text{Mg(s)} + \frac{1}{2} \text{O}_2(\text{g}) \rightarrow \text{MgO(s)}$
 (2) $\frac{1}{2} \text{C graphite} + \frac{1}{2} \text{O}_2(\text{g}) \rightarrow \frac{1}{2} \text{CO}_2(\text{g})$
 (3) $\text{C graphite} + \frac{1}{2} \text{O}_2(\text{g}) \rightarrow \text{CO(g)}$
 (4) $\text{CO(g)} + \frac{1}{2} \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$

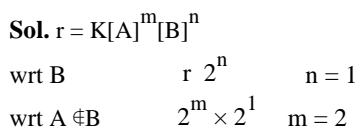
Ans. [3]



54. In a reaction, $A + B \rightarrow \text{Product}$, rate is doubled when the concentration of B is doubled, and rate increases by a factor of 8 when the concentrations of both the reactants (A and B) are doubled, rate law for the reaction can be written as

- (1) Rate = $k[A][B]$ (2) Rate = $k[A]^2[B]$
 (3) Rate = $k[A][B]^2$ (4) Rate = $k[A]^2[B]^2$

Ans. [2]



55. Limiting molar conductivity of NH_4OH (i.e. $\Lambda^\circ_m(\text{NH}_4\text{OH})$) is equal to

(1) $\Lambda^\circ_m(\text{NH}_4\text{OH}) + \Lambda^\circ_m(\text{NH}_4\text{Cl}) - \Lambda^\circ_m(\text{HCl})$

(2) $\Lambda^\circ_m(\text{NH}_4\text{Cl}) + \Lambda^\circ_m(\text{NHOH}) - \Lambda^\circ_m(\text{NaCl})$

(3) $\Lambda^\circ_m(\text{NH}_4\text{Cl}) + \Lambda^\circ_m(\text{NaCl}) - \Lambda^\circ_m(\text{NaOH})$

(4) $\Lambda^\circ_m(\text{NaOH}) + \Lambda^\circ_m(\text{NaCl}) - \Lambda^\circ_m(\text{NH}_4\text{Cl})$

Ans. [2]

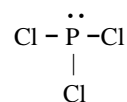


$$\pi_{\text{mNH}_4\text{Cl}} + \pi_{\text{mNaOH}} - \pi_{\text{mNaCl}} = \pi_{\text{mNH}_4\text{OH}}$$

56. Which of the following species contains three bond pairs and one lone pair around the central atoms ?



Ans. [2]



57. Buffer solutions have constant acidity and alkalinity because

(1) They have large excess of H^+ or OH^- ions

(2) They have fixed value of pH

(3) These give unionised acid or base on reaction with added acid or alkali

(4) Acids and alkalies in these solutions are shielded from attack by other ions

Ans. [3]

58. In Freundlich Adsorption isotherm, the value of $1/n$ is :

(1) 1 in case of physical adsorption

(2) 1 in case of chemisorption

(3) between 0 and 1 in all cases

(4) between 2 and 4 in all cases

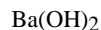
Ans. [3]

59. pH of a saturated solution of $\text{Ba}(\text{OH})_2$ is 12. The value of solubility product (K_{SP}) of $\text{Ba}(\text{OH})_2$ is

(1) 4.0×10^{-6} (2) 5.0×10^{-6}

(3) 3.3×10^{-7} (4) 5.0×10^{-7}

Ans. [4] Sol.



pH = 12

\therefore pOH = 2

Q $[\text{OH}]^- = 2S = 10^{-2}$

$\therefore S = \frac{1}{2} \times 10^{-2} = 5 \times 10^{-3}$

K_{SP} = $4S^3 = 4(5 \times 10^{-3})^3$

= $4 \times 125 \times 10^{-9}$

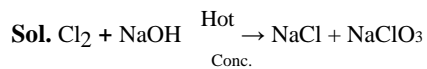
= 500×10^{-9}

= 5×10^{-7}

60. When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from :

- (1) Zero to -1 and zero to +3 (2) Zero to +1 and zero to -3
(3) Zero to +1 and zero to -5 (4) Zero to -1 and zero to +5

Ans. [4]



61. Which one of the following statements is incorrect about enzyme catalysis ?

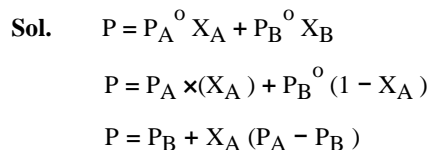
- (1) Enzymes are denaturated by ultraviolet rays and at high temperature
(2) Enzymes are least reactive at optimum temperature
(3) Enzymes are mostly proteinous in nature
(4) Enzyme action is specific

Ans. [2]

62. P_A and P_B are the vapour pressure of pure liquid components, A and B, respectively of an ideal binary solution. If x_A represents the mole fraction of component A, the total pressure of the solution will be:

- (1) $P_B + x_A (P_B - P_A)$ (2) $P_B + x_A (P_A - P_B)$
(3) $P_A + x_A (P_B - P_A)$ (4) $P_A + x_A (P_A - P_B)$

Ans. [2]



63. The protecting power of lyophilic colloidal sol is expressed in term of

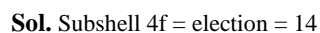
- (1) Critical miscelle concentration
(2) Oxidation number
(3) Coagulation value
(4) Gold number

Ans. [4]

64. Maximum number of electrons in a subshell with $l = 3$ and $n = 4$ is :

- (1) 10 (2) 12
(3) 14 (4) 16

Ans. [3]



65. 50 mL of each gas A and of gas B takes 150 and 200 seconds respectively for effusing through a pin hole under the similar conditions. If molecular mass of gas B is 36, the molecular mass of gas A will be ?
- (1) 32 (2) 64
(3) 96 (4) 128

Ans. [Bonus]

$$\text{Sol. } \frac{r_1}{r_2} = \sqrt{\frac{M_w}{M_w}}$$

$$\frac{V_1}{t_1} \times \frac{t_2}{V_2} = \sqrt{\frac{M}{M}}$$

$$\frac{50}{150} \times \frac{200}{50} = \sqrt{\frac{M}{M}}$$

$$\frac{4}{3} = \sqrt{\frac{36}{M_{w_1}}}$$

$$\frac{16}{9} = \frac{36}{M_{w_1}}$$

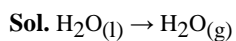
$$M_{w_1} = \frac{36 \times 9}{16} =$$

— — —

— — —

66. Standard enthalpy of vapourisation $\Delta_{\text{vap}}H^\ominus$ for water at 100°C is $40.66 \text{ kJ mol}^{-1}$. The internal energy of vaporisation of water at 100°C (in kJ mol^{-1}) is :
- (1) +43.76 (2) +40.66
(3) +37.56 (4) -43.76
- (Assume water vapour to behave like an ideal gas)

Ans. [3]



$$\Delta H = \Delta E + \Delta nRT$$

$$40.66 = \Delta E + 1 \times \frac{8.314}{1000} \times 373$$

$$\Delta E = 37.5 \text{ kJ}$$

67. The number of octahedral void(s) per atom present in a cubic close-packed structure is :

(1) 2 (2) 4

(3) 1 (4) 3

Ans. [3]

68. The correct set of four quantum numbers for the valence electron of rubidium atom ($Z = 37$) is

(1) $5, 0, 0, +\frac{1}{2}$ (2) $5, 1, 0, +\frac{1}{2}$

(3) $5, 1, 1, +\frac{1}{2}$ (4) $6, 0, 0, +\frac{1}{2}$

Ans. [1]

Sol. $\text{Rb}(37) = [\text{Kr}]5s^1$

$$n = 5, l = 0, m = 0, s = +1/2$$

69. A metal crystallizes with a face-centered cubic lattice. The edge of the unit cell is 408 pm. The diameter of the metal atom is

- (1) 144 pm (2) 204 pm
(3) 288 pm (4) 408 pm

Ans. [3]

Sol. For FCC $r = \frac{a}{2\sqrt{2}}$

So diameter = $\frac{a}{\sqrt{2}} = \frac{408}{1.414} = 288.5$ pm

70. The enthalpy of fusion of water is 1.435 kcal/mol. The molar entropy change for the melting of ice at 0°C is :

- (1) 5.260 cal/(mol K) (2) 0.526 cal/(mol K)
(3) 10.52 cal/(mol K) (4) 21.04 cal/(mol K)

Ans. [1]

Sol. $\Delta S = \frac{\Delta H}{T} = \frac{1.435 \times 1000}{273} = 5.26 \frac{\text{Cal.}}{\text{mol} \times \text{k}}$

71. In which of the following compounds, nitrogen exhibits highest oxidation state ?

- (1) N₃H (2) NH₂OH
(3) N₂H₄ (4) NH₃

Ans. [1]

Sol. Oxidation number of nitrogen -N₃H = -1/3, NH₂OH = -1, N₂H₄ = -2, NH₃ = -3

72. Aluminium is extracted from alumina (Al₂O₃) by electrolysis of a molten mixture of :

- (1) Al₂O₃+Na₃AlF₆+CaF₂ (2) Al₂O₃+KF+Na₃AlF₆
(3) Al₂O₃+HF+NaAlF₄ (4) Al₂O₃+CaF₂+NaAlF₄

Ans. [1]

Sol. Al₂O₃ + Na₃AlF₆ (cryolite) + CaF₂

73. Which of the statements is not true ?

- (1) K₂Cr₂O₇ solution in acidic medium is orange
(2) K₂Cr₂O₇ solution becomes yellow on increasing the pH beyond 7
(3) On passing H₂S through acidified K₂Cr₂O₇ solution, a milky colour is observed
(4) Na₂Cr₂O₇ is preferred over K₂Cr₂O₇ in volumetric analysis

Ans. [4]

Sol. Because Na₂Cr₂O₇ is hygroscopic

74. A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number ?

- (1) Cl (2) C
(3) S (4) H

Ans. [1]



Maximum change in oxidation number = Cl

75. Which one of the following is an outer orbital complex and exhibits paramagnetic behaviour :

- (1) $[\text{Cr}(\text{NH}_3)_6]^{3+}$ (2) $[\text{Co}(\text{NH}_3)_6]^{3+}$
(3) $[\text{Ni}(\text{NH}_3)_6]^{2+}$ (4) $[\text{Zn}(\text{NH}_3)_6]^{2+}$

Ans. [3]



Weak ligand with two unpaired electron.

76. The ease of adsorption of the hydrated alkali metal ions on an ion-exchange resins follows the order :

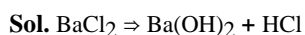
- (1) $\text{K}^+ < \text{Na}^+ < \text{Rb}^+ < \text{Li}^+$ (2) $\text{Na}^+ < \text{Li}^+ < \text{K}^+ < \text{Rb}^+$
(3) $\text{Li}^+ < \text{K}^+ < \text{Na}^+ < \text{Rb}^+$ (4) $\text{Rb}^+ < \text{K}^+ < \text{Na}^+ < \text{Li}^+$

Ans.[4]

77. Equimolar solutions of the following substances were prepared separately. Which one of these will record the highest pH value ?:

- (1) LiCl (2) BeCl₂
(3) BaCl₂ (4) AlCl₃

Ans.[3]

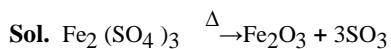


Ba(OH)₂ is a strong base.

78. Sulphur trioxide can be obtained by which of the following reaction :

- (1) $\text{S} + \text{H}_2\text{SO}_4 \xrightarrow{\Delta}$ (2) $\text{H}_2\text{SO}_4 + \text{PCl}_5 \xrightarrow{\Delta}$
(3) $\text{CaSO}_4 + \text{C} \rightarrow$ (4) $\text{Fe}_2 + (\text{SO}_4)_3 \rightarrow$

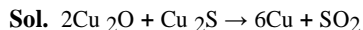
Ans.[4]



79. In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with :

- (1) Iron sulphide (FeS) (2) Carbon monoxide (CO)
(3) Copper (I) sulphide (Cu₂S) (4) Sulphur dioxide (SO₂)

Ans.[3]



80. Identify the wrong statement in the following
- (1) Atomic radius of the elements increases as one moves down the first group of the periodic table
 - (2) Atomic radius of the elements decreases as one moves across from left to right in then 2nd period of the periodic table
 - (3) Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius
 - (4) Amongst isoelectronic species, greater the negative charge on the anion, large is the ionic radius

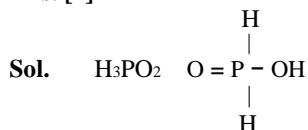
Ans. [3]

Sol. Ionic size $\propto \frac{1}{\text{charge on cation}}$.

81. Which of the following statements is not valid for oxoacids of phosphorus ?

- (1) All oxoacids contain tetrahedral four coordinated phosphorous
- (2) All oxoacids contain atleast one P = O units and one P – OH group
- (3) Orthophosphoric acid is used in the manufacture of triple superphosphate
- (4) Hypophosphorous acid is a diprotic acid

Ans. [4]



82. Identify the alloy containing a non-metal as a constituent in it

- (1) Bell metal
- (2) Bronze
- (3) Invar
- (4) Steel

Ans. [4]

Sol. Steel \rightarrow Fe + C

83. The pair of species with the same bond order is

- (1) NO, CO
- (2) N₂, O₂
- (3) O₂²⁻, B₂
- (4) O₂⁺, NO⁺

Ans. [3]

Sol. O₂²⁻ & B₂ Bond order is one

84. Bond order of 1.5 is shown by:

- (1) O₂²⁻
- (2) O₂
- (3) O₂⁺
- (4) O₂⁻

Ans. [4]

Sol. O₂⁻ Bond order = 1.5

85. Which one of the following is a mineral of iron ?

- (1) Pyrolusite
- (2) Magnetite
- (3) Malachite
- (4) Cassiterite

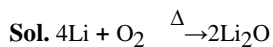
Ans. [2]

Sol. Fe₃O₄

86. Which one of the alkali metals, forms only, the normal oxide, M_2O on heating in air ?

- (1) Li (2) Na
(3) Rb (4) K

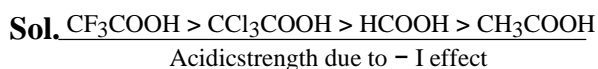
Ans. [1]



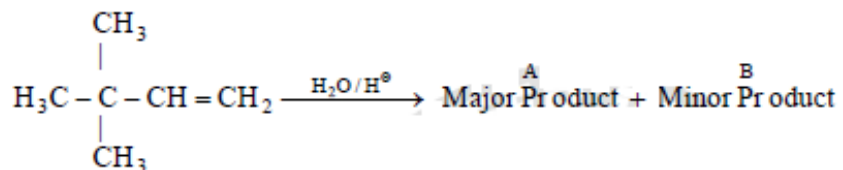
87. The correct order of decreasing acid strength of trichloroacetic acid (A), trifluoroacetic acid (B), acetic acid (C) and formic acid (D) is :

- (1) $A > B > C > D$ (2) $A > C > B > D$
(3) $B > A > D > C$ (4) $B > D > C > A$

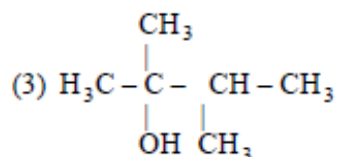
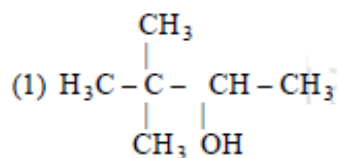
Ans. [3]



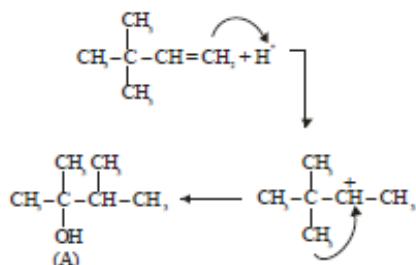
88. In the following reaction :



The major product is :



Ans. [3]



Sol. (Major Product)

89. Which nomenclature is not according to IUPAC system ?.

(1)	$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH} - \text{CH}_2 - \text{CH}_3, \\ \quad \\ \text{CH}_3 \quad \text{C}_6\text{H}_5 \end{array}$ <p>2 - Methyl - 3 - phenylpentane</p>
(2)	$\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{COOH},$ <p>5 - oxohexanoic acid</p>
(3)	$\text{Br} - \text{CH}_2 - \text{CH} = \text{CH}_2,$ <p>1 - Bromo - prop - 2 - ene</p>
(4)	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH}_2 - \text{CH} - \text{CH}_2 - \text{CH} - \text{CH}_3, \\ \quad \\ \text{Br} \quad \text{CH}_3 \end{array}$ <p>4 - Bromo, 2, 4 - di - methylhexane</p>

Ans. [3]

Sol. $\text{Br} - \text{CH}_2 - \text{CH} = \text{CH}_2$

Correct Name - 3 Bromo propene

90. Among the following compounds the one that is most reactive towards electrophilic nitration is :

- (1) Toluene (2) Benzene
(3) Benzoic acid (4) Nitrobenzene

Ans. [1]

Sol. Due to +R effect of methyl group



is more reactive towards ESR (Nitration).

91. Deficiency of vitamin B₁ causes the disease

- (1) Cheilosis (2) Sterility
(3) Convulsions (4) Beri-Beri

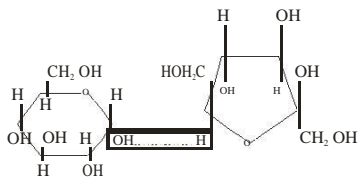
Ans. [4]

Sol. Deficiency of B₁ cause Beri-Beri.

92. Which one of the following sets of monosaccharides forms sucrose ?

- (1) β - D - Glucopyranose and α - D - fructofuranose (2) α - D - Glucopyranose and β - D - fructofuranose
(3) α - D - Glucopyranose and α - D - fructofuranose (4) α - D - Glucopyranose and β - D - fructofuranose

Ans. [4]



Sol. α D glucopyranose

β D fructofuranose

93. Which one of the following statements regarding photochemical smog is not correct ?:
- (1) Photochemical smog is formed through photochemical reaction involving solar energy
 - (2) Photochemical smog does not cause irritation in eyes and throat
 - (3) Carbon monoxide does not play any role in photochemical smog formation
 - (4) Photochemical smog is an oxidising agent in character

Ans. [2]

Sol. Photo chemical smog causes irritation in eyes & throat

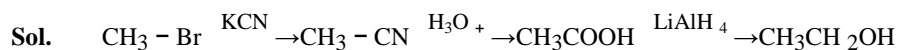
94. In the following sequence of reactions



the end product (C) is :

- (1) Acetaldehyde
- (2) Ethyl alcohol
- (3) Acetone
- (4) Methane

Ans. [2]



95. Which one of the following is not a condensation polymer ?

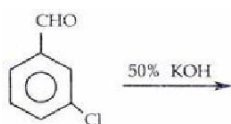
- (1) Dacron
- (2) Neoprene
- (3) Melamine
- (4) Glyptal

Ans. [2]



Sol. (2 - Chloro1,3 - butadiene)
(chloroprene)

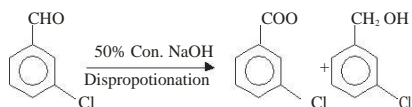
96. Predict the products in the given reaction



(1)		+	
(2)		+	
(3)		+	
(4)		+	

Ans.[1]

Sol. Cannizaro reaction



97. Which of the following acids does not exhibit optical isomerism ?

- (1) Lactic acid (2) Tartaric acid
(3) Maleic acid (4) α -amino acids

Ans.[3]

Sol. $\text{HOOC}-\text{CH}=\text{CH}-\text{COOH}$ (Maleic acid) almost show optical isomerism

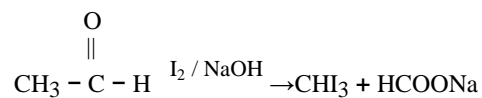
98. CH_3CHO and $\text{C}_6\text{H}_5\text{CH}_2\text{CHO}$ can be distinguished chemically by :

- (1) Tollen's reagent test (2) Fehling solution test
(3) Benedict test (4) Iodoform test

Ans.[4]

Sol. CH_3CHO give positive iodoform test

$\text{C}_6\text{H}_5\text{CH}_2\text{CHO}$ donot gives due to absence of $\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} -$ group.



99. Which of the following statements is false ?

- (1) The repeat unit in natural rubber is isoprene
(2) Both starch and cellulose are polymers of glucose
(3) Artificial silk is derived from cellulose
(4) Nylon-66 is an example of elastomer

Ans.[4]

Sol. Nylon 6, 6 is a fibre not an elastomer.

100. Acetone is treated with excess of ethanol in the presence of hydrochloric acid. The product obtained is

(1)	$(\text{CH}_3)_2\text{C} \begin{matrix} \nearrow \text{OH} \\ \searrow \text{OC}_2\text{H}_5 \end{matrix}$
(2)	$(\text{CH}_3)_2\text{C} \begin{matrix} \nearrow \text{OC}_2\text{H}_5 \\ \searrow \text{OC}_2\text{H}_5 \end{matrix}$
(3)	$\text{CH}_3\text{CH}_2\text{CH}_2 - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_3$
(4)	$\text{CH}_3\text{CH}_2\text{CH}_2 - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_2\text{CH}_2\text{CH}_3$

Ans.[2]

Sol. Nucleophilic addition

