SHIKSHA CLASSES, BHANDARA

TEST-9

CHEMISTRY , PHYSICS, BIOLOGY

Time : - 3 Hours   **Max. Marks:- 720**   **Date : ....**

INSTRUCTIONS :

1. The test is of 3 hours duration.

2. The Test Booklet consists of 180 questions. The maximum marks are 720.

3. There are three parts in the question paper A, B, C consisting of Chemistry, Physics having 45 questions each and Biology having 90 questions of equal weightage. Each question is allotted 4 (four) marks for each correct response. ¼ (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

4. There is only one correct response for each question. Filling up more than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly.

SYLLABUS

CHEMISTRY : ORGANIC COMPOUNDS CONTAINING NITROGEN, PRACTICAL ORGANIC CHEMISTRY.

PHYSICS : MODERN PHYSICS.

BIOLOGY : BIOTECHNOLOGY : BIOTECHNOLOGY-PRINCIPLES AND PROCESSES, BIOTECHNOLOGY AND ITS APPLICATIONS.
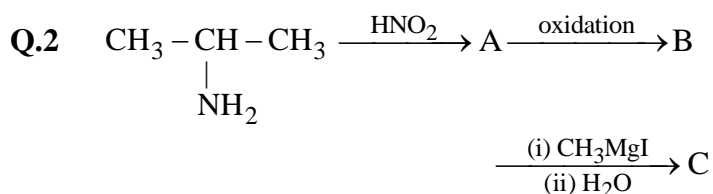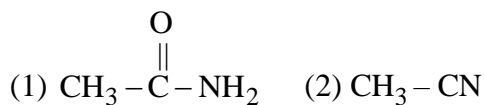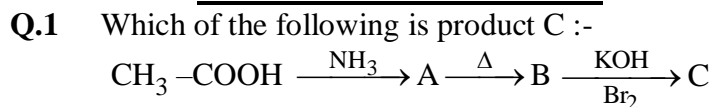
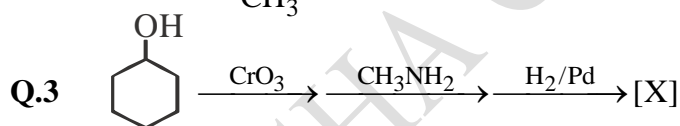Name : ....

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PART A – CHEMISTRY

Q.1 Which of the following is product C :-

$$CH_3-COOH \xrightarrow{NH_3} A \xrightarrow{\Delta} B \xrightarrow[Br_2]{KOH} C$$

(1) $CH_3 - \overset{\overset{\displaystyle O}{\|}}{C} - NH_2$

(2) $CH_3 - CN$

(3) $CH_3 - CH_2 - NH_2$

(4) $CH_3 - NH_2$

Q.2

$$CH_3 - \underset{\underset{\displaystyle NH_2}{|}}{CH} - CH_3 \xrightarrow{HNO_2} A \xrightarrow{oxidation} B$$

$$\xrightarrow[(ii) H_2O]{(i) CH_3MgI} C$$

C is :-

(1) $CH_3CH_2CH_2CH_2OH$

(2) $CH_3 - CH_2 - \underset{\underset{\displaystyle OH}{|}}{CH} - CH_3$

(3) $CH_3 - \underset{\underset{\displaystyle CH_3}{|}}{CH} - CH_2 - OH$

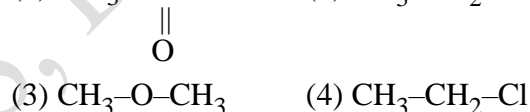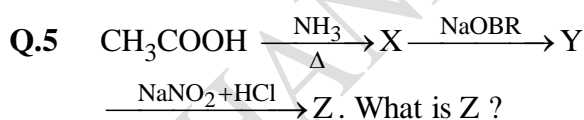(4) $CH_3 - \underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{C}} - OH$

Q.3
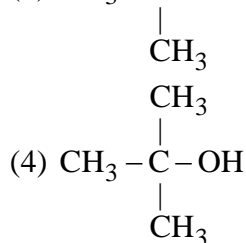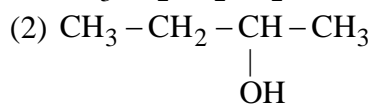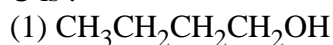
Product [X] of given reaction is :-

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

Q.4 $R - \overset{\overset{\displaystyle O}{\|}}{C} - NH_2 \xrightarrow[(ii) H_3O^+]{(i) LiAlH_4} P$ (Major),

P should be :-

(1) $R-CH_2-OH$

(2) $R-CH_2-NH_2$

(3) $R - \overset{\overset{\displaystyle O}{\|}}{C} - H$

(4) None of these

Q.5 $CH_3COOH \xrightarrow[\Delta]{NH_3} X \xrightarrow{NaOBR} Y$

$$\xrightarrow{NaNO_2+HCl} Z.$$ What is Z ?

(1) $CH_3 - \underset{\underset{\displaystyle O}{\|}}{C} - H$

(2) CH_3-CH_2-OH

(3) CH_3-O-CH_3

(4) CH_3-CH_2-Cl
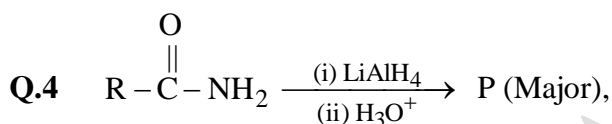
Q.6 Which does not give isocyanide test ?

(1)

(2) $(CH_3)_2CH-NH_2$

(3) $Ph-NH_2$

(4) $CH_3-NH-CH_3$

Q.7 In which case alkylamine is not formed ?

(1) $R{\longrightarrow}X + NH_3 \rightarrow$

(2) $R{\longrightarrow}CH = NOH + [4H] \xrightarrow[C_2H_5OH]{Na}$
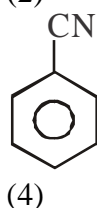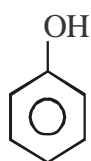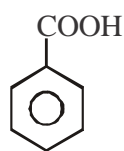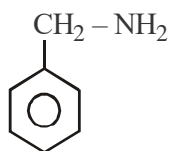
(3) $R{\longrightarrow}CN + H_2O \xrightarrow{H^+}$

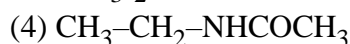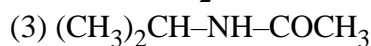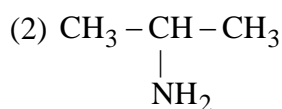(4) $RCONH_2 + 4[H] \xrightarrow{LiAlH_4}$

Q.8 In given reaction

$$\xrightarrow{H_2O/H^+} C$$

The end product (C) is :-

$CH_2 - NH_2$

(1) [benzyl amine structure]

COOH

(2) [benzoic acid structure]

OH

(3) [phenol structure]

CN

(4) [benzonitrile structure]

Q.9 $(CH_3)_2CH - \underset{\underset{O}{\|}}{C} - NH_2 \xrightarrow[Br_2]{NaOH} A \xrightarrow{COCl_2} B$

B is :-

(1) $(CH_3)_2CH–N=C=O$

(2) $CH_3 - \underset{\underset{NH_2}{|}}{CH} - CH_3$

(3) $(CH_3)_2CH–NH–COCH_3$

(4) $CH_3–CH_2–NHCOCH_3$
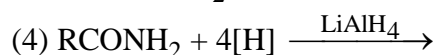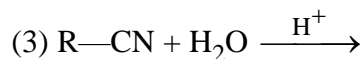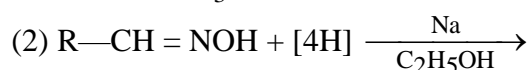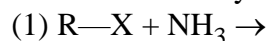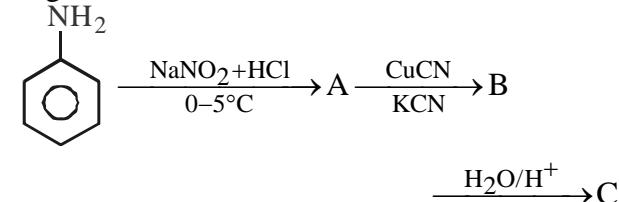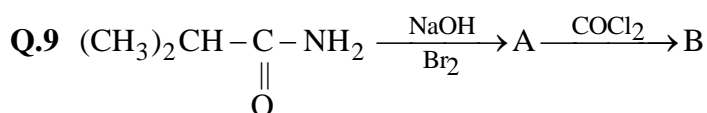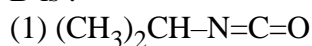
Q.10 The reaction of chloroform with alcoholic KOH and p-toluidine forms :

(1) H_3C—[ring]—CN

(2) H_3C—[ring]—NC

(3) H_3C—[ring]—N_2Cl

(4) H_3C—[ring]—$NHCHCl_2$
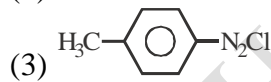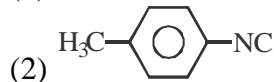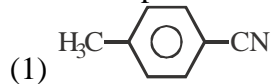
Q.11 (A) and (B) in the following reactions are :

$R - \underset{\underset{O}{\|}}{C} - R' \xrightarrow{HCN} (A) \xrightarrow{(B)} \underset{R'}{\overset{R}{C}}\begin{smallmatrix} OH \\ \\ CH_2NH_2\end{smallmatrix}$

(1) (A) = $RR'C\begin{smallmatrix} OH \\ \\ CN\end{smallmatrix}$; (B) = $LiAlH_4$

(2) (A) = $RR'C\begin{smallmatrix} OH \\ \\ COOH\end{smallmatrix}$; (B) = NH_3

(3) (A) = $RR'C\begin{smallmatrix} OH \\ \\ CN\end{smallmatrix}$; (B) = H_3O^+

(4) (A) = $RR'CH_2CN$; (B) = NaOH

Q.12 [Ph–NH_2] $\xrightarrow[\Delta]{CHCl_3, KOH} X \xrightarrow[H_2O]{LiAlH_4} Y$

(Y) is :-

(1) $Ph - \underset{\underset{H}{|}}{N} - CH_3$ (2) $Ph–CH_2–NH_2$

(3) $Ph - \underset{\underset{H}{|}}{\overset{\overset{O}{\|}}{N}} - C - H$ (4) $Ph - \overset{\oplus}{N} \equiv \overset{\ominus}{C}$
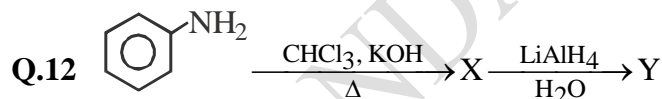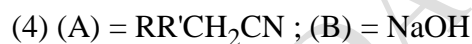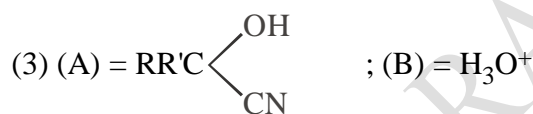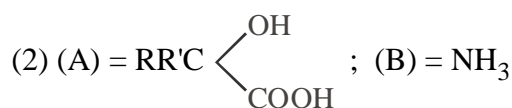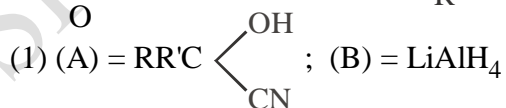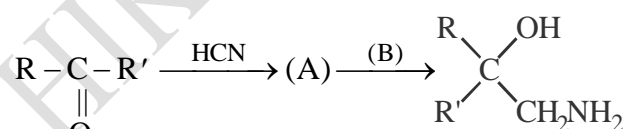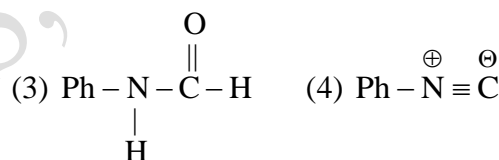
Q.13 Identify 'X' in the following sequence of reaction :-

[Ph]$-\overset{\ominus}{N}-\overset{\ominus}{N}Cl \xrightarrow[KCN]{CuCN} P \xrightarrow{LiAlH_4} Q \xrightarrow{HNO_2} X$
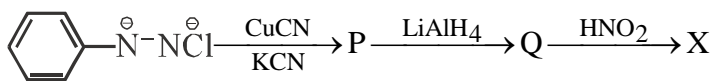
(1) Benzoic acid (2) Phenyl acetic acid

(3) Benzyl alcohol (4) Benzamide

Q.14 The final product (IV) obtained in the reaction sequence :

Toluene $\xrightarrow[2.\,H^+]{1.\,KMnO_4/OH^-} I \xrightarrow{SOCl_2} II$

$\xrightarrow{NH_3} II \xrightarrow{OBr^-} IV$ is :
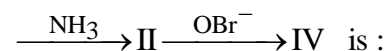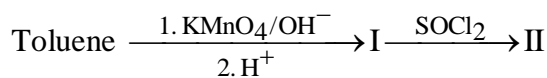
(1) $C_6H_5CONH_2$ (2) $p-CH_3C_6H_4NO_2$

(3) $C_6H_5CH_2NH_2$ (4) $C_6H_5NH_2$

Q.15

$\xrightarrow[\text{H}_2\text{O}]{\text{Br}_2}$ (A) $\xrightarrow[\text{(ii) H}_3\text{PO}_2+\text{H}_2\text{O}]{\text{(i) NaNO}_2/\text{HCl}}$ (B)

Product (B) in this reaction is :-

(1)

(2)

(3)

(4)
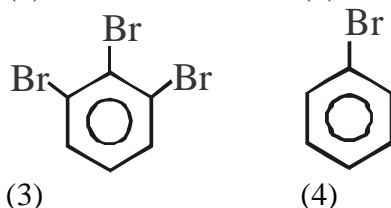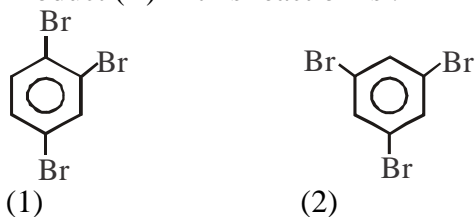
Q.16 Which of the following will not give Hoffmann bromamide reaction :

(1) $CH_3 - \overset{\overset{\displaystyle O}{\|}}{C} - NH_2$

(2) $\overset{\overset{\displaystyle O}{\|}}{C}$–NH–Br

(3) $\overset{\overset{\displaystyle O}{\|}}{C}$–NH$_2$

(4) $\overset{\overset{\displaystyle O}{\|}}{C}$–NH–CH$_3$.
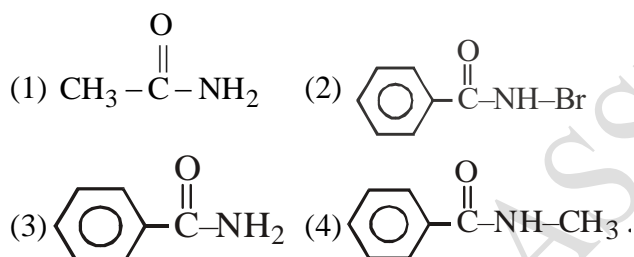
Q.17 Find out the reaction in which obtained product give positive isocyanide test :-

(1) $\xrightarrow{\text{LiAlH}_4}$

(2) $\xrightarrow{\text{NaBH}_4}$

(3) $\xrightarrow{\text{LiAlH}_4}$

(4) $\xrightarrow{\text{NaBH}_4}$
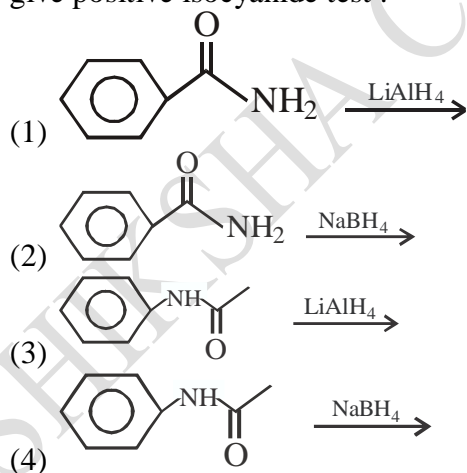
Q.18 Correct basic strength order of compounds :-
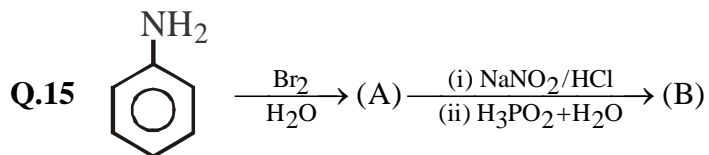
(i)

(ii)

(iii)

(iv)
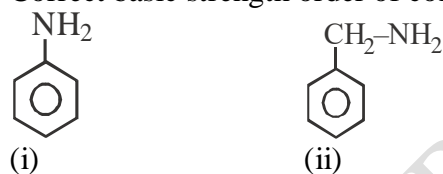
(1) iv < ii < i < iii   (2) iv < iii < i < ii
(3) iv < i < iii < ii   (4) ii < i < iii < iv

Q.19 The product obtained from the reaction is :-

Br—⬡—CH$_2$Cl+NaCN $\xrightarrow{\text{ethanol}}$

(1) Br—⬡—CH$_2$CN

(2) Br—⬡—CH$_2$Cl

(3) NC—⬡—CH$_2$CN

(4) Br—⬡(—CH$_2$Cl)(—CN)
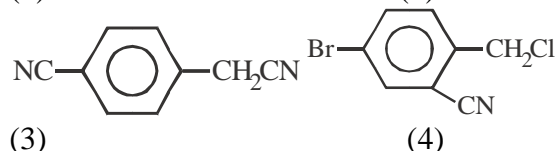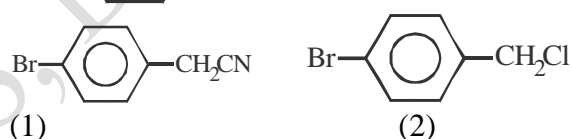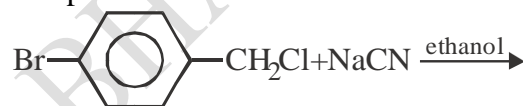
Q.20 The reaction of a primary amine with chloroform and ethanolic solution of KOH is called –
(1) Hoffmann's reaction
(2) Coupling reaction
(3) Carbylamine reaction
(4) Curtius reaction.

Q.21

$\xrightarrow{\text{NaNO}_2/\text{HCl}}$ (A) $\xrightarrow[\text{(mild basic medium)}]{}$ (B),
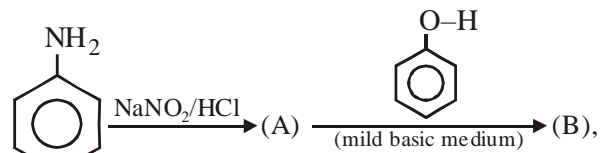
Product (B) of this reaction is :-

SPACE FOR ROUGH WORK

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(1) p-CH₃-C₆H₄-N=N-Ph

(2) p-OH-C₆H₄-N=N-C₆H₄-CH₃

(3) p-OH-C₆H₄-Ph

(4) with OH, N=N-C₆H₄-CH₃
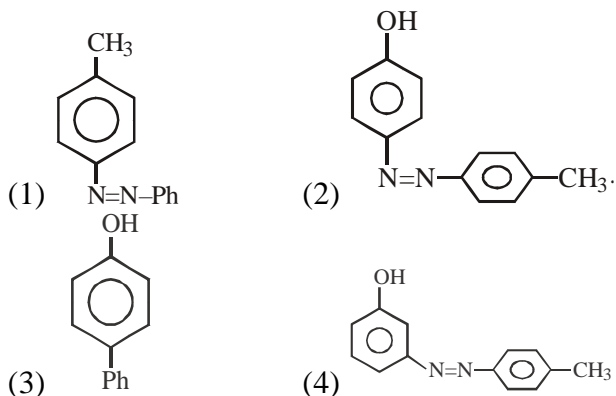
Q.22 In the following Reaction the product (A)

$C_6H_5-\overset{\oplus}{N}\equiv N\ \overset{\ominus}{Cl}$ + $C_6H_5-NH_2$ $\xrightarrow{H^{\oplus}}$ (A) is Yellow dye

(1) C₆H₅-N=N-NH-C₆H₅

(2) C₆H₅-N=N-C₆H₄-NH₂ (ortho)

(3) C₆H₅-N=N-C₆H₄-NH₂ (ortho)

(4) C₆H₅-N=N-C₆H₄-NH₂ (para)
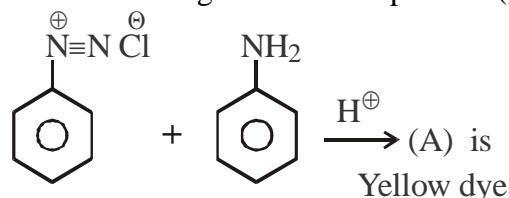
Q.23 In a Lassaignes's test for sulphur in the organic compound with sodium nitroprusside solution the purple colour formed is due to-
(1) $[Fe(CN)_5\ NOS]^{4-}$
(2) $[Fe(CN)_5\ S]^{2-}$
(3) $[Fe(CN)_5\ NOS]^{2-}$

Q.24 Method by which Aniline cannot be prepared is
(1) reduction of nitrobenzene with H_2/Pd in ethanol.
(2) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution.
(3) hydrolysis of phenylisocyanide with acidic solution.
(4) degradation of benzamide with bromine in alkaline solution.

Q.25 Carbon and hydrogen in an organic compound are detected as
(1) $CaHCO_3$, $CaCO_3$
(2) $CaHCO_3$, $CuSO_4 .5H_2O$
(3) $CaCO_3$, $CuSO_4.5H_2O$
(4) $CaCO_3$, $Cu(OH)_2$

Q.26 In the Hofmann mustard oil reaction of primary amines, the black precipitate is due to –
(1) HgS   (2) Ag_2S
(3) CuS   (4) BaS

Q.27 Which of the following is incorrect?
(1) $FeCl_3$ is used in detection of phenols.
(2) Fehling solution is used in detection of glucose.
(3) Tollen's reagent is used in detection of unsaturation.
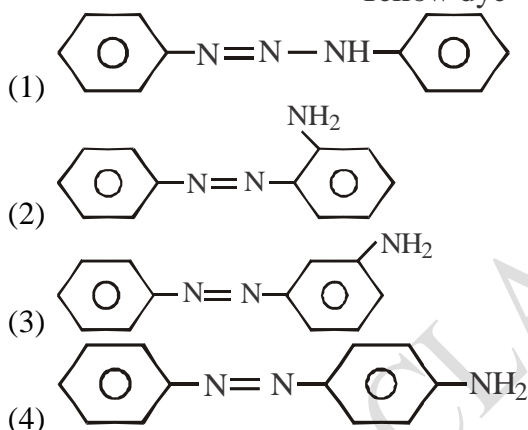(4) $NaHSO_3$ is used in detection of carbonyl compounds.

Q.28 Which one of the following compounds is formed when nitrobenzene is treated with bromine in the presence of ferric ion?
(1) m -bromonitrobenzene
(2) o-bromonitrobenzene
(3) p-bromonitrobenzene
(4) Mixture of o- and p-bromonitrobenzene

Q.29 An organic compound having carbon, hydrogen and sulphur contains 4% of sulphur. The minimum molecular weight of the compound is
(1) 200   (2) 400   (3) 600   (4) 800

Q.30 The sodium extract of an organic compound on acidification with acetic acid and addition of lead acetate solution gives a black precipitate. The organic compound contains –
(1) nitrogen   (2) halogen
(3) sulphur   (4) phosphorus

Q.31 Nitrobenzene undergoes reduction with Zn/alc. KOH to form a compound A. The number of sigma and pi bonds in A, respectively, are
(1) 17, 6   (2) 27, 6
(3) 27, 8   (4) 17, 8

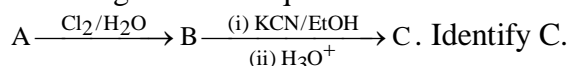**Q.32** One percent composition of an organic compound A is, carbon 85.71% and hydrogen : 14.29%. Its vapour density is 14. Consider the following reaction sequence

$A \xrightarrow{Cl_2/H_2O} B \xrightarrow[\text{(ii) } H_3O^+]{\text{(i) KCN/EtOH}} C$. Identify C.

(1) $CH_3 - \underset{\underset{OH}{|}}{CH} - CO_2H$

(2) $HO - CH_2 - CH_2 - CO_2H$

(3) $HO - CH_2 - CO_2H$

(4) $CH_3 - CH_2 - CO_2H$

Q.33 0.3780 g of an organic compound gave 0.5740 g of silver chloride in Carius estimation. Calculate the percentage of chlorine present in the compound.
(1) 37.6%   (2) 19.6%
(3) 62.4%   (4) 79.4%

Q.34 In the estimation of sulphur by Carius method, 0.468 g of an organic sulphur compound gave 0.668 g of barium sulphate. Find the percentage of sulphur in the given compound.
(1) 37.6%   (2) 19.6%
(3) 62.4%   (4) 79.4%

Q.35 The distinguishing test between methanoic acid and ethanoic acid is
(1) Litmus test
(2) Tollen's test
(3) Esterification test
(4) Sodium bicarbonate test

Q.36 0.30 g of an organic compound containing C, H and Oxygen on combustion yields 0.44 g CO_2 and 0.18 g H_2O. If one mol of compound weighs 60, then molecular formula of the compound is –
(1) CH_2O (2) C_3H_8O
(3) C_4H_6O (4) $C_2H_4O_2$

Q.37 Choose the correct statement for Lucas test
(i) 1° Alcohol: $RCH_2OH \xrightarrow[\text{HCl}]{ZnCl_2}$ No reaction at room temperature.

(ii) 3° Alcohol: $R_2CHOH \xrightarrow[\text{HCl}]{ZnCl_2} R_2CH–Cl$
white turbidity after 5-10 min

(iii) 2° Alcohol : $R_3C–OH \xrightarrow[\text{HCl}]{ZnCl_2} R_3C–Cl$
white turbidity instantly
(1) only i   (2) ii and iii
(3) i, ii and iii   (4) only iii

Q.38 Choose the correct statement.
(i) In Schiff's Test appearance of pink, red or magenta colour confirms the presence of ketone group.
(ii) In Fehling's Test appearance of a red precipitate confirms the presence of the aldehyde group
(iii) Nitrogen compounds dissolve in mineral acids and change red litmus to blue.
(1) only i   (2) ii and iii
(3) i, ii and iii   (4) only iii

Q.39 Which of the following amines does not react with Hinsberg reagent?
(1) $CH_3CH_2–NH_2$ (2) $CH_3–NH–CH_3$
(3) $(CH_3CH_2)_3N$ (4) All of these

Q.40 Which of the following compound will not undergo azo coupling reaction with benzene diazonium chloride?
(1) Aniline   (2) Phenol
(3) Anisole   (4) Nitrobenzene

Q.41 Primary amines react with nitrous acid to yield
(1) Insoluble nitrite salts (2) Yellow oily layer
(3) Nitrogen gas   (4) Azo dye

Q.42 On heating an aliphatic primary amine with chloroform and ethanolic potassium hydroxide, the organic compound formed is –
(1) an alkyl cyanide   (2) an alkyl isocyanide
(3) an alkanol   (4) an alkanediol

Q.43 In acid medium nitrobenzene is reduced to aniline as shown in the reaction

$C_6H_5 - NO_2 + 6[H] \rightarrow C_6H_5 - NH_2 + 2H_2O$
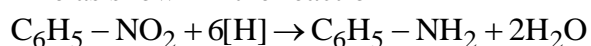
The reducing agent used in this reaction is –
(1) $LiAlH_4$ (2) Sn/HCl
(3) Na/alcohol   (4) H_2/Ni

SPACE FOR ROUGH WORK

Q.44 Aniline reacts with which of these to form Schiff base
(1) Acetic acid   (2) Benzaldehyde
(3) Acetone   (4) NH_3

Q.45 In the reaction

$$CH_3CN + 2H \xrightarrow[\text{Ether}]{HCl} X \xrightarrow[\text{H}_2\text{O}]{\text{Boiling}} Y;$$
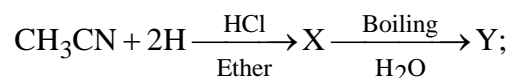
the term Y is:
(1) Acetone   (2) Ethyl amine
(3) Acetaldehyde   (4) Dimethyl amine

PART B – PHYSICS

Q.46 The work function of metal is 1eV. Light of wavelength 3000 Å is incident on this metal surface. The velocity of emitted photo-electrons will be :-
(1) 10 m/s   (2) 1×10^3 m/s
(3) 1×10^4 m/s   (4) 1×10^6 m/s

Q.47 The number of photo-electrons emitted per second from a metal surface increases when :-
(1) The energy of incident photons increases
(2) The frequency of incident light increases
(3) The wavelength of the incident light increases.
(4) The intensity of the incident light increases.

Q.48 The binding energy per nucleon of O^{16} is 7.97 MeV and that of O^{17} is 7.75 MeV. The energy (in MeV) required to remove a neutron from O^{17} is :-
(1) 3.52   (2) 3.64
(3) 4.23   (4) 7.86

Q.49 The work function of a metallic surface is 5.01eV. The photo-electrons are emitted when light of wavelength 2000 Å falls on it. The potential difference applied to stop the fastest photo-electrons is [h = 4.14×10^{-15} eV sec]
(1) 1.2 volt   (2) 2.24 volt
(3) 3.6 volt   (4) 4.8 volt

Q.50 In the given reaction
$$_zX^A \rightarrow {}_{z+1}Y^A \rightarrow {}_{z-1}K^{A-4} \rightarrow {}_{z-1}K^{A-4}$$
radioactive radiations are emitted in the sequence
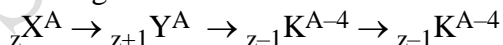
(1) α, β, γ (2) $\beta, \gamma, \alpha,$
(3) γ, α, β (4) β, α, γ

Q.51 A radioactive nucleus undergoes a series of decay according to the scheme.

$$A \xrightarrow{\alpha} A_1 \xrightarrow{\beta} A_2 \xrightarrow{\alpha} A_3 \xrightarrow{\gamma} A_4$$
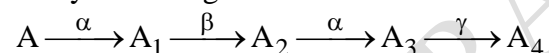
If the mass number and atomic number of A are 180 and 72 respectively, then what are these numbers for A_4 :
(1) 172 and 69   (2) 174 and 70
(3) 176 and 69   (4) 176 and 70

Q.52 When the momentum of a proton is changed by an amount p_0, the corresponding change in the de-Broglie wavelength is found to be 0.25%. Then, the original momentum of the proton was :-
(1) p_0 (2) $100\,p_0$
(3) $400\,p_0$ (4) $4\,p_0$

Q.53 In the Davission and Germer experiment, the velocity of electrons emitted from the electron gun can be increased by :-
(1) Decreasing the potential difference between the
    anode and filament.
(2) Increasing the potential difference between the
    anode and filament.
(3) Increasing the filament current.
(4) Decreasing the filament current.

Q.54 The kinetic energy of electron and proton is 10^{-32} J. Then the relation between their de-Broglie wavelengths is :-
(1) $\lambda_p < \lambda_e$ (2) $\lambda_p > \lambda_e$
(3) $\lambda_p = \lambda_e$ (4) $\lambda_p = 2\lambda_e$

Q.55 In Fig. X represents time and Y represents activity of a radioactive sample. Then the activity of sample, varies with time according to the curve :-
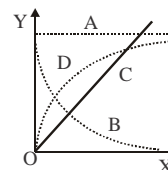
(1) A   (2) B
(3) C   (4) D
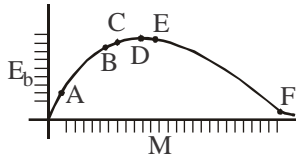
Q.56 The above is a plot of binding energy per nucleon E_b, against the nuclear mass M ; A, B, C, D, E, F correspond to different nuclei. Consider four reactions

(i) $A + B \rightarrow C + \varepsilon$ (ii) $C \rightarrow A + B + \varepsilon$
(iii) $D + E \rightarrow F + \varepsilon$ (iv) $F \rightarrow D + E + \varepsilon$
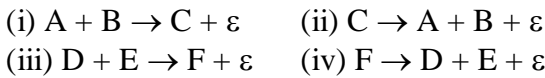
where ε is the energy released ? In which reactions is ε positive

(1) (i) and (iv)   (2) (i) and (iii)
(3) (ii) and (iv)   (4) (ii) and (iii)

Q.57 The curves (1), (2) (3) and (4) show the variation between the applied potential difference (V) and the photoelectric current (i) ,at two different intensities of light ($I_1 > I_2$). In which figure is the correct variation shown :-
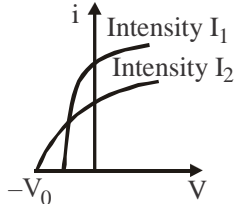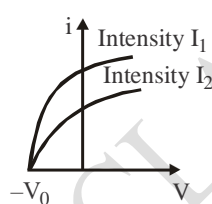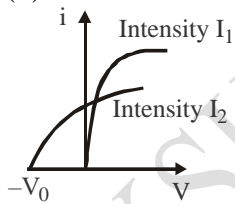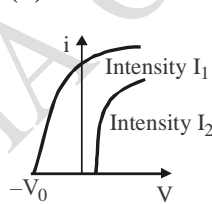
Q.58 What is the respective number of α and β particles emitted in the following radioactive decay :-

$_{90}X^{200} \rightarrow {}_{80}Y^{168}$
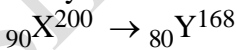
(1) 6 and 8   (2) 8 and 8
(3) 6 and 6   (4) 8 and 6

Q.59 The rate of disintegration of fixed quantity of a radioactive element can be increased by :-

(1) Increasing the temperature
(2) Increasing the pressure
(3) Chemical reaction
(4) It is not possible

Q.60 The half life of a radioactive substance is 20 minutes. The approximate time interval $(t_2 - t_1)$ between the time t_2 when 2/3 of it has decayed and time t_1 when 1/3 of it had decayed is :-

(1) 7 min   (2) 14 min
(3) 20 min   (4) 28 min

Q.61 A mixture consists of two radioactive materials A_1 and A_2 with half lives of 20 s and 10 s respectively. Initially the mixture has 40g of A_1 and 160g of A_2. The amount of the two in the mixture will become equal after :-

(1) 60 s   (2) 80 s
(3) 20 s   (4) 40 s

Q.62 Fusion reaction takes place at high temperature because :-

(1) Molecules break up at high temperature.
(2) Nuclei break up at high temperature.
(3) Atoms get ionised at high temperature.
(4) Kinetic energy is high enough to overcome the coulomb repulsion between nuclei.

Q.63 The energy that should be added to an electron, to reduce its de-Broglie wavelength from 10^{-10} m to 0.5×10^{-10} m, will be :-

(1) Four times the initial energy
(2) Thrice the initial energy
(3) Equal to the initial energy
(4) Twice the initial energy

Q.64 Fission of nuclei is possible because the binding energy per nucleon in them :-

(1) Increases with mass number at high mass numbers.
(2) Decreases with mass number at high mass numbers.
(3) Increases with mass number at low mass numbers.
(4) Decreases with mass number at low mass numbers.

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Q.65 M_p denotes the mass of a proton and M_n that of a neutron. A given nucleus, of binding energy B, contains Z protons and N neutrons. The mass $M(N,Z)$ of the nucleus is given by (c is the velocity of light) :-

(1) $M(N, Z) = NM_n + ZM_p - Bc^2$

(2) $M(N, Z) = NM_n + ZM_p + Bc^2$

(3) $M(N, Z) = NM_n + ZM_p - B/c^2$

(4) $M(N, Z) = NM_n + ZM_p + B/c^2$

Q.66 A photon of energy E ejects a photoelectron from a metal surface whose work function is W_0. If this electron enters into a uniform magnetic field of induction B in a direction perpendicular to the field and describes a circular path of radius r, then the radius r, is given by (in the usual notation)

(1) $\sqrt{\dfrac{2m(E - W_0)}{eB}}$ (2) $\sqrt{2m(E - W_0)\,eB}$

(3) $\sqrt{\dfrac{2e(E - W_0)}{mB}}$ (4) $\sqrt{\dfrac{2m(E - W_0)}{eB}}$

Q.67 Radiation coming from transitions n = 2 to n = 1 of hydrogen atoms fall on He^+ ions in n = 1 and n = 2 states. The possible transition of helium ions as they absorb energy from the radiation is

(1) n = 1 → n = 4   (2) n = 2 → n = 4

(3) n = 2 → n = 5   (4) n = 2 → n = 3

Q.68 Using a nuclear counter the count rate of emitted particles from a radioactive source is measured. At t = 0 it was 1600 counts per second and t = 8 seconds it was 100 counts per second. The count rate observed, as counts per second, at t = 6 seconds is close to :

(1) 150   (2) 360

(3) 200   (4) 400

Q.69 A hydrogen atom, initially in the ground state is excited by absorbing a photon of wavelength 980Å. The radius of the atom in the excited state, it terms of Bohr radius a_0, will be :

(hc = 12500 eV – Å)

(1) $9a_0$ (2) $25a_0$

(3) $4a_0$ (4) $16a_0$

Q.70 The half-life of polonium is 140 days. After how many days 16 g polonium will be reduced to 1 g?

(1) 700 days   (2) 280 days

(3) 560 days   (4) 420 days

Q.71 When light of wavelength 300 nm falls on a photoelectric emitter, photoelectrons are liberated. For another emitter, however light of 600 nm wavelength is sufficient for creating photoemission. What is the ratio of the work functions of two emitters

(1) 1 : 4   (2) 4 : 1

(3) 1 : 2   (4) 2 : 1

Q.72 The mass defect for the nucleus of helium is 0.0303 amu. What is the binding energy per nucleon for helium in MeV?

(1) 28   (2) 4

(3) 7   (4) 1

Q.73 The series corresponding to minimum wavelength transition in H-atom –

(1) Balmer series   (2) Lyman series

(3) Paschen series   (4) Brackett series

Q.74 Photoelectric emission is observed from a metallic surface for frequencies v_1 and v_2 of the incident light ($v_1 > v_2$). If the maximum values of kinetic energy of the photoelectrons emitted in the two cases are in the ratio 1 : n, then the threshold frequency of the metallic surface is

(1) $\dfrac{v_1 - v_2}{n - 1}$ (2) $\dfrac{nv_1 - v_2}{n - 1}$

(3) $\dfrac{nv_2 - v_1}{n - 1}$ (4) $\dfrac{v_1 - v_2}{n}$

Q.75 Two photons of energy 2.5 eV and 3.5 eV fall on a metal surface of work function 1.5 eV. The ratio of the maximum velocities of the photoelectrons emitted from the metal surface is

(1) 1 : 4   (2) 2 : 1

(3) 1 : 2   (4) $1 : \sqrt{2}$

SPACE FOR ROUGH WORK

9

Q.76 According to Bohr's model of hydrogen atom, relation between principal quantum number n and radius of stable orbit is –
(1) $r \propto 1/n$ (2) $r \propto n$
(3) $r \propto 1/n^2$ (4) $r \propto n^2$

Q.77 Remaining quantity (in%) of radioactive element after 5 half lives is
(1) 4.125%   (2) 3.125%
(3) 31.1%   (4) 42.125%

Q.78 Consider two particles of different masses. In which of the following situations the heavier of the two particles will have smaller de Broglie wavelength?
(i) Both have a free fall through the same height.
(ii) Both move with the same kinetic energy.
(iii) Both move with the same linear momentum.
(iv) Both move with the same speed.
Which of the following statement(s) is/are correct?
(1) ii, iii, iv   (2) i, ii, iii
(3) i, ii, iv   (4) i, ii, iv

Q.79 What is the shortest wavelength present in the Paschen series of spectral lines of hydrogen atom?
(1) 6199 Å   (2) 5199 Å
(3) 8199 Å   (4) 7199 Å

Q.80 The work function for Al, K and Pt is 4.28eV, 2.30eV and 5.65 eV respectively. Their respective threshold frequencies would be
(1) Pt > Al > K   (2) Al > Pt > K
(3) K > Al > Pt   (4) Al > K > Pt

Q.81 The photoelectric threshold frequency of a metal is ν. When light of frequency 4ν is incident on the metal, the maximum kinetic energy of the emitted photoelectron is
(1) 4 hν (2) 3 hν
(3) 5 hν (4) (5/2) hν

Q.82 The graph between the stopping potential (V_0) and wave number ($1/\lambda$) is as shown in the figure. ϕ is the work function, then
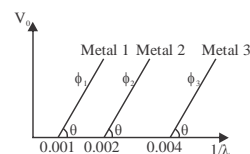
(1) $\phi_1 : \phi_2 : \phi_3 = 1 : 2 : 4$
(2) $\phi_1 : \phi_2 : \phi_3 = 4 : 2 : 1$
(3) Violet light (λ = 400nm) can be used to light
photoelectrons from metal 2
(4) Both (1) and (3)

Q.83 The radius of the shortest orbit of a single electron system is 18 pm. This system may be
(1) H   (2) D
(3) He$^+$ (4) Li^{++}

Q.84 Determine the ratio of area of circular orbits in doubly ionised lithium atom in 2nd & 3rd Bohr orbit
(1) 16 : 81   (2) 4 : 5
(3) 1 : 3   (4) 1 : 1

Q.85 A hydrogen atom rises from its n = 1 state to the
n = 4 state by absorbing energy. If the potential energy of the atom in the n = 1 state be – 13.6eV, then potential energy in the n = 4 state will be -
(1) 3.4 eV   (2) –1.54 eV
(3) 0.85 eV   (4) – 0.85 eV

Q.86 The transition from the state n = 4 to n = 3 in a hydrogen like atom results in ultraviolet radiation. Infrared radiation will be obtained in the transition from -
(1) $2 \to 1$ (2) $3 \to 2$ (3) $4 \to 2$ (4) $5 \to 4$

Q.87 Energy required for the electron excitation in Li^{++} from the first to the third Bohr orbit is :
(1) 12.1 eV   (2) 36.3 eV
(3) 108.8 eV   (4) 122.4 eV

Q.88 If in a nuclear fusion reaction, mass defect is 0.3%, then energy released in fusion of 1 kg mass
(1) 27×10^{10} J   (2) 27×10^{11} J
(3) 27×10^{12} J   (4) 27×10^{13} J

SPACE FOR ROUGH WORK

Q.89 Half life of is 4.5×10^9 year. The activity of 1g sample of is

(1) 1.0 Bq   (2) 1.23×10^4 Bq

(3) 0.98×10^{-17} Bq   (4) 1.23×10^{10} Bq

Q.90 The half life period of a radioactive element X is same as the mean life time of another radioactive element Y. Initially, they have the same number of atoms. Then

(1) X and Y decay at same rate always.

(2) X will decay faster than Y.

(3) Y will decay faster than X.

(4) X and Y have same decay rate initially.

PART C – BIOLOGY

Q.91 Given, below are three basic steps of genetical modifying an organism. Arrange these steps in correct manner :-

(a) Introduction of the identified DNA into the host.

(b) Maintenance of introduced DNA in the host and transfer of the DNA to its progeny.

(c) Identification of DNA with desirable genes.

(1) a → b → c   (2) c → a → b

(3) b → a → c   (4) c → b → a

Q.92 The technique of genetic engineering include:-

(1) Creation of recombinant DNA

(2) Gene cloning

(3) Gene Transfer

(4) All of the above

Q.93 In 1997, the first transgenic cow Rosie produced human protein – enriched milk (2.4 grams per litre), milk contains :-

(1) Alpha-lactaglobulin   (2) Alpha-lactalbumin

(3) Beta-lactaglobulin   (4) Beta-lactalbumin

Q.94 Today for which of the following human diseases transgenic models exist :-

(1) Cancer   (2) Cystic fibrosis

(3) rheumatoid arthritis   (4) All of the above

Q.95 Complete the given below statement :-

Stanley cohen and Herbert Bayer accomplished construction of first recombinant DNA in _____ by isolating the antibiotic resistance gene by cutting out a piece of DNA from a plasmid which was responsible for conferring antibiotic resistance.

(1) 1974   (2) 1977

(3) 1972   (4) 1988

Q.96 Among the following, select the tools of recombinant DNA technology :-

(a) Restriction enzymes   (b) Polymerase enzymes

(c) Ligases   (d) Vectors

(e) Host organisms

(1) a,d,e   (2) a,d,c,e

(3) a,b,c,d,e   (4) only a

Q.97 Restriction enzymes belongs to a large class of the enzymes called

(1) Cellulase   (2) Nucleases

(3) Chitinase   (4) Spooling

Q.98 Recognise the figure and find out the correct matching
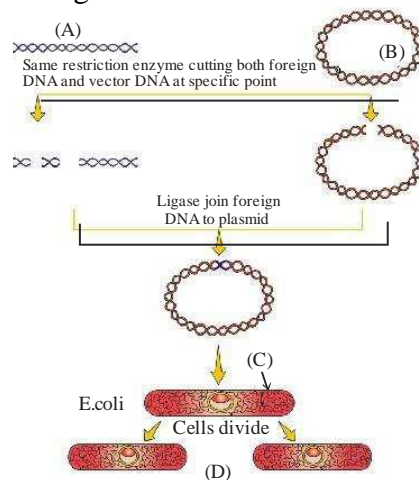
(1) A-foreign DNA, B-vector DNA, C-translation, D-PCR

(2) A-Vector DNA, B-Foreign DNA, C-Transduction, D-electrophoresis.

(3) A-foreign DNA, B-vector DNA, C-Transformation, D-r-DNA technology

(4) A-Vector DNA, B-Foreign DNA, C-Transformation, D-r-DNA technology.

Q.99 Purified DNA ultimately precipitate out after the addition of chilled ethanol. This DNA that separate out can be removed by
(1) Electrophoresis   (2) Downstream processing
(3) PCR   (4) Spooling

Q.100 Recognise the figure and find out the correct matching for A & B :-

(a)

(b)
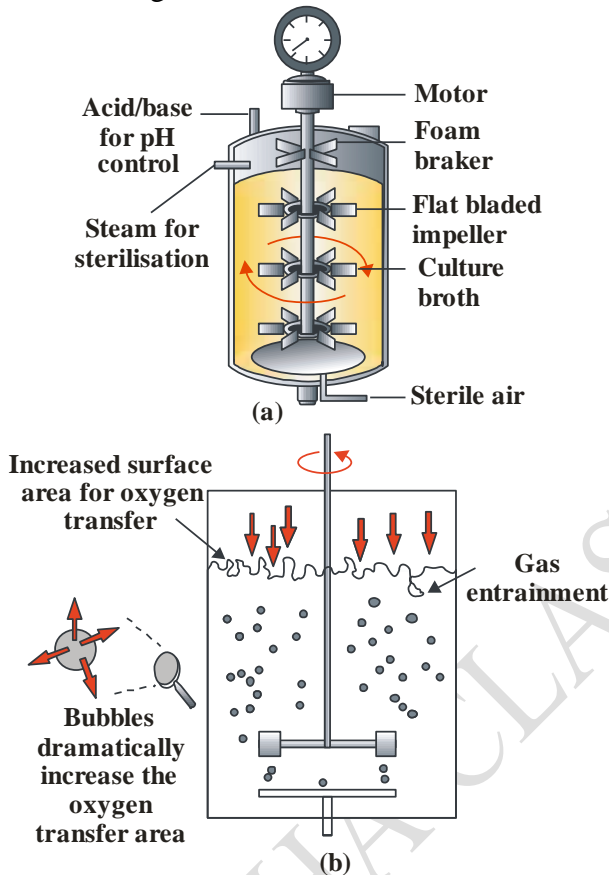
(1) a – Simple stirred tank bioreactor
    b – Mixed tank bioreactor
(2) a – Simple stirred tank bioreactor
    b – Sparged stirred tank bioreactor
(3) a – Sparged stirred tank bioreactor
    b – Simple stirred tank bioreactor
(4) a – Mixed tank bioreactor
    b – Sparged stirred tank bioreactor

Q.101 After the biosynthetic phase, the product is separated and purified by the process called as:-

(1) Agarose gel electrophoresis
(2) PCR
(3) Downstream processing
(4) Insertional inactivation

Q.102 ADA-deficiency occurs due to the :-
(1) Deletion   (2) Translocation
(3) Substitution   (4) Inversion

Q.103 Correction of a genetic defect involves delivery of a normal gene into the individual or embryo to take over the function of and compensate for the non functional gene is called :-
(1) Genetic modification   (2) Genetic correction
(3) Gene therapy   (4) Bioremediation

Q.104 Which of the following technique is employed to check the progression of a restriction enzyme digestion?
(1) PCR   (2) Bioreactor
(3) Gel electrophoresis(4) Micro injection

Q.105 Which of the following steps are catalysed by taq polymerase in a PCR?
(1) Annealing of primers to template DNA
(2) Denaturation of template DNA
(3) Extension of primer on the template DNA
(4) All of the above

Q.106 Fill the blank spaces marked as A & B. At present, about __A__ recombinant therapeutics have been approved for human use the world over. In India, __B__ of these are presently being marketed.
(1) A = 30, B = 12   (2) A = 36, B = 16
(3) A = 27, B = 17   (4) A = 32, B = 13

Q.107 Identify the X,Y,Z in given figure of polymerase chain Reaction.
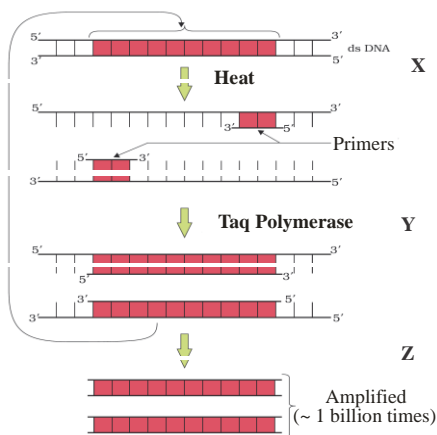
(1) X=Annealing, Y=Denaturation, Z=Extension

(2) X=Extension, Y=Annealing, Z=Denaturation

(3) X=Denaturation, Y=Annealing, Z=Extension

(4) X=Denaturation, Y=Extension, Z=Annealing

Q.108 Bioreactors are useful in :-
   (1) Separation & purification of product.
   (2) Microinjection.
   (3) processing of large volume of culture.
   (4) Isolation of genetic Material.

Q.109 Strategy used to prevent nematode infection of tobacco root's is :-
   (1) Use of agrochemicals
   (2) Bt toxin gene
   (3) Gene mutation
   (4) RNA-interference

Q.110 Which of the following is the correct match?
   (1) cry IAb – cotton bollworms
   (2) cry IAc – cotton bollworms
   (3) cry IAc – Corn borer
   (4) cry IIAb – Corn borer

Q.111 Transgenic animals have been used :-
   (1) for testing safety of vaccines
   (2) for testing toxicity of drugs
   (3) To produce useful biological products.
   (4) all of the above

Q.112 Which of the following statement is not correct regarding Bt-cotton?

(1) Bt-toxin is produced by a bacterium called *Bacillus thuringiensis*

(2) The choice of gene depends upon the crop and the targeted pest, as most Bt-toxins are insect group specific.

(3) Bt-cotton helped to reduce post harvest losses.

(4) Bt toxin protein exists as inactive protoxin but once an insect ingest due to alkaline pH it becomes active.

Q.113 Golden rice will help in :-
   (1) producing petrol like fuel.
   (2) Making pest resistance.
   (3) Making herbicide tolerance.
   (4) Enhance nutritional valine.

Q.114 Maturation of proinsulin into insulin takes place after
   (1) Removal of C-peptide
   (2) Removal of disulphide bridge
   (3) Addition of C-peptide
   (4) Removal of A–peptide

Q.115 From which of the following technique, early diagnosis of disease is/are not possible.
   (a) ELISA   (b) Urine analysis
   (c) PCR   (d) Serum analysis
   (e) recombinant DNA technology
   (1) a,b,d   (2) a,c,e   (3) a,b   (4) b,d

Q.116 Select the correct statement :-
   (a) Transgenic animals are used for study of complex factors involved in growth such as insulin like growth factor.
   (b) Transgenic animals are specially made to serve as models for human disease so that investigation of new treatment for disease is made possible.
   (c) First transgenic cow, Rosie, produced human protein-enriched milk containing the human alpha-lactglobulin.
   (d) Transgenic mice are being developed for use in testing the sefety of vaccines before they are used on humans.
   (1) a,b,c,d   (2) a,b,d
   (3) a,c,d   (4) b,c,d

Q.117 From all transgenic animals, 95 percent of all existing transgenic animals are :-
(1) pig   (2) sheep
(3) cow   (4) mice

Q.118 Read the following statements and select the incorrect ones :-
(a) In gel electrophoresis, DNA fragments separate according to their size through sieving effect provided by the agarose gel.
(b) Larger the fragment size, the farther it moves.
(c) Unless one cuts the vector and the source DNA with the same restriction enzyme, the recombinant vector molecule cannot be created.
(d) Now a days the most commonly used matrix is agarose which is a synthetic polymer extracted from sea weeds.
(1) a,b,c,d   (2) a,c
(3) b,d   (4) c,d

Q.119 In pBR-322 amp^R and tet^R genes are present. When we ligate a foreign DNA at Pvu I site, then recombinant plasmids will lose the resistance to the
(1) Ampicillin   (2) Tetracycline
(3) Both (1) & (2)   (4) None

Q.120 Which transgenic animals has been used for organ transplantation into humans without risk of rejection?
(1) Pig   (2) cow
(3) Mice   (4) Goat

Q.121 Which Indian government organisation will make decisions regarding the validity of GM research and the safety of introducing GM organisms for public service.
(1) ICAR   (2) IARI
(3) KVIC   (4) GEAC

Q.122 How many documented varieties of Basmati rice are grown in India.
(1) 2,00,000   (2) 50,000
(3) 1000   (4) 27

Q.123 The indian parliament has recently cleared the _____ amendment of Indian patent Bill, that takes such issues into consideration, including patent terms emergency provision & research and development initative.
(1) First   (2) second
(3) third   (4) fourth

Q.124 Which term is used to refer to the use of bio-resources by multinational companies and other organisation without proper authorisation from the countries and people concerned without compensatory payment
(1) Biopatent   (2) Biopiracy
(3) Bio resources   (4) Bio war

Q.125 Which of the following method is used to directly inject the recombination DNA into the nucleus of plant cell :-
(1) Biolistics   (2) microinjection
(3) Retrovirus   (4) Ti-plasmid

Q.126 Now a days the most commonly used matrix is agarose which is a natural polymer extracted from
(1) Agrobacterium tumifaciens (2) Sea weeds
(3) Cotton   (4) *E.coli*

Q.127 Proteins encoded by the genes cry IIAb control the :-
(1) Corn borer   (2) Cotton bollworm
(3) Both (1) and (2)   (4) Aphids

Q.128 For testing the safety of polio vaccines which of the following animal is used ?
(1) Transgenic cow   (2) Transgenic pig
(3) Transgenic mice   (4) monkeys

Q.129 The vector for delivery of ADA-cDNA into cells of patient receiving gene therapy is :-
(1) Agrobacterium   (2) Reovirus
(3) E.coli   (4) Retrovirus

Q.130 Genetic engineering is –
(1) making artificial genes.
(2) hybridisation of DNA of one organism to that of others.
(3) production of alcohol by using microorganisms.
(4) making artificial limbs, diagnostic instruments such as ECG, EEG etc.

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Q.131 Which of the following is related to genetic engineering?
(1) Plasmid   (2) Heterosis
(3) Plastid   (4) Mutation

Q.132 Known sequences of DNA that is used to find complementary DNA strands is
(1) vector   (2) DNA probe
(3) plasmid   (4) recombinant DNA

Q.133 Insect resistance transgenic cotton has been produced by inserting a piece of DNA from
(1) an insect   (2) a bacterium
(3) a wild relative of cotton   (4) a virus

Q.134 Construction of a recombinant DNA involves
(1) cleaving and rejoining DNA segments with 'endonuclease' alone.
(2) cleaving DNA segments with 'endonuclease' and rejoining them with 'ligase'.
(3) cleaving DNA segments with 'ligase' and rejoining them with 'endonuclease'.
(4) cleaving and rejoining DNA segments with 'ligase' alone.

Q.135 Restriction endonucleases are most widely used in recombinant DNA technology. They are obtained from
(1) bacteriophages   (2) bacterial cells
(3) plasmids   (4) all prokaryotic cells

Q.136 Insulin has 51 amino acids arranged in
(1) single polypeptide
(2) two polypeptides of 21 and 30 amino acids
(3) two polypeptides of 25 and 26 amino acids
(4) three polypeptides having 15, 16 and 20 amino acids.

Q.137 Find the incorrect statement.
(1) Gene therapy is a genetic engineering technique used to treat disease at molecular level by replacing defective genes with normal genes.
(2) Calcitonin is a medically useful recombinant product in the treatment of infertility.
(3) Bt toxin is a biodegradable insecticide obtained from *Bacillus thuringiensis*.

(4) *Trichoderma sp.* is a biocontrol agent for fungal diseases of plants.

Q.138 A set of bacterial clones, each containing a plasmid or phage, is called –
(1) gene library   (2) gene pool
(3) genophore   (4) genome

Q.139 The technique which involves addition or deletion of genes is
(1) gene therapy   (2) genetic engineering
(3) gene splicing   (4) artificial synthesis

Q.140 Plasmids are extrachromosomal circular DNA molecules
(1) which have their own point of replication and can replicate independently.
(2) which have their own point of replicant but cannot replicate independently.
(3) which do not have their own point of replication and cannot replicate independent of bacterial chromosomal DNA.
(4) none of the above

Q.141 The source of *Taq* polymerase used in PCR is a
(1) thermophilic fungus
(2) mesophilic fungus
(3) thermophilic bacterium
(4) halophilic bacterium

Q.142 Cloning does not provide
(1) same morphological character
(2) variation
(3) same genetic character
(4) all of the above

Q.143 In recombinant DNA technique the term vector refers to
(1) plasmids that can transfer foreign DNA into a living cell.
(2) cosmids that can cut DNA at specific base sequence.
(3) plasmids that can join different DNA fragments.
(4) cosmids that can degrade harmful proteins.

Q.144 Which of the following is a plasmid?
(1) pBR 322   (2) *Bam* H I
(3) *Sal* I   (4) *Eco* R I

SPACE FOR ROUGH WORK

Q.145 If a recombinant DNA bearing gene for ampicillin resistance is transferred into *E. coli* cells and the host cells are spread on agar plates containing ampicillin, then
(1) both transformed and untransformed recipient cells will die.
(2) both transformed and untransformed recipient cells will grow.
(3) transformed recipient cells will grow and untransformed recipient cells will die.
(4) transformed recipient cells will die and untransformed recipient cells will grow.

Q.146 The term, 'Southern Blotting' refers to –
(1) transfer of DNA fragments from in *vitro* cellulose membrane to electrophoretic gel.
(2) attachment of probes to DNA fragments.
(3) transfer of DNA fragments from electrophoretic gel to nitrocellulose sheet.
(4) comparison of DNA fragments from two sources.

Q.147 Which of the following is correctly matched?
(1) Agrobacterium tumefaciens - tumour.
(2) Thermus aquaticus - Bt-gene
(3) pBR322 - enzyme
(4) Ligase - molecular scissors

Q.148 Restriction enclonoclease are:
(1) Not synthesized by bacteria.
(2) Present in mammalian cells for degradation of DNA.
(3) Used for in-vitro DNA Synthesis.
(4) Used in genetic engineering.

Q.149 Which of the following enzyme used in PCR is
(1) Taq Polymerase (2) DNA gyrase
(3) DNA polymerase-I (4) RNA polymcrase-I

Q.150 An analysis of chromosomal DNA using the Southern hybridization technique does not use
(1) electrophoresis (2) blotting
(3) autoradiography (4) PCR

Q.151 Commonly used vectors for human genome sequencing are
(1) T - DNA (2) BAC and YAC
(3) expression vectors (4) T/A cloning vectors

Q.152 The DNA molecule to which the gene of interest is integrated for cloning is called
(1) template (2) carrier
(3) transformer (4) vector

Q.153 A foreign DNA and plasmid cut by the same restriction endonuclease can be joined to form a recombinant plasmid using
(1) Eco RI (2) Taq polymerase
(3) Polymerase III (4) Ligase

Q.154 Which of the following is not a component of downstream processing?
(1) Separation (2) Purification
(3) Preservation (4) Expression

Q.155 Which of the following restriction enzymes produces blunt ends?
(1) Sal I (2) Eco RV
(3) Xho I (4) Hind III

Q.156 Which kind of therapy was given in 1990 to a four year-old girl with adenosine deaminase (ADA) deficiency?
(1) Gene therapy (2) Chemotherapy
(3) Immunotherapy (4) Radiation therapy

Q.157 The function of a selectable marker is
(1) Eliminating transformants and permitting non- transformants.
(2) Identify ori site.
(3) Elimination of non-transformants and permitting transformants.
(4) To destroy recognition sites.

Q.158 With respect to DNA fragmentation.
Statement 1: Gel electrophoresis and elution are two important processes.
Statement 2: After staining with ethidium bromide it has to be exposed to U.V. light.
(1) Only 1 is correct.
(2) Both 1 and 2 are correct statements.
(3) Only 2 is correct.
(4) Only 1 is correct and 2 is not correct.

Q.159 ____ are especially useful for cloning large DNA fragments during eukaryotic molecular studies.
(1) Yeast artificial chromosomes
(2) Cosmids

16

(3) Plasmids

(4) Bacteriophages

Q.160 Bacteria harbor _____ which are circular double strands of DNA that are extrachromosomal.

(1) Restriction endonucleases (2) Plasmids

(3) Proteases (4) Plaques

Q.161 A method to separate DNA or RNA fragments by length -

(1) Gel electrophoresis (2) RFLP

(3) Southern blotting (4) DNA profiling

Q.162 PCR is used to _____.

(1) amplify a single gene or smaller piece of DNA

(2) create DNA without introns

(3) insert foreign DNA into a vector

(4) clone organisms

Q.163 The polymerase chain reaction (PCR) is comprised of repeated cycles of the following steps

i : primer extension ii : annealing

iii : denaturation

(1) iii; i; ii (2) i; iii; ii

(3) ii; i; iii (4) iii; ii; i

Q.164 'Cry' gene is obtained from

(1) *Agrobacterium tumefaciens*

(2) *Bacillus thuringiensis*

(3) *Rhizobium leguminosarum*

(4) *Rhizobium phaseoli*

Q.165 Arrange the following in sequential order of their usage in recombinant DNA technology.

(I) Calcium chloride

(II) DNA ligase

(III) Ethylene diamine tetra acetic acid

(IV) Restriction endonuclease

The correct answer is

(1) (I), (IV), (III) and (II)

(2) (IV), (I), (II) & (III)

(3) (I), (IV), (II) and (III)

(4) (IV), (III), (II) & (I)

Q.166 Fearing that the child to be born may have a genetic disorder, a couple goes to a doctor. Which one of the following techniques is likely to be suggested by the doctor to cure the genetic disorder?

(1) r DNA technology (2) Embryo transfer

(3) Hybridoma technology (4) Gene therapy

Q.167 The enzymes which are absolutely necessary for recombinant DNA technology are:

(1) Restriction endonucleases and Ligases

(2) Peptidases and Ligases

(3) Restriction endonucleases and topoisomerases

(4) Endonucleases and polymerases

Q.168 Identify the desirable characteristics for a plasmid used in rDNA technology from the following:

a. Ability to multiply and express outside the host

  in a bioreactor

b. A highly active promoter

c. A site at which replication can be initiated

d. One or more identifiable marker genes

e. One or more unique restriction sites

(1) a, c and e only (2) b, c and e only

(3) a, c, d and e only (4) b, c, d and e only

Q.169 Why the GM food may be harmful, for our body ?

(1) Pathogens enter with GM food and produce diseases.

(2) Antibiotic resistance gene in GM food develops resistance in microflora of alimentary canal

(3) No much effect

(4) Desirable proteins and lipids are obtained by GM foods

Q.170 Which one of the following options is a correct match of phenomenon and its explanation?

(1) Reverse Transcription PCR – Many copies of a DNA sequence.

(2) Central dogma – RNA $\rightarrow$ DNA

$\rightarrow$ Protein $\rightarrow$ RNA.

(3) RNA silencing – Use of ds-RNA to stop the expression of ss-RNA.

(4) Transcription- Process of formation of RNA & proteins.

SPACE FOR ROUGH WORK

17

Q.171 'Restriction' in Restriction enzyme refers to:
(1) Cleaving of phosphodiester bond in DNA by the enzyme.
(2) Cutting of DNA at specific position only.
(3) Prevention of the multiplication of bacteriophage
    in bacteria.
(4) All of the above

Q.172 In agarose gel electrophoresis, DNA molecules are separated on the basis of their:
(1) Charge only   (2) Size only
(3) Charge to size ratio (4) All of the above

Q.173 A probe which is a molecule used to locate specific sequences in a mixture of DNA or RNA molecules could be:
(1) A single stranded RNA
(2) A single stranded DNA
(3) Either RNA or DNA
(4) Can be ss DNA but not ss RNA

Q.174 This shows the cleavage of a DNA sequence. This occurs ____ the forming of recombinant DNA.

Sticky ends
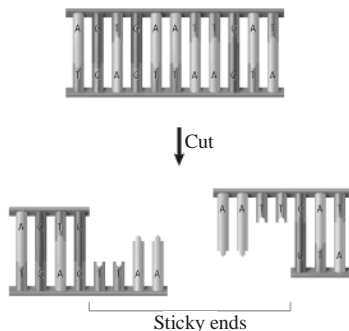
(1) before   (2) after
(3) during   (4) during and after

Q.175 Why do scientists often examine the expression of thousands of genes at once, using microarrays?
(1) The technology does not yet exist to look at individual genes.
(2) Examining thousands of genes is faster than looking at individual genes.
(3) Genes disappear when they are looked at individually.

(4) Genes often interact in conjunction with many other genes.

Q.176 How is gene therapy an advantage over traditional treatments for diabetes?
(1) It can allow the body to produce its own insulin, rather than having to inject insulin into the person.
(2) It can allow the body to completely synthesize genetically engineered insulin, allowing for smaller dose injections.
(3) It can replace the body's need to produce insulin, by allowing synthetic insulin to be produced by the pancreas.
(4) It enhances the production of human insulin by inserting and integrating synthetic insulin into the DNA of the organism.

Q.177 _____ can join DNA fragments that have complementary sticky ends or blunt ends.
(1) Proteases   (2) DNA ligase
(3) Restriction endonucleases (4) Plasmids

Q.178 _____ will intercalate between the bases causing DNA to fluoresce orange when a gel is illuminated with ultraviolet light.
(1) Ethidium bromide (2) Fatty acids
(3) Agarose   (4) Buffer solutions

Q.179 _____ is the uptake of DNA into a cell and its expression.
(1) Transformation   (2) Replication
(3) Translation   (4) Transcription

Q.180 Bacteria harbor _____ which are circular double strands of DNA that are extrachromosomal.
(1) Plaques   (2) Plasmids
(3) Restriction endonucleases (4) Proteases

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