

SHIKSHA CLASSES, BHANDARA

TEST-8

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. $\frac{1}{4}$ (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 HALOGENS, ORGANIC COMPOUNDS CONTAINING OXYGEN.

PHYSICS : RAY AND WAVE OPTICS.

BIOLOGY : BIOLOGY IN HUMAN WELFARE : HUMAN HEALTH AND DISEASE, STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION, MICROBES IN HUMAN WELFARE.

Name :

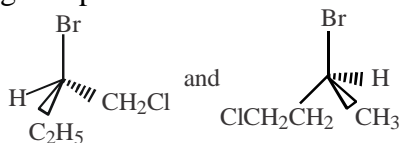
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PART A – CHEMISTRY

Q.1 The given pair are :-



- (1) enantiomers (2) diastereomers
(3) homomers (4) constitutional isomer

Q.2 Ethylene dichloride and ethylidene chloride are isomeric compounds. Identify the statement which is not applicable to both of them :-

- (1) They react with alcoholic KOH
(2) They are dihalides
(3) They react with aq. KOH and give the same product
(4) They are position isomers

Q.3 The product obtained when ethyl alcohol is distilled with bleaching powder is :-

- (1) Chloroform (2) Ethyl chloride
(3) Acetaldehyde (4) Chloral

Q.4 $\text{CH}_2 = \text{CHCH}_3 + \text{PCl}_5 \rightarrow (\text{a}),$



$\text{CH}_3\text{CH}_2\text{CHO} + \text{PCl}_5 \rightarrow (\text{b}),$

- (a) and (b) are :-
(1) gem-dihalides
(2) (a) gem-dihalide, (b) Vic-dihalide
(3) Vic-dihalides
(4) (a) Vic-dihalide, (b) gem-dihalide

Q.5 Which one of the following has the highest dipole moment ?

- (1) CH_3F (2) CH_3Br
(3) CH_3Cl (4) CH_3I

Q.6 Which one of the following does not give white precipitate with acidified silver nitrate solution?

- (1) $\text{C}_6\text{H}_5\text{Cl}$
(2) $\text{H}_2\text{C} = \text{CH} - \text{Cl}$
(3) $\text{H}_2\text{C} = \text{CH} - \text{CH}_2 - \text{Cl}$
(4) Both (1) and (2)

Q.7 Compound $\text{C}_4\text{H}_8\text{Cl}_2$ (a) on hydrolysis gives a compound $\text{C}_4\text{H}_8\text{O}$ (b) which reacts with hydroxylamine and does not give any test with Tollen reagent. What are (a) and (b) ?

- (1) 1,1-Dichlorobutane and butanal
(2) 2,2-Dichlorobutane and butanal
(3) 1,1-Dichlorobutane and butanone
(4) 2,2-Dichlorobutane and butanone

Q.8 $\text{HC} \equiv \text{CH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HgSO}_4} \xrightarrow[\text{HOH}]{\text{CH}_3\text{MgBr}} \xrightarrow{\text{P/Br}_2}$

(X); (X) is :-

- (1) $\text{CH}_3\text{CH}(\text{Br})\text{CH}_3$ (2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$
(3) $\text{H}_2\text{C} = \text{CH} - \text{Br}$ (4) $\text{BrCH} = \text{CH} - \text{CH}_3$

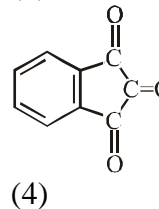
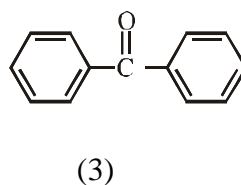
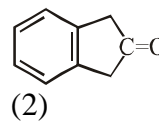
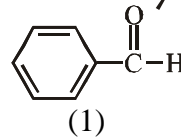
Q.9 Match List I with II and pick the correct matching from the codes given below :-

List I (Haloalkane/arene) **List II (Application)**

- | | |
|----------------------|---------------------------|
| a. Iodoform | 1. CF_4 |
| b. BHC | 2. Antiseptic |
| c. Freon-14 | 3. Moth repellent |
| d. Halothanes | 4. Inhalative anaesthetic |
| e. p-Dichlorobenzene | 5. Termite pesticide |

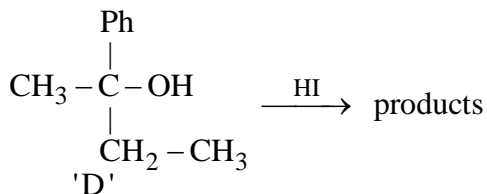
- (1) a-2, b-4, c-5, d-3, e-1
(2) a-2, b-5, c-1, d-4, e-3
(3) a-3, b-4, c-2, d-1, e-5
(4) a-1, b-3, c-5, d-2, e-4

Q.10 Which of the following carbonyl compound form most stable hydrate when H_2O is added across the $\text{C}=\text{O}$ group.



SPACE FOR ROUGH WORK

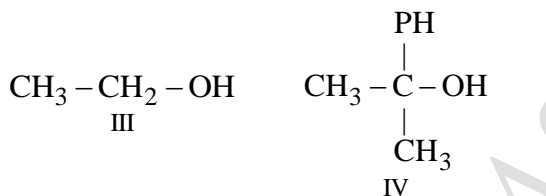
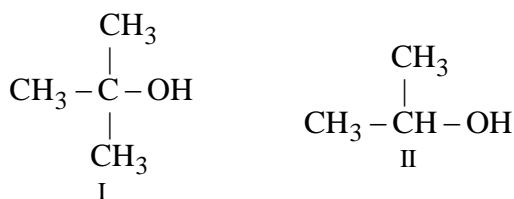
Q.11 The following reaction is suppose to take place through S_N1 mechanism



If the configuration of substrate is D, then configuration of products will be :-

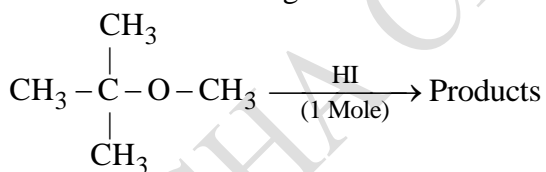
- (1) D (2) L
(3) 50% D & 50%L (4) May be D or L

Q.12 Arrange the following in order of their reactivity when reacting with HCl/ZnCl_2 :-

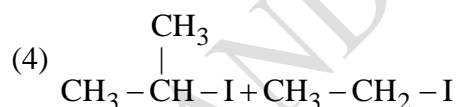
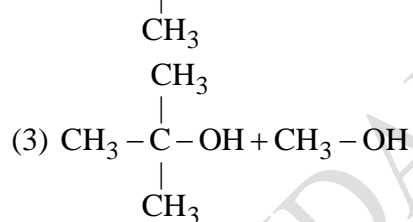
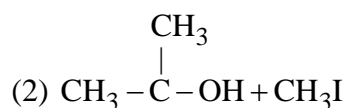
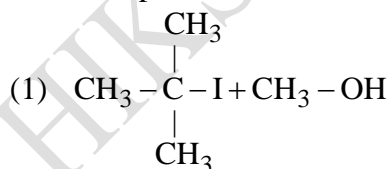


- (1) $\text{IV} > \text{I} > \text{II} > \text{III}$ (2) $\text{I} > \text{II} > \text{III} > \text{IV}$
(3) $\text{IV} > \text{III} > \text{II} > \text{I}$ (4) $\text{III} > \text{II} > \text{I} > \text{IV}$

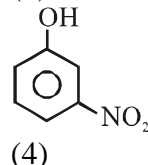
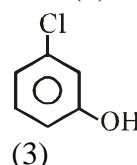
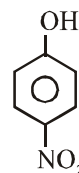
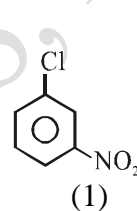
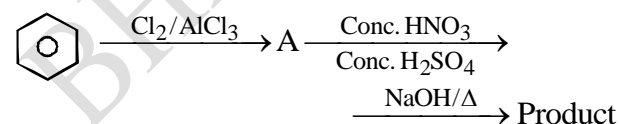
Q.13 Consider the following reaction



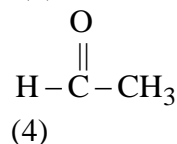
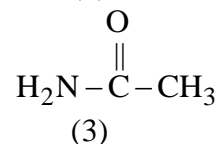
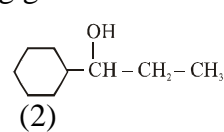
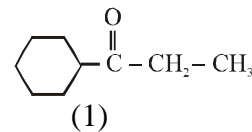
The main products of reaction will be :-



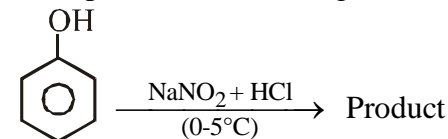
Q.14 The main product of following reaction will be



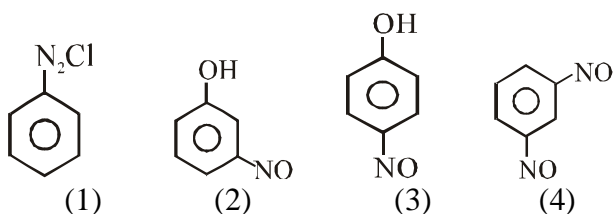
Q.15 Which of the following give iodoform test :



Q.16 Main product of following reaction will be :



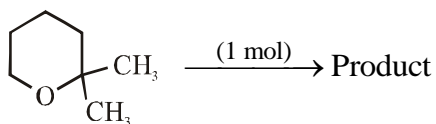
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Q.17 Which of the following reaction involves the formation of carbene intermediate :-

- (1) Reimer Tiemann reaction
- (2) Carbyl amine reaction
- (3) Hoffmann bromoimide reaction
- (4) Both 1 & 2

Q.18 The main product of following reaction will be:-

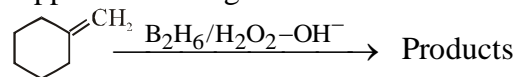


- (1) $\text{HO}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{I}$
- (2) $\text{I}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{OH}$
- (3) $\text{I}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{I}$
- (4)

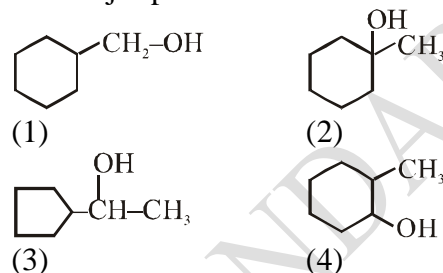
Q.19 Which of the following compound on hydration (addition of H_2O) with $\text{H}_2\text{SO}_4/\text{HgSO}_4/\text{H}_2\text{O}$ give aldehyde as major product :-

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

Q.20 Suppose following reaction

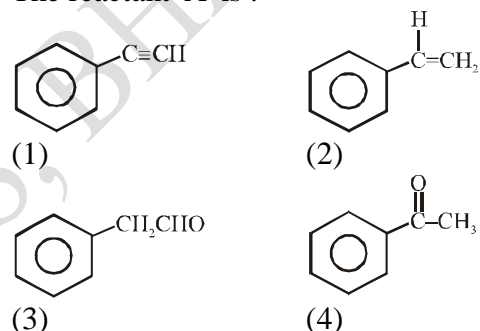


The major product will be :-

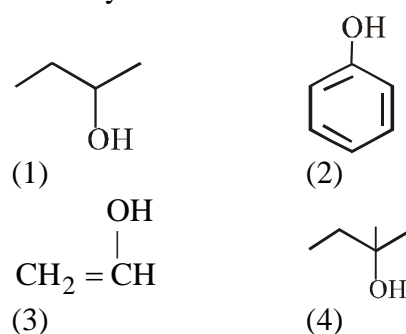


Q.21 $\text{A} \xrightarrow[1\% \text{ HgSO}_4]{20\% \text{ H}_2\text{SO}_4} \text{B} \xrightarrow{\text{I}_2+\text{NaOH}} \text{C} + \text{C}_6\text{H}_5\text{COONa}$

The reactant 'A' is :-



Q.22 Which of the following give immediate turbidity on reaction with HCl/ZnCl_2 :-



Q.23 Phenol reacts with bromine in carbon disulphide at low temperature to give :-

- (1) m-Bromophenol
- (2) p-Bromophenol
- (3) o & p-Bromophenol
- (4) 2,4,6-Tribromophenol

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Q.24 The following reaction is known as
 Phenol $\xrightarrow[\text{H}^+]{\text{CHCl}_3/\text{NaOH}}$ Salicylaldehyde

- (1) Gattermann aldehyde synthesis
- (2) Duff reaction
- (3) Perkin reaction
- (4) Reimer-Tiemann reaction

Q.25 Propan-1-ol can be prepared from propene by :-

- (1) $\text{H}_2\text{O}/\text{H}_2\text{SO}_4$
- (2) $\text{Hg}(\text{OAc})_2/\text{H}_2\text{O}$ followed by NaBH_4
- (3) B_2H_6 followed by $\text{H}_2\text{O}_2/\text{OH}^-$
- (4) $\text{CH}_3\text{CO}_2\text{H}/\text{H}_2\text{SO}_4$

Q.26 $\text{ROH} + \text{HX} \rightarrow \text{RX} + \text{H}_2\text{O}$

In the above reaction, the reactivity order of hydrogen halides is :-

- (1) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$
- (2) $\text{HBr} > \text{HCl} > \text{HI} > \text{HF}$
- (3) $\text{HCl} > \text{HBr} > \text{HI} > \text{HF}$
- (4) $\text{HF} > \text{HBr} > \text{HCl} > \text{HI}$

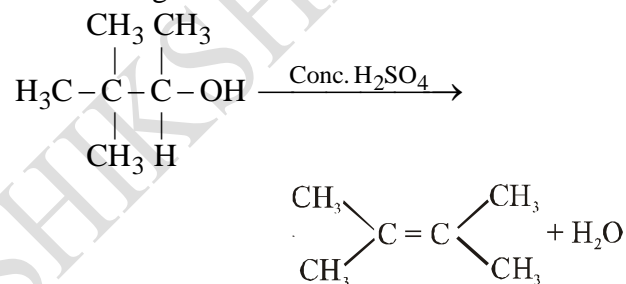
Q.27 In hydroboration reaction :-

- I. Syn addition takes place
- II. Reaction proceed through formation of cyclic transition state
- III. Markownikoff rule is followed in reaction
- IV. Anti addition takes place and anti markownikoff rule is followed.

Correct statement is/are :-

- (1) III
- (2) I, II, III
- (3) II, III, IV
- (4) All of them are correct

Q.28 In following reaction :-



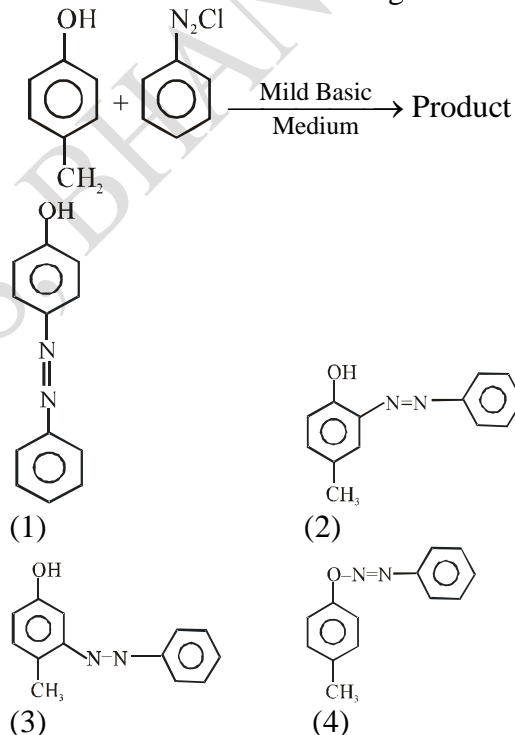
Which type of reaction intermediate is likely to involve

- (1) Carbocation
- (2) Carbanion
- (3) Carbon free radical
- (4) Carbene

Q.29 In the anion HCOO^- , the two carbon oxygen bonds are found to be equal length. What is the reason:-

- (1) The $\text{C}=\text{O}$ are weaker than the $\text{C}-\text{O}$ bond.
- (2) The anion is obtained by removal of proton from acid molecules.
- (3) The anion has two equal contributing resonating structure.
- (4) Carbon is present in sp^2 state of hybridisation

Q.30 The main Product of following reaction will be

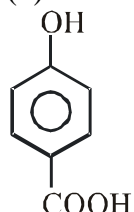
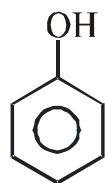
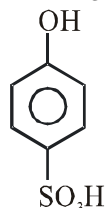
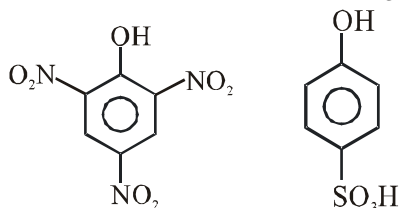


Q.31 Haloform reaction is characteristic of :-

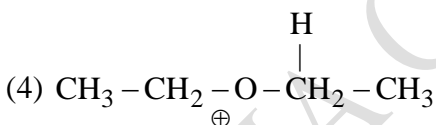
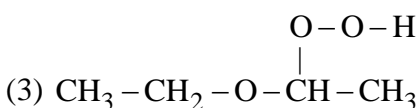
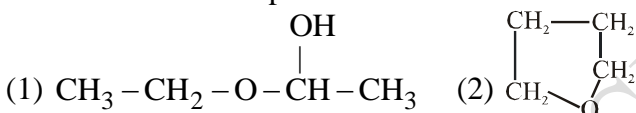
- (1) Carbonyl compound having $-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$ group
- (2) Compound having $-\overset{\text{O}}{\parallel}{\text{C}}-\text{Cl}$ group
- (3) $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}_2$
- (4) Anhydride

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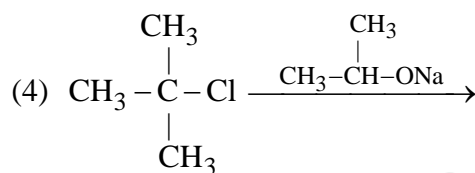
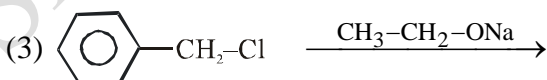
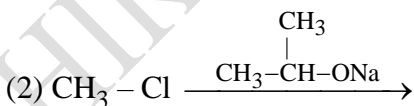
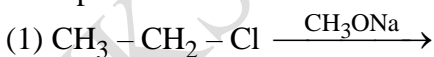
Q.32 Which of the following does not give bicarbonate test with NaHCO_3 :-



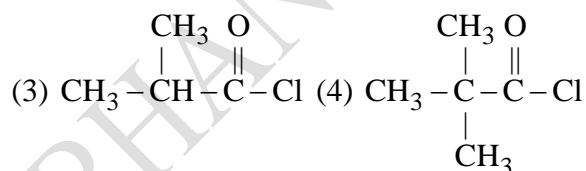
Q.33 Ether on heating at high temperature in Presence of air form explosive compound. The structure of this compound is :-



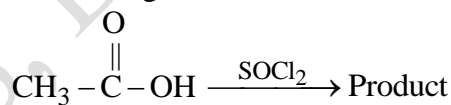
Q.34 In which of the following reaction ether is not a main product :-



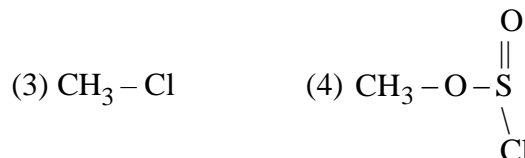
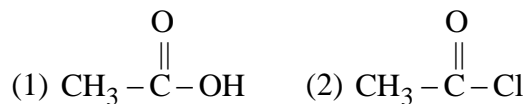
Q.35 Which of following is most reactive compound toward nucleophile ?



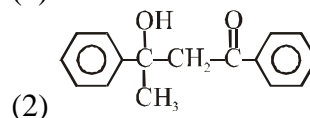
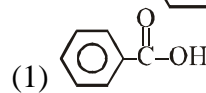
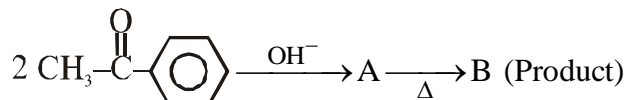
Q.36 In following reaction :-



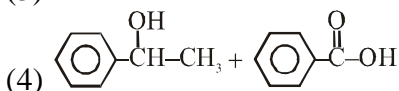
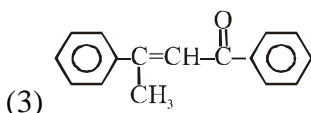
The structure of Main Product is



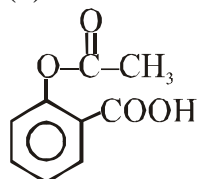
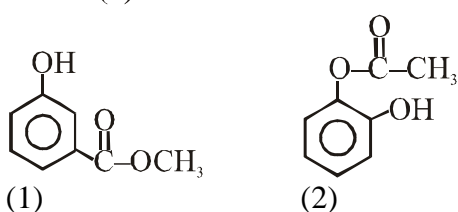
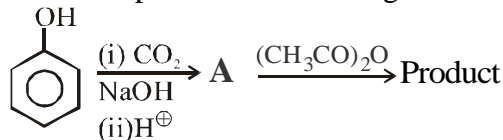
Q.37 The structure of main product (B) of following reaction will be :-



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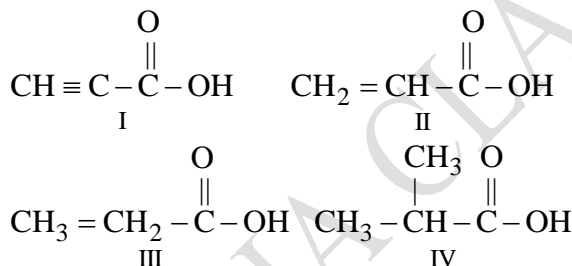


Q.38 The main product of following reaction will be



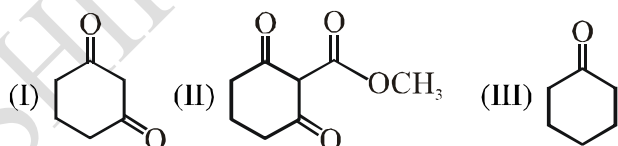
(4) All of these

Q.39 Arrange the following in order of their reactivity toward decarboxylation reaction :-



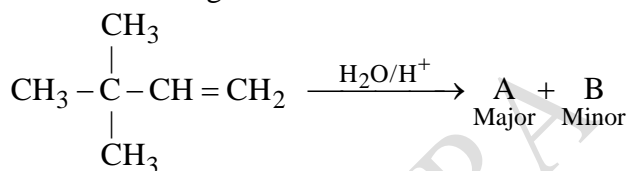
(1) IV > III > II > I (2) I > II > III > IV
 (3) III > II > I > IV (4) III > IV > II > I

Q.40 Arrange the following in increasing order of their acidic strength :-

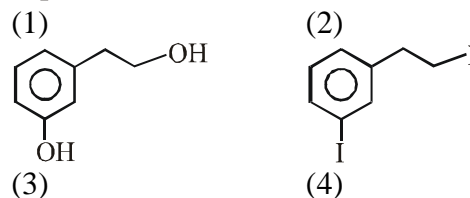
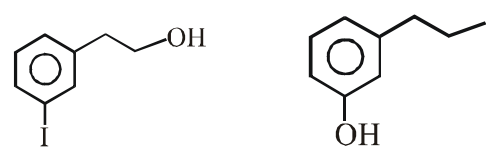
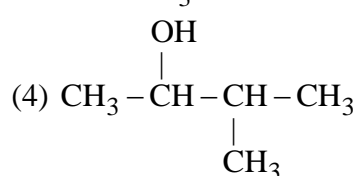
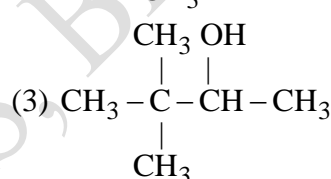
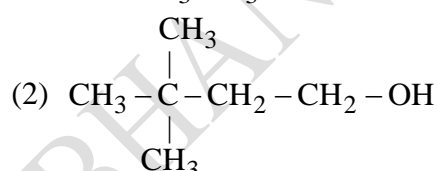
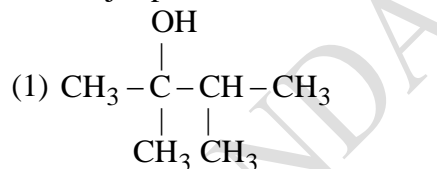


(1) II > I > III (2) III > II > I
 (3) I > II > III (4) III > I > II

Q.41 In the following reaction :-



The major product is :-



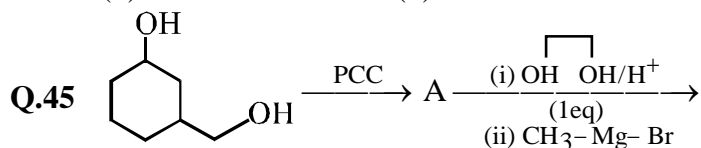
SPACE FOR ROUGH WORK

Q.43 Kolbe's electrolysis of sodium acetate at anode gives :-

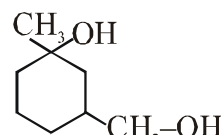
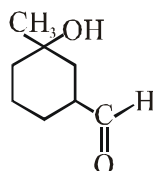
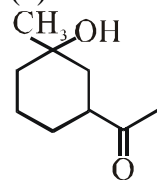
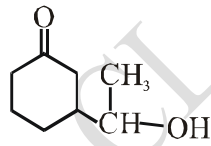
- (1) Ethane only (2) Only CO₂
 (3) Ethane + CO₂ (4) CO₂ + H₂

Q.44 Arrange the following compound in decreasing order of reactivity towards nucleophilic addition reaction:-

- C₆H₅COCH₃ CH₃-COCH₃ CH₃-CHO
 (I) (II) (III)
 (1) I > II > III (2) III > II > I
 (3) II > I > III (4) III > I > II

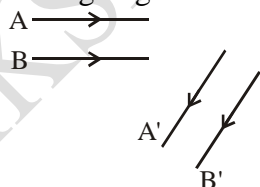


What is C?

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

PART B - PHYSICS

Q.46 Figure shows two rays A and B being reflected by a mirror and going as A' and B'. The mirror :

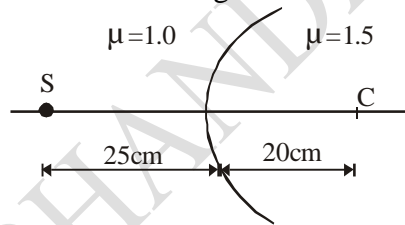


- (1) is plane
 (2) is convex
 (3) is concave
 (4) may be any spherical mirror

Q.47 A point object is placed at a distance of 30 cm from a convex mirror of focal length 30 cm. The image will form at :-

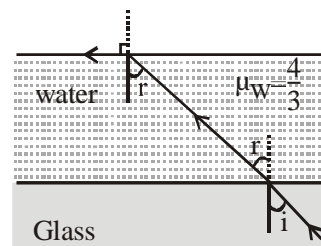
- (1) infinity
 (2) pole
 (3) focus
 (4) 15 cm behind the mirror

Q.48 Locate the image formed by refraction in the situation shown in figure :-



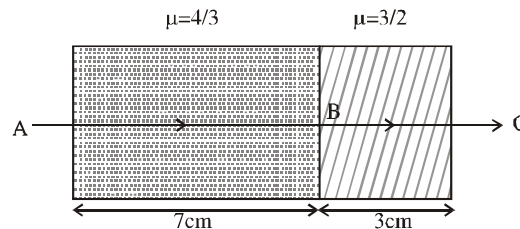
- (1) 100 cm left (2) infinity
 (3) 1 cm to the right (4) 18 cm to the left

Q.49 A ray of light is incident at the glass-water interface at an angle i, it emerges finally parallel to the surface of water, then the value of μ_g would be:-



- (1) (4/3) sin i (2) 1 / sin i
 (3) 4/3 (4) 1

Q.50 The given figure shows a ray of light passing through two media having refractive indices 4/3 and 3/2 respectively. The ratio of times taken by the ray in traversing the distances AB and BC is:-



- (1) 56 : 27 (2) 21 : 8
 (3) 7 : 3 (4) 28 : 9

SPACE FOR ROUGH WORK

Q.51 In compound microscope, the focal length of the objective and eye lens are 2.5 cm and 5cm respectively. An object is at 3.75 cm before the objective and image is formed at the least distance of distinct vision, then the distance between two lenses will be (i.e. length of the microscope tube):-

- (1) 11.67 cm (2) 12.67 cm
(3) 13.00 cm (4) 12.00 cm

Q.52 If two +5D lenses are mounted at some distance apart, the equivalent power will always be negative if the distance is :-

- (1) Greater than 40 cm (2) Equal to 40 cm
(3) Equal to 10 cm (4) Less than 10 cm

Q.53 A convex lens is in contact with concave lens. The magnitude of the ratio of their focal length is $\frac{2}{3}$. Their equivalent focal length is 30cm. Their individual focal lengths in cm will be:-

- (1) -75, 50 (2) -10, 15
(3) 75, 50 (4) 10, -15

Q.54 Find the angle of minimum deviation for an equilateral prism made of a material of refractive index 1.732. What is the angle of incidence for this deviation ?

- (1) $60^\circ, 30^\circ$ (2) $30^\circ, 60^\circ$
(3) $90^\circ, 60^\circ$ (4) $60^\circ, 60^\circ$

Q.55 A thin prism P_1 with angle 4° and made from glass of refractive index 1.54 is combined with another thin prism P_2 made from glass of refractive index 1.72 to produce dispersion without deviation. The angle of prism P_2 is :-

- (1) 2.6° (2) 3°
(3) 4° (4) 5.33°

Q.56 When a plane mirror is rotated through an angle θ then the reflected ray turns through the angle 2θ then the size of the image :-

- (1) Is doubled (2) In halved
(3) Remains the same (4) Becomes infinite

Q.57 Under which of the following conditions will a convex mirror of focal length f produce an image that is erect, diminished and virtual :-

- (1) Only when $2f > u > f$ (2) Only when $u = f$
(3) Only when $u < f$ (4) Always

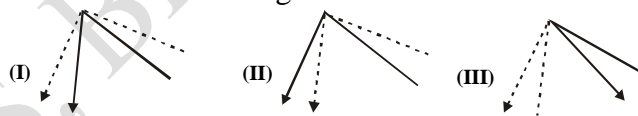
Q.58 The ratio of angle of minimum deviation produced by a thin prism ($\mu = \frac{3}{2}$) in air to that in liquid of refractive index $\frac{9}{7}$ is :

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

Q.59 In a compound microscope, the focal lengths of two lenses are 1.5 cm and 6.25 cm. An object is placed at 2 cm from objective and the final image is formed at 25 cm from eye lens. The distance between the two lenses is -

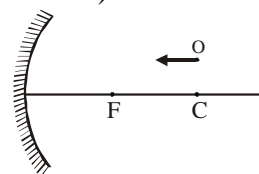
- (1) 6.00 cm (2) 7.75 cm
(3) 9.25 cm (4) 11.00 cm

Q.60 Each of these diagrams is supposed to show two different rays being reflected from the same point on the same plane mirror. Which one of the following is correct ?



- (1) Only I (2) Only II
(3) Only III (4) All

Q.61 A point object O is going towards concave mirror as shown in the figure. Choose the correct option representing direction of velocity of the image (F is the focus and C is the centre of curvature)



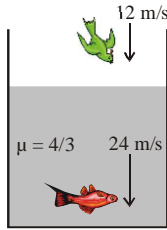
- (1) (2) (3) (4)

Q.62 An object and a screen are fixed on the uprights of an optical bench. The distance between them is 100 cm. A convex lens is placed in between the object and the screen and the position of the lens is so adjusted that the image of the object is formed on the screen at two conjugate positions of the lens. The distance between these conjugate positions of the lens is 40 cm. What is the focal length of the lens :-

- (1) 15 cm (2) 18 cm (3) 21 cm (4) 24 cm

SPACE FOR ROUGH WORK

- Q.63** A fish and a bird are moving as shown in figure. Find the velocity of bird as observed by fish.



- (1) 8 m/s upwards (2) 9 m/s downwards
 (3) 9 m/s upwards (4) 9 m/s downwards
- Q.64** A diverging lens with magnitude of focal length 25cm is placed at a distance of 15 cm from a converging lens of magnitude of focal length 20 cm. A beam of parallel light falls on the diverging lens. The final image formed is :
- (1) real and at a distance of 40 cm from the divergent lens.
 (2) real and at a distance of 6 cm from the convergent lens.
 (3) real and at a distance of 40 cm from convergent lens.
 (4) virtual and at a distance of 40 cm from convergent lens.
- Q.65** Magnification produced by astronomical telescope for normal adjustment is 10 and length of telescope is 1.1 m. The magnification when the image is formed at least distance of distinct vision ($D = 25$ cm) is -
- (1) 14 (2) 6
 (3) 16 (4) 18
- Q.66** The near point of a hypermetropic person is 75 cm from the eye. What is the power of the lens required to enable the person to read clearly a book held at 25 cm from the eye?
- (1) + 2.67 D (2) - 3.42 D
 (3) 4.62 D (4) 5.42 D
- Q.67** A parallel beam of light travelling in water (refractive index = $4/3$) is refracted by a spherical air bubble of radius 2cm situated in water. Assuming the light rays to be paraxial,

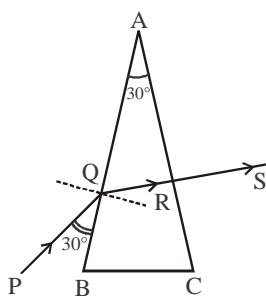
the position of the image due to refraction at the first surface is -

- (1) 6 cm from the first surface
 (2) 12 cm from the first surface
 (3) 3 cm from the first surface
 (4) 10 cm from the first surface
- Q.68** In Y.D.S.E two slits are made one millimeter apart and the screen is placed one metre away. The fringe separation when light of wavelength 500 nm is used is :-
- (1) 5×10^{-4} m (2) 2.5×10^{-3} m
 (3) 2×10^{-4} m (4) 10×10^{-4} m
- Q.69** Resultant intensity at centre of screen due to two coherent sources is I_0 . If sources are incoherent, then intensity at the same point will be :
- (1) $4I_0$ (2) $2I_0$
 (3) I_0 (4) $I_0 / 2$
- Q.70** In Y.D.S.E the ratio of intensity of maxima & minima is 25 : 9. The ratio of slit width is :-
- (1) 18 : 3 (2) 4 : 1
 (3) 8 : 1 (4) 16 : 1
- Q.71** Two light wave of intensities I_0 & $9I_0$ superpose at a point to produce a resultant intensity of $7I_0$. Calculate phase difference between light waves :-
- (1) $2\pi/3$ (2) 2π
 (3) $\pi/3$ (4) $3\pi/2$
- Q.72** Two light waves of same intensity superpose at point P with phase difference of $\pi/3$. The resultant intensity at point P will be ?
- (1) I_0 (2) $2I_0$
 (3) $3I_0$ (4) $4I_0$
- Q.73** If narrow slit of width 2 mm is illuminated by monochromatic light of wavelength 500 nm, then the distance between the first minima of both side on a screen at a distance of 1 m is :-
- (1) 5 mm (2) 0.5 mm
 (3) 1 mm (4) 10 mm

SPACE FOR ROUGH WORK

- Q.74** In Y.D.S.E. using light of wavelength λ , intensity of light at a point on the screen with path difference λ is M unit. Calculate intensity of light at a point where path difference is $\lambda / 3$ is :-
 (1) $M/2$ (2) $M/4$
 (3) $M/8$ (4) $M/16$
- Q.75** Two coherent sources with intensity ratio $\beta : 1$ produces interference. Fringe visibility will be
 (1) 2β (2) $\frac{2}{1+\beta}$
 (3) $\frac{2\sqrt{\beta}}{1+\beta}$ (4) $\frac{\sqrt{\beta}}{1+\beta}$
- Q.76** Two light waves of intensity I & 4I superpose at Point A with zero phase difference & at point B with phase difference of $\pi/2$. Calculate difference of resultant intensities of point A & B :-
 (1) $2I_1$ (2) 5I
 (3) 4I (4) 9I
- Q.77** Light of wavelength 6000\AA is incident on a single slit of width 0.3 mm. The angular position of first minima will be :-
 (1) 2×10^{-3} rad (2) 3×10^{-3} rad
 (3) 1.8×10^{-3} rad (4) 6×10^{-3} rad
- Q.78** Diffraction of sound waves is more evident than light waves in daily life as :-
 (1) $\lambda_{\text{sound}} > \lambda_{\text{light}}$
 (2) $\lambda_{\text{sound}} < \lambda_{\text{light}}$
 (3) $\lambda_{\text{sound}} = \lambda_{\text{light}}$
 (4) Sound waves are longitudinal but light waves are transverse
- Q.79** If the width of the slit is a, then the value of first secondary maximum in single slit diffraction pattern is given by :-
 (1) $a \sin \theta = \lambda/2$ (2) $a \cos \theta = 3\lambda/2$
 (3) $a \sin \theta = \lambda$ (4) $a \sin \theta = 3\lambda/2$
- Q.80** Light of wavelength 5000\AA is incident on a single slit such that angular position of first minima is 30° . The width of slit is :-
 (1) 10^{-3} cm (2) 10^{-4} cm
 (3) 10^{-5} cm (4) 10^{-2} cm
- Q.81** Light of wavelength 5000\AA is incident on a single slit such that first minima is formed at a distance 5mm from the centre. If the screen is placed 2 m away then find the width of slit :-
 (1) 0.2 mm (2) 2 mm
 (3) 0.4 mm (4) 4 mm
- Q.82** Which of the following waves can not be polarised?
 (1) Radio waves (2) Ultraviolet waves
 (3) Infrared waves (4) Ultrasonic waves
- Q.83** The refractive index of a medium is $\sqrt{3}$. If the unpolarised light is incident on it at the polarizing angle of the medium, then angle of refraction is :-
 (1) 60° (2) 45°
 (3) 30° (4) 0°
- Q.84** Unpolarised light of intensity I_0 is incident on a polarizer. Then percentage of intensity of light that get transmitted from polarizer :
 (1) I_0 (2) $2I_0$
 (3) $I_0 / 2$ (4) $I_0 / 4$
- Q.85** The angle of polarisation for any medium is 60° what will be critical angle for this ?
 (1) $\sin^{-1} \sqrt{3}$ (2) $\tan^{-1} \sqrt{3}$
 (3) $\cos^{-1} \sqrt{3}$ (4) $\sin^{-1} 1/\sqrt{3}$
- Q.86** Two polariser are placed such that, the angle between their transmission axis is 60° . If unpolarised light of intensity I_0 is incident on first polaroid then transmitted intensity from second polaroid will be :-
 (1) $I_0 / 2$ (2) $I_0 / 4$
 (3) $I_0 / 6$ (4) $I_0 / 8$
- Q.87** In the diagram, a prism of angle 30° is used. A ray PQ is incident as shown. An emergent ray RS emerges perpendicular to the second face. The angle of deviation is :-

SPACE FOR ROUGH WORK



- (1) 0° (2) 60°
 (3) 30° (4) 45°

Q.88 A myopia patient uses :-

- (1) Convex lens (2) Concave lens
 (3) Cylindrical lens (4) Bifocal lens

Q.89 A beam of electron is used in Y.D.S.E. The slit width is d . When velocity of electron is increased then:-

- (1) No interference is observed
 (2) Fringe width increases
 (3) Fringe width decreases
 (4) Fringe width remain same

Q.90 In Y.D.S.E. using red & blue lights of wavelengths 7800 \AA and 5200 \AA nth red fringe coincides with $(n + 1)^{\text{th}}$ blue fringe value of n is

- (1) 2 (2) 3
 (3) 4 (4) 5

PART C – BIOLOGY

Q.91 The dough which is used for making idli and dosa is fermented by :-

- (1) Lactobacillus
 (2) Propioni bacterium sharmanii
 (3) Bacteria
 (4) Saccharomyces cerevisae

Q.92 Large holes in swiss cheese are due to production of large amount of CO_2 by a :-

- (1) Bacteria (2) Fungi
 (3) Yeast (4) Lactobacillus

Q.93 Fill the blank space :-

Penicillin was extensively used to treat American soldiers wounded in _____ world war.

- (1) First (2) Second
 (3) Third (4) All of the above

Q.94 Functioning of *statin* is based on?

- (1) Allosteric inhibition
 (2) Non competitive inhibition
 (3) Competitive inhibition
 (4) End-product inhibition

Q.95 Which of the following alcoholic drink are produced by distillation of the fermented broth?

- (1) Whisky (2) Rum
 (3) Wine (4) Both (1) and (2)

Q.96 Treatment of waste water is done by the :-

- (1) Autotrophic microbes
 (2) Heterotrophic microbes
 (3) Chemoautotrophic microbes
 (4) All of the above

Q.97 Physical removal of large and small particle from the sewage through filtration and sedimentation is called?

- (1) primary treatment (2) secondary treatment
 (3) Biological treatment (4) Both (2) and (3)

Q.98 Along with IARI (Indian Agricultural research institute) which of the following plays a crucial role in developing biogas technology in India:-

- (1) ICAR (Indian council of Agricultural research)
 (2) KVIC (Khadi and village Industries commission)
 (3) Indian Biogas Society
 (4) W.H.O.

Q.99 In which of the following process CO_2 and CH_4 both gases are produced :-

- (a) Fermentation of dough
 (b) Cheese making
 (c) Production of beverages
 (d) Biogas formation
 (1) a,b,d (2) a,b,c,d
 (3) only d (4) a,b,c

Q.100 Which of the following bacteria involved in biogas production?

- (1) Bacillus thuringiensis
 (2) Trichoderma
 (3) Baculovirus
 (4) Methanobacterium

SPACE FOR ROUGH WORK

Q.101 Match the column A with column B :-

Column A **Column B**

- (a) Pest control method (i) Mosquito
(b) Dragon flies (ii) attack insects and arthropods
(c) Trichoderma (iii) Relies on natural predator
(d) Baculo viruses (iv) Kill plant pathogen
(1) a-iii, b-ii, c-iv, d-i (2) a-iii, b-i, c-iv, d-ii
(3) a-i, b-ii, c-iii, d-iv (4) a-iv, b-ii, c-iii, d-i

Q.102 Free living fungi that are very common in the root ecosystem and act as effective biocontrol agent of several plant pathogen :-

- (1) Bacillus thuringiensis (2) Baculovirus
(3) Trichoderma (4) Lady bird

Q.103 Dragon flies are used to get rid of :-

- (1) Aphids (2) Mosquitoes
(3) Both (1) and (2) (4) Plant pathogens

Q.104 From the given list which of the following can be used as biofertilizers :-

- (a) Rhizobium (b) Azospirillum
(c) Mycorrhiza (d) Anabaena
(e) Azotobacter

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

Q.105 The main source of biofertilizers :-

- (1) Bacteria (2) Fungi
(3) Cyanobacteria (4) All of the above

Q.106 Which of the following are not used as a source of single cell protein (SCP) :-

- (1) Spirulina
(2) Methylophilus methylotrophus
(3) Chlorella
(4) Jatropha

Q.107 Methods for crop improvement are :-

- (1) Only selection and hybridization
(2) Only hybridization
(3) Selection, hybridisation and mutational breeding
(4) None of the above

Q.108 The main steps in breeding a new genetic variety of a crop by hybridization are given

below in irregular manner. So arrange all steps in sequenced manner :-

- (a) Evaluation and selection of parents
(b) Collection of variability
(c) Selection and losing of superior recombinants.
(d) Cross hybridisation among the selected parents.
(e) Testing, release and commercialisation of new cultivars

Option :

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

Q.109 The entire collection (of plants/seeds) having all the diverse alleles for all genes in a given crop is called

- (1) Herbarium
(2) Selection of superior recombinant
(3) Gene library
(4) Germplasm collection

Q.110 Match the following column :-

- | X | Y |
|----------------|-------------------|
| A. Cauliflower | i. Pusa A-4 |
| B. Okra | ii. Pusa sem-3 |
| C. Flat bean | iii. Pusa shubhra |
| D. Wheat | iv. Himgiri |

Option :-

- (1) A-i, B-iii, C-ii, D-iv (2) A-iii, B-i, C-iv, D-i
(3) A-iii, B-i, C-ii, D-iv (4) A-iv, B-ii, C-i, D-iii

Q.111 Which one of the following is a case of correct matching ?

- (1) Callus → Unorganised mass of cells produced in tissue culture.
(2) Protoplast fusion → A technique of micropropagation.
(3) Protoplast → A cell without cell membrane
(4) Cytokinins → Promotes root regeneration

Q.112 _____ is responsible for green revolution in India

- (1) Dr. N.E. Borlaug
(2) Dr. M.S. Swaminathan
(3) Dr. Gurdev S. Khush
(4) Guha and Maheshwari

SPACE FOR ROUGH WORK

Q.113 The technique of obtaining large number of plantlets by tissue culture :-

- (1) Macropropagation (2) Meiosis
(3) Embryogenesis (4) Micropropagation

Q.114 Principle of plant tissue culture ?

- (1) Totipotency (2) Pleuripotency
(3) PCR (4) Mutation

Q.115 Which of the following are not disease resistant varieties :-

- (1) Pusa subhra (2) Pusa swani
(3) Pusa komal (4) Pusa sadabahar

Q.116 Which of the following industrial product synthesis by the use of microbe ?

- (1) Beverage (2) Antibiotics
(3) Curd (4) Both (1) and (2)

Q.117 Complete the following sentences :-

_____are chemical substance, which are produced by some microbes and can kill or retard the growth of other microbes.

- (1) Antibiotics
(2) Fermented Beverages
(3) Fruit juice
(4) Enzymes

Q.118 Identify the events indicated by A and B in given figure.

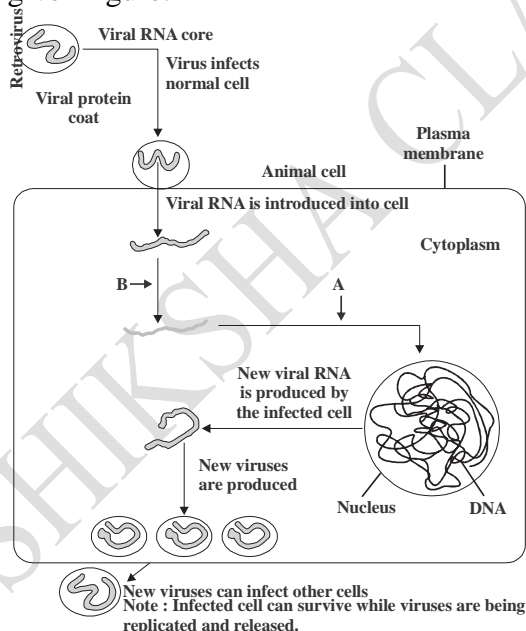


Figure : Replication of retrovirus

(1) A → Viral RNA is produced by reverse transcriptase

(2) B → Viral RNA incorporates into host genome

(3) A → Viral DNA is produced by reverse transcriptase

(4) B → Host DNA incorporates into viral genome.

Q.119 After getting into the body of the person, the HIV replicates and direct the infected cells to produce virus particles. Above statement is true for which cells ?

- (1) Macrophage
(2) T - Helper cells
(3) Both Macrophage and T - helper
(4) Only in RBC

Q.120 Select the incorrect statement for AIDS :-

- (1) ELISA test is positive only after window period.
(2) ELISA test may be positive in incubation period.
(3) In AIDS patients CD_4 vs CD_8 ratio is less than 1
(4) Symptoms are always present in window period.

Q.121 A person is addicted to "Smack". This person is at high risk for HIV infection because :-

- (1) Smack contains HIV
(2) Smack contaminates blood and blood products.
(3) Smack is generally taken by injection
(4) Smack is a depressant

Q.122 AIDS was first detected in :-

- (1) Homo sexual females in 1981
(2) Homo sexual males in 1986
(3) Homo sexual males in 1981
(4) Homo sexual female in 1986

Q.123 Adeno-carcinoma refers to :-

- (1) A benign tumor of connective tissue of Adenohypophysis.
(2) A malignant tumor of connective tissue of Adenohypophysis.

SPACE FOR ROUGH WORK

- (3) A benign tumor of Epithelium tissue of thyroid gland.
 (4) A malignant tumor of Epithelium of any gland.

Q.124 Malignant tumors are different from benign tumor in having :-

- (1) Property of contact inhibition
 (2) Slow growth
 (3) Invading nature
 (4) Non-metastatic nature

Q.125 Which of the following is not true for cancer cells :-

- (1) Mutation inhibit production of telomerase enzyme.
 (2) Cancer cells make more telomerase enzyme
 (3) Mutation destroy telomerase inhibitor
 (4) Mutation inactive the cell control.

Q.126 Which of the following is used in the treatment of thyroid cancer :-

- (1) CO – 60 (2) I – 131
 (3) C₁₄ (4) U₂₃₈

Q.127 Biopsy test is often performed to diagnose :-

- (1) AIDS (2) Allergy
 (3) Down Syndrom (4) Osteosarcoma

Q.128 Match the column :-

- | Column - A
(Drugs) | Column - B
(Sources) |
|-----------------------|-------------------------|
| a. Smack | i. Erythroxyllum coca |
| b. Coke | ii. Cannabis sativa |
| c. Marijuana | iii. Nicotiana tobacum |
| d. Nicotene | iv. Papaver somniferum |
- (1) a – i , b – ii , c – iii , d – iv
 (2) a – iii , b – i , c – ii , d – iv
 (3) a – iv , b – i , c – ii , d – iii
 (4) a – i , b – iii , c – iv , d – ii

Q.129 Which of the following is not a hallucinogen :-

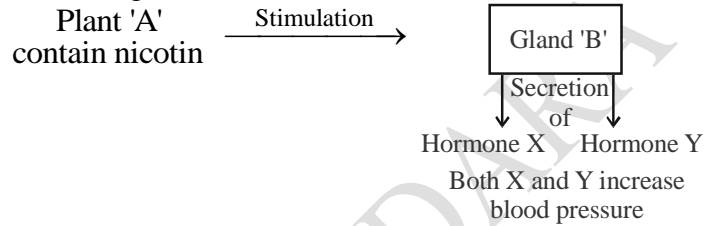
- (1) Atropa belladona (2) Datura innoxia
 (3) Barbiturates (4) Cocain

Q.130 Which of the following is not an immediate adverse effect of drugs and alcohol abuse :-

- (1) Reckless behaviour
 (2) Vandalism
 (3) Violence

(4) Drop in academic performance

Q.131 Identify the A,B,X and Y in following line diagram.



- (1) A - Papaver somniferum, B - Adrenal gland
 X - Adrenalin , Y - Nor-adrenalin gland
 (2) A - Tobacco, B - Adrenal gland
 X - Noradrenalin, Y - adrenlin
 (3) A - Dature , B - Pituitary gland
 X - growth hormone, Y - oxytocin
 (4) A - Tobacco, B - Thyroid gland
 X - T₃ , Y - T₄

Q.132 Which antibody provide protection to foetus ?

- (1) IgG (2) IgM
 (3) IgA (4) IgD

Q.133 Which is correct match ?

- (1) IgA – Pentamer
 (2) IgD – Receptor antibody
 (3) IgM – Most abundant antibody
 (4) IgE – Surface protection

Q.134 Which of the following disease is caused by intestinal helminthic parasitism ?

- (1) Ascariasis (2) Filariasis
 (3) Amoebiasis (4) Shigellosis

Q.135 Which test is done for diagnosis of typhoid ?

- (1) Chest x-ray (2) Widal test
 (3) Montoux test (4) Torniquet test

Q.136 Which chemical of T-killer cell helps in destruction of target cell ?

- (1) Interleukin (2) Monokine
 (3) Antibody (4) Perforin

Q.137 Which is not an autoimmune disorder ?

- (1) Rheumatoid arthritis
 (2) Hashimoto disorder
 (3) Diabetes malitus type-I
 (4) Alzheimer's disease

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- Q.138** Heamozoin particles are derivatives of :-
 (1) Heamoglobin (2) Bile
 (3) Myosin (4) Troponin
- Q.139** Which of the following set is the main allergic inflammatory mediator ?
 (1) Adranaline and nor-adranaline
 (2) Dopamine and seratonin
 (3) Ach and dopamine
 (4) Histamin and seratonin
- Q.140** Which of the following is maturation site of β -Lymphocytes ?
 (1) Bone marrow
 (2) Thymus
 (3) Bone marrow and thymus
 (4) Thyroid
- Q.141** Which of the following organism is used in production of hepatitis-B vaccine ?
 (1) E.coli (2) Sheep
 (3) Transgenic yeast (4) Goat
- Q.142** Sustaned high grade fever, weekness, stomach pain, constipation, headache and loss of appetite are common symptoms of which disease ?
 (1) Malaria (2) Filariasis
 (3) Typhoid (4) Pneumonia
- Q.143** Which of the following is most common infections disease ?
 (1) Common cold (2) Pneumonia
 (3) Filariasis (4) Ascariasis
- Q.144** Which human cells are first Infected by sporozoits?
 (1) RBC (2) Hepatocytes
 (3) Enterocytes (4) Melanocytes
- Q.145** Virus infected cells secrete protein called interferone which protects non-infected cells from further viral infection. This represents :-
 (1) CMI (2) AMI
 (3) Cytokine barrier (4) Physiological barrier
- Q.146** Vaccination is based on :-
 (1) Nk – cell
 (2) Memory B-and T cells
 (3) Cytokine barrier
 (4) Physiological barrier

- Q.147** Stool with excess mucous and blood clots indicates
 (1) Plague (2) Filariasis
 (3) Dysentery (4) Typhoid
- Q.148** Most of the lymphoid tissue of our body are constituted by :-
 (1) GALT (2) BALT
 (3) LALT (4) CALT
- Q.149** Which disease is spreaded by culex ?
 (1) Ascariasis (2) Elephantiasis
 (3) Amoebiasis (4) Dengue
- Q.150** Trichophyton cause :-
 (1) dysentry (2) Chickengunya
 (3) Ringworm (4) Pneumonia
- Q.151** Vaginal acidic pH is example of :-
 (1) Physical barrier (2) Physiological barrier
 (3) Cytokin barrier (4) Celluler barrier
- Q.152** How many of the birds in the list given below are exotic breeds of hen:-
 Aseel, Black Bengal, Minorca, white leghorn, Plymoth rock.
 (1) Five (2) Four
 (3) Three (4) Two
- Q.153** Read the following four statement (a - d) :-
 (a) Inbreeding exposes harmful recessive genes that are eliminated by selection.
 (b) Atrificial insemination helps as overcome several problems of normal matings.
 (c) In MOET, the embryo eggs at 8 - 32 cells stages are recovered non-surgically and transferred to surrogate mothers.
 (d) A single outcross often helps to overcome inbreeding depression.
 How many of the above statement are correct?
 (1) Four (2) Three
 (3) Two (4) One
- Q.154** Which of the following statement is incorrect about bee keeping?
 (1) Bees are the pollinators of many of our crop species such as sunflower, *Brassica*, apple, pear.
 (2) The increased demand of honey has led to large scale bee-keeping practices.

SPACE FOR ROUGH WORK

- (3) *Apis indica* is common wild species of honey bee
- (4) Bee- Keeping is not labour intensive
- Q.155** Consider the following four statements (a-d) and select the option which includes all the correct ones only.
- (a) Inbreeding refers to the mating of more closely related individuals in with the same breed for 4 - 6 generations.
- (b) However, continued inbreeding, especially close inbreeding, usually increase fertility and productivity this is called inbreeding depression.
- (c) MOET technology has been demonstrated for cattle, sheep, rabbit, buffaloes, mares.
- (d) Fishery industry devoted to the catching, processing or selling of fish, shellfish of other aquatic animals
- (1) statements (b), (c) and (d)
- (2) statements (a) , (b)
- (3) statements (b), (d)
- (4) statements (a), (c) and (d)
- Q.156** Which of the following disease caused by a protozoan in silkworm ?
- (1) Muscardin (2) Thrush
- (3) Pebrine (4) Flacherie
- Q.157** Outcrossing is an important strategy of animal husbandry because it :
- (1) exposes harmful recessive genes that are eliminated by selection.
- (2)is useful in overcome inbreeding depression.
- (3) is the best breeding method for animals that are below average in productivity in milk production.
- (4) Both (2) and (3)
- Q.158** Which of the following points are important for successful bee-keeping ?
- (a) knowledge of nature and habits of bee.
- (b) selection of suitable location for keeping the beehives.
- (c) catching and hiving of swarms.
- (d) management of beehives during different seasons.
- (1) only (a) and (d)
- (2) only (b) and (c)
- (3) only (c) and (d)
- (4) statement (a), (b), (c) & (d)
- Q.159** Which type of parthenogenesis occur in honey bee?
- (1) Theletoky (2) Arrhenotoky
- (3) Amphitoky (4) Both (1) and (2)
- Q.160** Lac is resinous secretion of dermal glands, which secrete by :
- (1) Laccifer (2) *Apis mellifera*
- (3) *Bombyx mori* (4) Amphids
- Q.161** Which type breeding allows the desirable qualities of two different breed to be combined?
- (1) Interspecific hybridization
- (2) Inbreeding
- (3) Outcrossing
- (4) Cross breeding
- Q.162** Among the following edible fishes, which one is a marine fish having rich source of omega-3 fatty acids?
- (1) Mrigal (2) Mackerel
- (3) Rohu (4) Mangur
- Q.163** Interspecific hybridization is the mating of
- (1) superior males and females of different breed.
- (2) two different related species
- (3) animals within same breed without having common ancestors
- (4) more closely related individuals within same breed for 4-6 generations.
- Q.164** Toxoid is included in which of the following :-
- (1) Natural active aquired immunity
- (2) Natural passive aquired immunity
- (3) Artificial active aquired immunity
- (4) Artificial passive aquired immunity
- Q.165** Which of the following disease is known as whooping cough ?
- (1) Pneumonia (2) Pertusis
- (3) Common cold (4) Emphysema

SPACE FOR ROUGH WORK

Q.166 Sabin vaccine is :-

- (1) IPV (2) MMR
(3) BCG (4) OPV

Q.167 Which of the following cells plays an important role in allergy ?

- (1) TK cell (2) NK cell
(3) Mast cell (4) Plasma cell

Q.168 Which one of the following statements is correct with respect to AIDS :-

- (1) The HIV enters helper T-lymphocytes thus reducing their numbers.
(2) The HIV can be transmitted through eating food together with an infected person.
(3) Drug addicts are least susceptible to HIV infection.
(4) AIDS patients are being fully cured with proper care and nutrition.

Q.169 Match the columns :-

Column - I

- p. Benign tumor
q. Contact inhibition
r. Malignant tumor

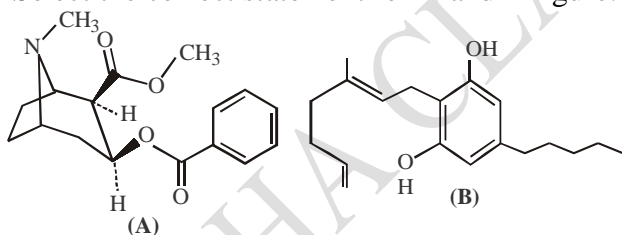
- (1) p-i, q-ii, r-iii
(3) p-iii, q-i, r-ii

Column - II

- (i) Metastasis
(ii) Non-invading
(iii) Normal cells

- (2) p-ii, q-iii, r-i
(4) p-i, q-iii, r-ii

Q.170 Select the correct statement for A and B figure:



- (1) A is cannabinoid molecule and B is morphine.
(2) Ganja is produced by A and heroin is produced by B.
(3) Both A and B are potent painkillers.
(4) A is a potent painkiller and B is cannabinoid molecule.

Q.171 Which one of the following provides non-specific defense for the body?

- (1) T-cells (2) B-cells
(3) Phagocytes (4) Stem cells

Q.172 Carcinoma is a cancer of –

- (1) connective tissue
(2) white blood cells
(3) lymphocytes
(4) ectoderm and endoderm

Q.173 Which is a viral disease?

- (1) Tetanus (2) Measles
(3) Cholera (4) Tuberculosis

Q.174 Drug which induces dreamy state of consciousness is

- (1) sedative (2) stimulant
(3) depressant (4) hallucinogen

Q.175 Which one of the following is not an autoimmune disease?

- (1) Graves' disease (2) Pernicious anemia
(3) Rheumatoid arthritis (4) Insomnia

Q.176 Which drug is not normally used as medicine to help patients suffering from mental illness like: depression and insomnia?

- (1) Barbiturates
(2) Lysergic acid diethylamides (LSD)
(3) Amphetamines
(4) Morphine

Q.177 Mark the correct statement :-

- (1) IgM, IgE and IgA account for more than 95% of the circulating immunoglobulins.
(2) CD-4 is related with helper T-cells, whereas CD-8 is related with killer or cytotoxic T-cells
(3) Dendritic and Langerhans cells, have only large amounts of class I HLA antigens on their cell surfaces.
(4) NK cells are considered to provide the first line of defense against tumours and virus infections.

Q.178 Which bacterium produce biogas :

- (1) Methano bacterium
(2) Lactobacillus
(3) Bacillus
(4) Clostridium

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Q.179 The green revolution succeeded in tripling the food supply. Increased yields have mainly due to:

- (1) improved crop varieties
- (2) Use of agrochemicals
- (3) Better management practices
- (4) (2) & (3) both

Q.180 Which of the following is a mismatch regarding the transgenic plant and its application:

- (1) Golden rice → Vitamin A enriched rice
- (2) Flavr savr tomato → Delay ripening
- (3) Tobacco → herbicide resistant
- (4) Bt corn → Resistant to nematode

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