

1.

The relation between species richness and area for a wide variety of taxa on a logarithmic scale is a:

1. rectangular hyperbola
2. straight line
3. sigmoid curve
4. sine curve

2. 2.50 μm
3. 5.00 μm
4. 10.00 μm
5. 7.5 μm

2.

Identify the incorrectly matched pair:

	Crop Variety	Resistant to
1.	Himgiri	Leaf and stripe rust
2.	Karan rai	White rust
3.	Pusa sadabahar	Bacterial blight
4.	Pusa shubhra	Black rot

6.

Select the incorrect statement

1. India has more than 50,000 genetically different strains of rice
2. India has 100 varieties of mango
3. The genetic variation in *Rauwolfia vomitoria* can be in terms of concentration and potency of reserpine
4. The tropical rainforest initially covered 14% of the land surface of earth, but now they cover only 6% of the land area

3.

Very small animals are rarely found in polar region mainly because:

1. Smaller animals have a relatively slower heart rate
2. Smaller animals have a more surface area relative to their volume
3. Smaller animals are invariably herbivores
4. Smaller animals rely on diffusion for exchange of gases with the environment

7.

Consider the following statements:

The rate of decomposition is high if:

- I. The detritus is rich in lignin and chitin.
 - II. The detritus is rich in nitrogen and sugars.
 - III. The environmental conditions are warm and moist.
- Which of the above statements are true?

1. I and II only
2. I and III only
3. II and III only
4. I, II, and III

4.

When the population density reaches the carrying capacity, the logistic growth curve is said to be in:

1. Lag phase
2. A phase of acceleration
3. A phase of deceleration
4. Asymptote

8.

Consider the following statements:

- I. The atmosphere only contains about 1% of total global carbon.
- II. Unlike carbon cycle, there is no respiratory release of phosphorus into atmosphere.
- III. Sulphur and phosphorus cycles are sedimentary cycles.

Which of the above statements are true?

1. I and II only
2. I and III only
3. II and III only
4. I, II, and III

5.

According to the Central Pollution Control Board, particles that are responsible for causing great harm to human health are of diameter

9.

Consider the following statements:

- I. Noise was added as an air pollutant to Air (Prevention and Control of Pollution) Act in 1987.
- II. Montreal protocol was signed in 1987 to control emission of ozone depleting substances.
- III. The Earth Summit for conservation of biodiversity and sustainable utilization of its benefits was held in 1992.

Which of the above statements are true?

1. I and II only
2. I and III only
3. II and III only
4. I, II, and III

10.

Consider the following statements:

- I. India's share of the global species diversity is 8.1% approximately.
- II. Two ecological hot spots of the world cover our bio-diversity regions.
- III. The Amazon rain forest has the greatest biodiversity on Earth.

Which of the above statements are true?

- 1. I and II only 2. I and III only
- 3. II and III only 4. I, II, and III

11.

Consider the following statements:

- I. Exonucleases remove nucleotides from the ends of DNA whereas, endonucleases make cuts at specific positions within DNA.
- II. To visualize pure DNA fragments, it is stained with ethidium bromide and seen in UV light.
- III. Plasmids and phage DNA are used as vectors in genetic engineering as they are extra chromosomal DNA molecules.

Which of the above statements are true?

- 1. I and II only 2. I and III only
- 3. II and III only 4. I, II, and III

12.

Consider the following statements:

- I. Ori is responsible for the copy number of the linked DNA.
- II. Transformation is a process through which a piece of DNA is introduced into a host bacterium.
- III. Bacteriophages have very high copy numbers of their genome within the bacterial cell.

Which of the above statements are true?

- 1. I and II only 2. I and III only
- 3. II and III only 4. I, II, and III

13.

Consider the following statements:

- I. Biolistics or gene gun can be used to introduce genes in both plant and animal cells.
- II. Agrobacterium tumefaciens does not naturally infect Monocots.
- III. Liposomes are used in the gene therapy for cystic fibrosis.

Which of the above statements are true?

- 1. I and II only 2. I and III only
- 3. II and III only 4. I, II, and III

14.

Consider the following statements:

- I. RNAi takes place in all eukaryotic organisms as a method of cellular defense.
- II. It involves silencing of a specific mRNA due to complementary dsDNA molecules that prevent

the translation of mRNA.

III. Fire and Mello got Nobel Prize for the discovery of RNAi.

Which of the above statements are true?

- 1. I and II only 2. I and III only
- 3. II and III only 4. I, II, and III

15.

Identify the biome that is not correctly matched with its mean annual temperature and mean annual precipitation:

Biome	Mean annual temperature [⁰ C]	Mean annual precipitation [cm]
1. Desert	0 – 25	25 – 100
2. Temperate Forest	10 – 22	50 – 220
3. Tropical forest	20 – 25	150 – 425
4. Coniferous forest	0 – 15	50 – 250

16.

Match the legislation in Column I with corresponding year in Column II and select the correct answer from the codes given:

	Legislation		Year
A	Air [Prevention and Control of Pollution] Act	P	1974
B	Environment [Protection] Act	Q	1981
C	Water [Prevention and Control of Pollution] Act	R	1986
D			

National Forest Policy S 1988

Codes

- | | A | B | C | D |
|----|---|---|---|---|
| 1. | R | Q | S | P |
| 2. | Q | R | P | S |
| 3. | Q | R | S | P |
| 4. | R | Q | P | S |

17.

Pusa komal is disease resistance variety of?

1. Cauliflower
2. Brassica
3. Cowpea
4. Chilli

18.

Triangular age pyramid represents

1. Expanding population.
2. Declining population.
3. Mature population.
4. Both 1. and 3.

19.

Natural ageing of a lake by biological enrichment of its water is called

1. Biomagnification
2. Eutrophication
3. Algal blooms
4. Toxification

20.

For the multiplication of any alien piece of DNA in an organism:

1. It must be devoid of any introns in it
2. It must be a part of a chromosome with an ori

3. It must have recognition sequence of at least one restriction enzyme

4. It must have selectable markers

21.

“Sexual deceit” is employed by

1. Ophrys to get pollinated.
2. Orchids on mango for shelter.
3. Cuckoo on crow.
4. Abingdon tortoise in Galapagos island.

22.

The type of population interaction exhibited by visiting flamingos and resident fishes in South American Lakes, is also shown by

1. Sparrow eating any seed.
2. Cuckoo and crow.
3. Abingdon tortoise and goats in Galapagos island.
4. Sea anemone and clown fish.

23.

Bacillus thuringiensis (Bt) strains have been used for designing novel -

1. Bioinsecticidal plants
2. Bio-mineralization processes
3. Biofertilizers
4. Bio-metallurgical techniques

24.

Hisardale a new breed of sheep developed in Punjab by crossing Bikaneri ewes and Merino rams is an example of

1. Outcrossing
2. Cross-breeding
3. Interspecific hybridisation
4. Outbreeding

25.

Which of the following is not correct with respect of control of vehicular air pollution in India?

1. Use of CNG as fuel
2. Not phasing out of old vehicles as they have better technology
3. Use of unleaded petrol, low-sulphur petrol and diesel
4. Use of catalytic converter

26. Each trophic level has certain mass of living material at a particular time called
1. Standing crop
 2. Standing state
 3. GPP
 4. NPP
27. A selectable marker is used to
1. help in eliminating the non-transformants, so that the transformants can be regenerated
 2. identify the gene for a desired trait in an alien organism
 3. select a suitable vector for transformation in a specific crop
 4. mark a gene on a chromosome for isolation using restriction enzyme
28. In hydrarch succession pioneer is phytoplankton and climax is forest (mesic). Given below is name of seral stages, arrange them in accordance with their appearance.
- A. Submerged free floating plants
 - B. Reed – swamp stage
 - C. Marsh meadow stage
 - D. Submerged plant stage
 - E. Scrub stage
- Option
1. A, B, C, D & E
 2. B, A, C, D & E
 3. D, A, C, B & E
 4. D, A, B, C & E
29. In nature, a given habitat has enough resources to support a maximum possible number, beyond which no further growth is possible. The limit is known as
1. Environmental resistance
 2. Intrinsic rate of natural increase
 3. Carrying capacity
 4. Exponentially growth
30. World Summit on sustainable development held in 2002 in
1. Rio de Janeiro
 2. Japan
 3. Johannesburg
 4. London
31. _____ is a thermophilic bacterium that can survive temperatures upto 95°C. Select the option which fills the blank correctly.
1. Thermus aquaticus
 2. Salmonella typhi
 3. E.coli
 4. Lactobacillus
32. Choose the nematode which infects the roots of tobacco plants causing a great reduction in yield.
1. A. tumefaciens
 2. M. incognita
 3. S. typhimurium
 4. B. thuringiensis
33. Mark the odd one w.r.t. shape of ecological pyramids.
1. Pyramid of energy.
 2. Pyramid of number in grassland ecosystem.
 3. Pyramid of biomass in aquatic ecosystem.
 4. Pyramid of biomass in terrestrial ecosystem.
34. Consider the following statements and state True (T) contributes to global warming or False (F)
- a. The Eastern Ghats have higher amphibian species diversity than the Western Ghats.
 - b. Habitat loss and fragmentation is the most important cause driving animals and plants to extinction.
 - c. Loss of biodiversity in a region may lead to lowered resistance to environmental perturbations.
 - d. In onsite conservation approaches, biodiversity at all levels is protected.
- A B C D

1. F T T T
2. T F T T
3. F F T T
4. T T T F

35.

Identify the incorrect statement w.r.t predation.

1. Nature's way to transfer energy fixed by plants to higher trophic levels.
2. Predators keep prey populations under control.
3. Predator increases the intensity of competition among competing prey species.
4. Predators in nature are "prudent" .

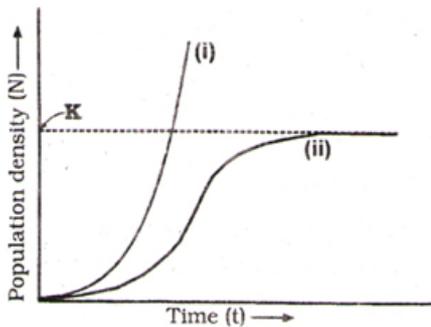
36.

Select the incorrect statement(s) (w.r.t. semi-dwarf varieties of wheat)

1. Developed by Norman E. Borlaug
2. Developed at International Centre for Wheat and Maize Improvement in Mexico
3. These varieties were derived from IR-8
4. Responsible for green revolution

37.

Study the population growth curves shown in the above diagram.



Which option is the best for curve (i) and (ii)

	Type of (i) curve	Type of (ii) curve	Status of food & space for curve(i)	Status & space for curve (ii)	Equation for curve (ii)	Equation for curve (i)
1.	Logistic curve	Exponential curve	Unlimited	Limited	$\frac{dN}{dt} = rN$	$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
2.	Exponential curve	Logistic curve	Unlimited	Limited	$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$	$\frac{dN}{dt} = rN$
3.	Logistic curve	Exponential curve	Limited	Unlimited	$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$	$\frac{dN}{dt} = rN$
4.	Exponential curve	Logistic curve	Limited	Unlimited	$\frac{dN}{dt} = rN$	$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$

38.

Which of the following is correct about probe ?

- A. It is ssDNA or ssRNA.
- B. Used to detect gene of interest from gene library.
- C. Used to detect mutations in genes in suspected cancer patients.
- D. Used to detect HIV in suspected AIDS patients.

1. A only
2. A and B
3. A, B and C
4. A,B,C and D

39.

Which of the following is not a direct method of gene transfer ?

1. Microinjection.
2. Biolistic.
3. Electroporation.
4. Disarmed pathogen vector.

40.

The restriction endonuclease breaks bonds between:

1. DNA-RNA hybrid
2. Introns
3. Nucleotides, i.e., breaks the phosphodiester bond
4. Pentose sugar and nitrogenous base, i.e., breaks N-glycosidic bond

41.

When DNA is transcribed into mRNA, usually the mRNA remains single-stranded, but in some cases a RNA can be made that is complementary to the mRNA. This is called _____ and its main function is to _____:

1. Antisense RNA, block gene expression
2. Antisense RNA, amplify mRNA
3. Antisense RNA, enhance translation
4. Reverse transcription, enhance translation

42.

What do you mean by bioprospecting?

1. Biological analysis of living things to classify them.
2. Exploring molecular, genetic and species level diversity for product of economic importance.
3. Exploring forests to identify diversity present their.
4. It is branch of biology which deals with prospect of conservation.

43.

State True (T) or False (F) for the following statements and select the correct option

- a. Mammals from colder climates generally have smaller ears and limbs to minimize the heat loss.
- b. Experience of altitude sickness is due to high atmospheric pressure at high altitudes.
- c. The size of a population for any species is not a static parameter.
- d. Resources for growth for most of the animal population are infinite and become limiting sooner or later.

a b c d

1. T T T T
2. F T T F
3. F F F F
4. T F T F

44.

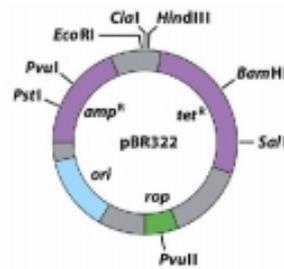
Which of the following statement is/are correct?

- a. As we move on Earth from low to high latitude, the biodiversity increases.
- b. In rivet popper hypothesis given by Paul Ehrlich, rivets on the wings are considered as key species.
- c. India possesses 8.1% species diversity of the world.

1. b and c only
2. b only
3. All a, b and c
4. a and c only

45.

If the gene of interest is cloned at ECoRI in pBR322, the recombinant E-coli after transformation are



1. Susceptible to ampicillin and tetracycline.
2. Sensitive to tetracycline.
3. Resistant to kanamycin.
4. Resistant to ampicillin and tetracycline

46.

In biotechnology transgenic animals are used for

- I. Study of disease.
- II. To obtained human protein.
- III. Vaccine safety for humans.
- IV. To know the carcinogenicity of any chemicals.

1. I, II, III and IV
2. III and IV only
3. I, III and IV
4. I and II only

47.

Find incorrect statement/s w.r.t. sewage treatment

- (a) Primary treatment involves filtration and sedimentation of activated sludge
- (b) 'Flocs' refers to masses of aerobic bacteria associated with fungal filaments to form mesh like structures
- (c) Aerobic treatment continues till the BOD is reduced
- (d) Aerobic bacteria kill other kind of bacteria and fungi present in the activated sludge

1. (b) & (d)
2. (a) & (c)
3. (b) & (c)
4. (a) & (d)

48.

The product has to be subjected through a series of processes before it is ready for marketing as a finished product called down stream processing. It includes

1. Separation
2. Purification
3. Quality control
4. Both 1 & 2

49.

Which of the following genes control the cotton bollworm?

1. cry IAc and cry IIAb
2. cry IIAb and cry IIAC
3. cry IAb and cry IAc

4. cry IAb and cry IIAC

50.

Select the incorrect statement regarding inbreeding:

1. Inbreeding helps in elimination of deleterious alleles from the population

2. Inbreeding is necessary to evolve a pure-line in any animal

3. Continued inbreeding reduces fertility and leads to inbreeding depression.

4. Inbreeding depression cannot be overcome by Out-crossing.

51.

Decline in the population of Indian native fishes due to introduction of *Clarias gariepinus* in river Yamuna can be categorised as

1. Co-extinction

2. Habitat fragmentation

3. Over exploitation

4. Alien species invasion

52.

Which of the following is an innovative remedy for plastic waste ?

1. Burning in the absence of oxygen

2. Burying 500 m deep below soil surface

3. Polyblend

4. Electrostatic precipitator

53.

In mung bean, resistance to yellow mosaic, virus and powdery mildew were brought about by :

1. Mutation breeding

2. Biofortification

3. Tissue culture

4. Hybridization and selection

54.

Given below are four statements pertaining to separation of DNA fragments using Gel electrophoresis. Identify the incorrect statements.

(a) DNA is negatively charged molecule and so it is loaded on gel towards the Anode terminal.

(b) DNA fragments travel along the surface of the gel whose concentration does not affect movement of DNA.

(c) Smaller the size of DNA fragment, larger is the distance it travels through it.

(d) Pure DNA can be visualized directly by exposing to UV radiation.

Choose correct answer from the options given below:

1. (a), (c) and (d)

2. (a), (b) and (c)

3. (b), (c) and (d)

4. (a), (b) and (d)

55.

The biomass available for consumption by the herbivores and the decomposers is called

1. Secondary productivity

2. Standing crop

3. Gross primary productivity

4. Net primary productivity

56.

Which of the following is not one of the prime health risks associated with greater UV radiation through the atmosphere due to the depletion of stratospheric ozone?

1. Reduced Immune System

2. Damage to eyes

3. Increased liver cancer

4. Increased skin cancer

57.

The option incorrect for water hyacinth is

1. Introduced in India because of its beautiful flowers and shape of leaves.

2. Drains oxygen from water, which leads to death of fishes.

3. Found growing wherever there is running water.

4. Grow faster than our ability to remove them.

58.

The Government of India in 1980s has introduced the concept JFM to :-

1. Work closely with the local communities for protecting and managing forests.

2. To control the emission of ozone depleting substances.

3. To take appropriate measures for conservation of biodiversity and sustainable utilisation of its

benefits.

4. To convert forest to agricultural land so as to feed the growing human population.

2. A-i, B-iii, C-iv, D-ii

3. A-ii, B-iii, C-i, D-iv

4. A-iv, B-iii, C-ii, D-i

59.

GPP utilizes _____ of incident radiation

1. 1 - 5%

2. 2 - 10%

3. 0.8 - 4%

4. 1.6 - 8%

63.

Jaya and Ratna are high-yielding semi-dwarf varieties of:-

1. Wheat

2. Rice

3. Wheat and rice respectively

4. Rice and white respectively

60.

Eco-san toilets are not associated with which of the following?

1. Are working in Sri Lanka and Kerala

2. Composting method for recycling of human excreta

3. Recycled material forms natural fertilizer

4. Enhance the need for chemical fertilizers

64.

The entire collection of plants/seeds having all the diverse alleles for all gene in a given crop is called :-

1. Hybrid vigour

2. Germplasm conservation

3. Somaclonal variation

4. Germplasm collection

61.

Choose the correct sequence of greenhouse gases with respect to their relative contribution to global warming in increasing order

1. N_2O , CFC, CH_4 , CO_2

2. CFC, N_2O , CO_2 , CH_4

3. CH_4 , N_2O , CO_2 , CFC

4. N_2O , CO_2 , CH_4 , CFC

65.

Which is not true about PCR (Polymerase Chain Reaction) ?

1. PCR can amplify very small amount of DNA

2. It can be used to detect HIV in suspects

3. Only RNA can be used as primer

4. Used to detect mutation in genes

62.

Match the columns -

Column-I		Column-II
(A) Rosie	(i)	a-1 antitrypsin
(B) ELISA	(ii)	Protein enriched milk
(C) ROP	(iii)	Test to detect antigen or antibody
(D) Emphysema	(iv)	Codes for protein involved in plasmid replication

1. A-ii, B-iii, C-iv, D-i

66.

Modern biotechnology consist:-

1. Microbiology

2. Tissue culture

3. Genetic engineering

4. All the above

67.

Ecology explains us:-

1. How organisms, while remaining as an individual interact with other organisms

2. How organisms, interact with physical habitats as a group

3. As a group how organisms behave like organised wholes that is population community, ecosystem or even as the whole biosphere
4. All of these
68. Bacillus thuringensis is used to control:-
1. Flies
 2. Mosquito
 3. Moth
 4. All the above
69. Formation of wide variety of habitats takes place by:-
1. Types of species inhabiting that area
 2. Types of predation
 3. Regional and local variation of environment conditions
 4. All of the above
70. Which one of the following is not a broadly utilitarian aspect of biodiversity ?
1. Pollination
 2. Climate moderation
 3. Source of Oxygen
 4. Source of medicine
71. Loss of biodiversity in a region may lead to :-
1. Decline in plant production
 2. Lowered resistance to environmental condition such as drought
 3. Increased variability in certain ecosystem process
 4. All
72. How much percent forest cover was recommended for hills by National forest policy (1988) ?
1. 33
 2. 67
 3. 40
 4. 30
73. Biocontrol of crop pests is often based on which of the following interspecific interactions ?
1. Competition
 2. Amensalism
 3. Predation
 4. Commensalism
74. The ecological pyramid of numbers in pond ecosystem is :-
1. Inverted
 2. Upright
 3. May be upright or inverted
 4. First upright then inverted
75. According to Alexander Von Humboldt's species area relationship formula $\log S = \log C + Z \log A$ What does Z show :-
1. Species richness
 2. Regression coefficient
 3. Intercept
 4. Area
76. Polyblend is mixed with ...A... to lay roads in ...B... Complete the given statement by choosing appropriate option for A and B :-
1. A-bitumen; B-Bengaluru
 2. A-carbon; B-Delh
 3. A-plastic; B-Kolkata
 4. A-cement; B-Chennai
77. Which of the following is not included in the "Evil Quartet" (w.r.t. causes of biodiversity loss)
1. Habitat loss and fragmentation
 2. Coevolution
 3. Alien species invasion and co-extinction
 4. Habitat loss and fragmentation
- 78.

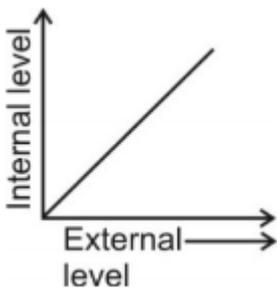
Recovery of healthy plants from diseased plant is possible by

1. Meristem culture
2. Somatic hybridisation
3. Protoplast fusion
4. Callus culture

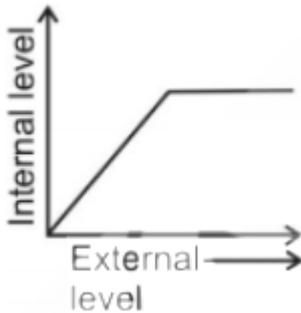
- A. Anthropogenic ecosystem possess self regulatory mechanism
- B. Forest is a natural ecosystem
- C. Estuaries is a terrestrial ecosystem

79.

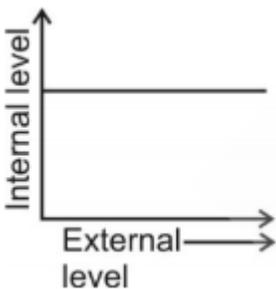
Find out the correct diagrammatic representation of organismic response w.r.t. conformers.



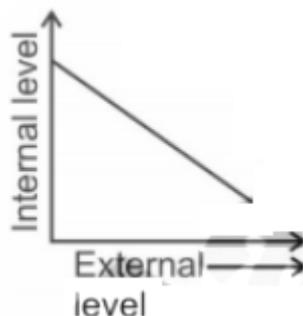
1.



2.



3.



4.

80.

Read the given statements stating true (T) and false (F) and select the correct option.

	A	B	C
1.	T	T	F
2.	F	T	F
3.	F	F	T
4.	T	F	F

81.

The historic convention on biological diversity (The earth summit) held in A in B.

1. A-Rio de Janeiro, B-1992
2. A-Johannesburg, B-2002
3. A-Rio de Janeiro, B-2002
4. A-Johannesburg, B-1992

82.

Biomagnification will be maximum among which of the given trophic level in an aquatic ecosystem?

1. T₁
2. T₂
3. T₃
4. T₄

83.

Which step proved to be the main challenging obstacle in the production of human insulin by genetic engineering?

1. Removal of C-peptide from active insulin
2. Getting polypeptides assembled into mature form
3. Addition of C-peptide to pro insulin
4. Splitting A and B polypeptide chains

84.

Which of the following are not given any place in ecological pyramids

1. Primary producers
2. Primary consumers
3. Top carnivores
4. Saprophytes

85.

Find the odd one out w.r.t. off-site conservation

1. Botanical gardens
2. Zoological parks
3. National parks
4. Seed banks

86.

An improved breed of cattle is

1. Leghorn
2. Jersey
3. Hisardale
4. Mule

87.

In an interaction, between two species, one species is harmed and other species is benefitted. This relationship can be indicated by

1. Commensalism
2. Predation
3. Competition
4. Both 2 and 3

88.

In grassland ecosystem the pyramid of biomass and energy will be A and B respectively.

Choose the correct option to fill the blanks A and B.

A B

1. Upright Upright
2. Upright Inverted
3. Inverted Upright
4. Inverted Inverted

89.

If a foreign gene is inserted

into pBR322 by using restriction enzyme BamHI, the selection process, for identifying recombinants requires plating on all **except**

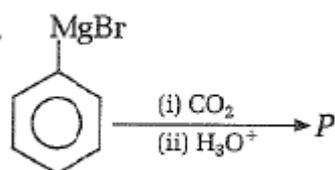
1. Ampicillin rich medium
2. Tetracycline rich medium
3. X-gal rich medium
4. Nutrient medium without antibiotics

90.

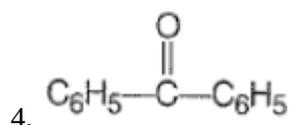
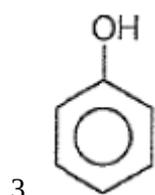
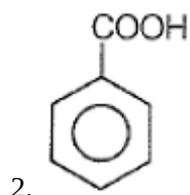
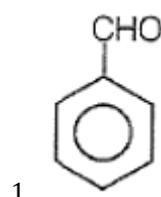
If any protein-encoding gene is expressed in a heterologous host, it is termed as

1. Recombinant protein
2. Single-cell protein
3. Humulin
4. Transposon

91.



In the above reaction product, 'P' is



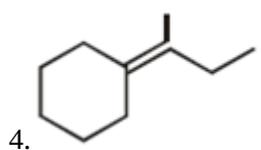
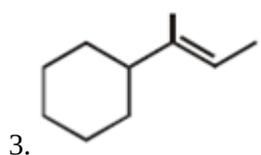
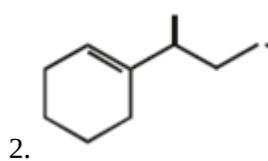
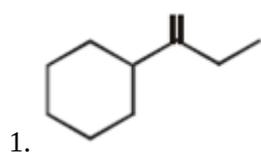
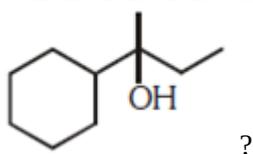
92. The compound which does not react with sodium is:

1. $\text{CH}_3\text{CHOHCH}_3$
2. $\text{CH}_3\text{—O—CH}_3$
3. CH_3COOH
4. $\text{C}_2\text{H}_5\text{OH}$

93. Vanillin, used as a flavouring agent is:

1. an aliphatic alcohol
2. an aromatic aldehyde
3. a hydrocarbon
4. a carbohydrate

94. Which of the following is not the product of dehydration of



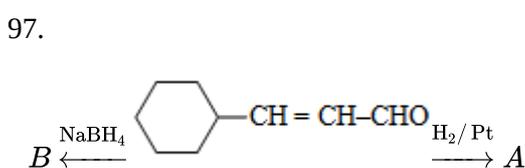
95. The electrolytic reduction of nitrobenzene in strongly acidic medium produces

1. p-aminophenol
2. azoxybenzene

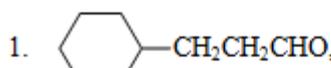
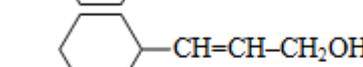
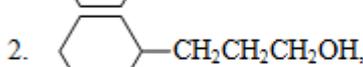
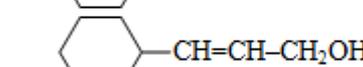
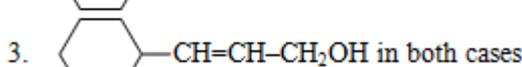
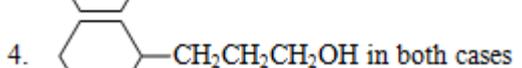
3. azobenzene
4. aniline

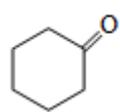
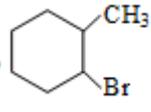
96. Among the following, the narrow spectrum antibiotic is:

1. chloramphenicol
2. penicillin G
3. ampicillin
4. amoxicillin

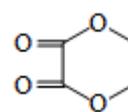
97. 

A and B are-

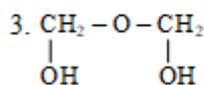
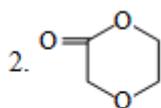
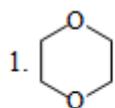
1. , 
2. , 
3.  in both cases
4.  in both cases

98.  is converted to  by-

1. (i) $\text{CH}_3\text{—MgI}$, H_3O^+ (ii) H_2SO_4 , Δ (iii) HBr , R_2O_2
2. (i) $\text{CH}_3\text{—MgI}$, H_3O^+ (ii) H_2SO_4 , Δ (iii) HBr
3. (i) $\text{CH}_3\text{—MgI}$, H_3O^+ (ii) HBr
4. (i) HBr , R_2O_2 (ii) $\text{CH}_3\text{—MgI}$, H_3O^+

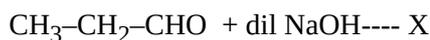
99. 
Oxalic acid + A \rightarrow

hence A $\xrightarrow{\text{conc. H}_2\text{SO}_4}$ B, B is-

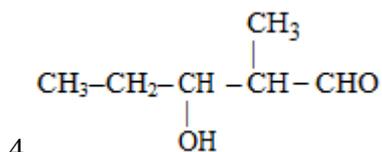
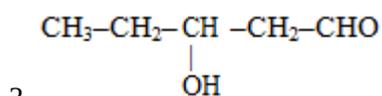
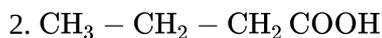


4. None of these

100.

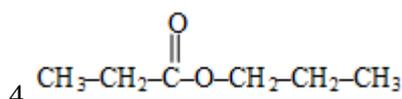
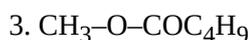
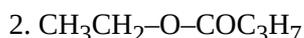
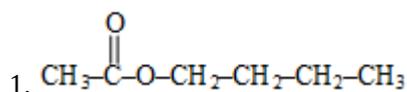


The product in the above reaction is



101.

A sweet smelling ester, with molar mass 116, on hydrolysis produces a carboxylic acid and an alcohol. Alcohol give positive iodoform reaction which of the following formula could correspond to above statements -



102.

Which of the following is an elastomer ?

1. Vulcanized rubber

2. Dacron

3. Polystyrene

4. Melamine

103.

Which of these is a hypnotic?

1. Metaldehyde

2. Acetaldehyde

3. Paraldehyde

4. None of these

104.

Sulpha drugs are use for

1. Removing bacteria

2. Precipitating bacteria

3. Stopping the growth of bacteria

4. Decreasing the size of bacteria

105.

Which of the following alkyl halide is used as a ethylating agent?

1. CH_3I

2. $\text{C}_2\text{H}_5\text{Cl}$

3. $\text{C}_2\text{H}_4\text{Br}_2$

4. $\text{C}_2\text{H}_5\text{OH}$

106.

Which one of the following gases is liberated when ethyl alcohol is heated with methyl magnesium iodide?

1. Methane

2. Ethane

3. Carbon dioxide

4. Propane

107.

Which of the following alcohols is expected to have the lowest pKa value ?

1. Ethanol

2. 2-Fluoro ethanol

3. 2,2,2-Trifluoroethanol

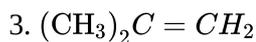
4. 2-Chloroethanol

108.

What is the structure of the compound, C_4H_8 , which when treated with $\text{H}_2\text{O}/\text{H}_2\text{SO}_4$ gives $\text{C}_4\text{H}_{10}\text{O}$ which is optically inactive?

1. $\text{CH}_3\text{CH}_2\text{CH} = \text{CH}_2$

2. $\text{CH}_3\text{CH} = \text{CHCH}_3$



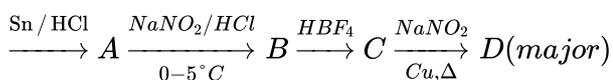
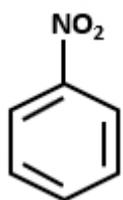
109.

Which of the following carbonyl compounds is most reactive towards nucleophilic addition reaction?

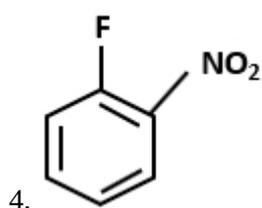
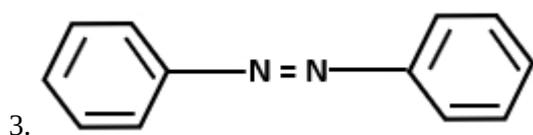
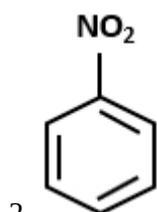
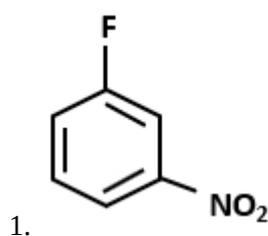
1. Benzaldehyde
2. p-tolualdehyde
3. p-nitrobenzaldehyde
4. Acetophenone

110.

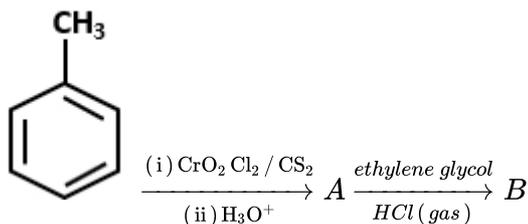
Consider the following reaction sequence



Major product D is



Consider the following reaction sequence.

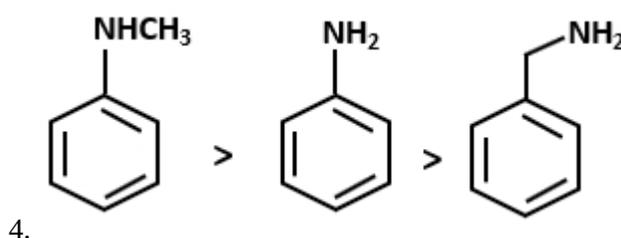
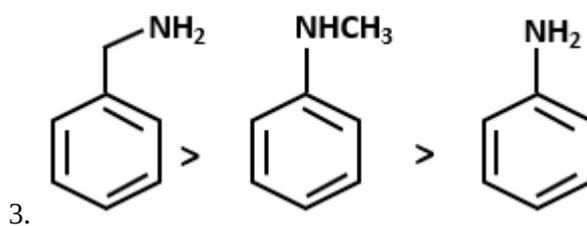
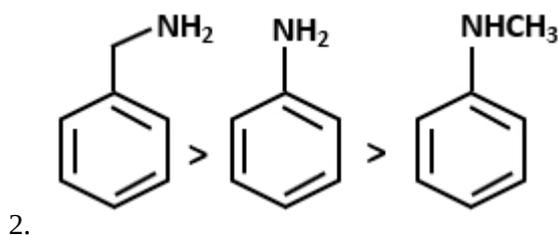
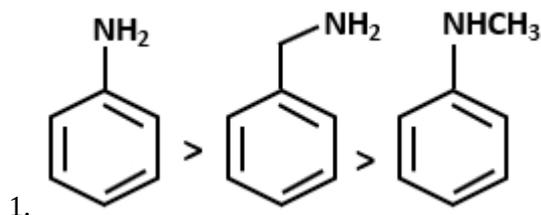


Product B is

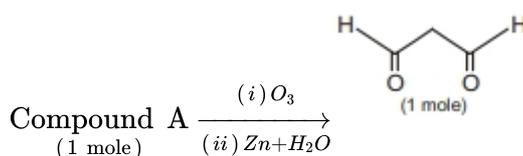
1. Ester
2. Acetal
3. Ketal
4. Lactone

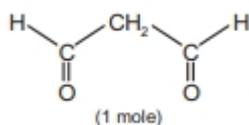
112.

The correct order of basic strength of the given compound is



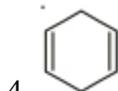
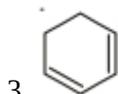
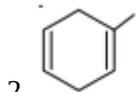
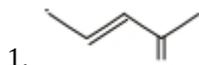
113.





+

Compound A can be



114.

$\text{CH}_3\text{CH}_2\text{CO}-\text{NH}_2$ can be converted to $\text{CH}_3\text{CH}_2\text{NH}_2$ in presence of

1. LiAlH_4
2. H_2/Pt
3. Sn/HCl
4. NaOBr/OH^-

115.

Which of the following polymer is addition as well as copolymer?

1. PHBV
2. PVC
3. Buna-S
4. Neoprene

116.

Cetyltrimethyl ammonium bromide is an example of

1. Artificial sweetener
2. Cationic detergent
3. Soap
4. Anionic detergent

117.

Grignard reagent added to methanal followed by hydrolysis to give

1. Primary alcohol
2. Tertiary alcohol
3. Methane
4. Methanoic acid

118.

Which of the following does not give HVZ reaction?

1. Butyric acid
2. Acetic acid
3. Benzoic acid
4. Phenylacetic acid

119.

The strongest acid among the following is

1. CH_3COOH
2. $\text{C}_6\text{H}_5\text{COOH}$
3. $\text{C}_6\text{H}_5\text{OH}$
4. $\text{C}_2\text{H}_5\text{COOH}$

120.

Benzoic acid on heating with soda lime gives

1. Phenol
2. Benzene
3. Salicylic acid
4. Soda ash

121.

Which of the following gives pink colour with Schiff's reagent?

1. CH_3CHO
2. $\text{CH}_3\text{CH}_2\text{COOH}$
3. $\text{C}_3\text{H}_5\text{COOH}$
4. $\text{C}_6\text{H}_5\text{COC}_6\text{H}_5$

122.

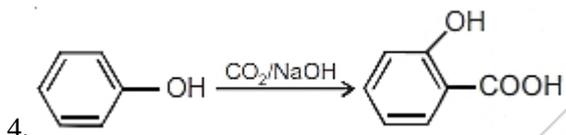
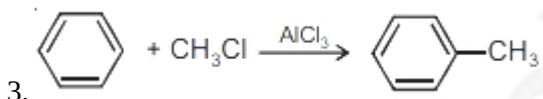
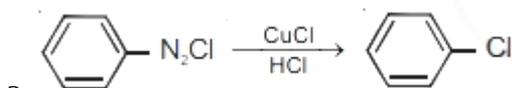
In which case formation of butane nitrile is possible?

1. $\text{C}_3\text{H}_7\text{Br} + \text{KCN}$
2. $\text{C}_4\text{H}_9\text{Br} + \text{KCN}$
3. $\text{C}_3\text{H}_7\text{OH} + \text{KCN}$

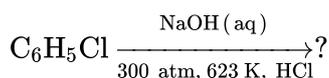


123.

Which of the following is called Sandmeyer's reaction?



124.

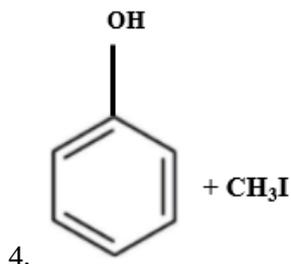
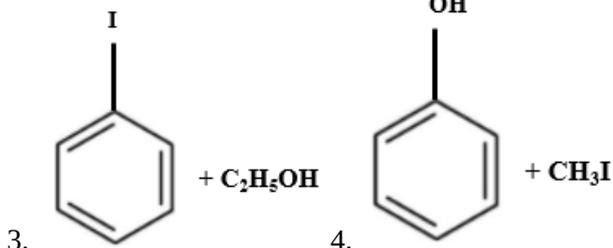
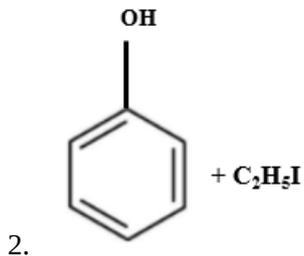
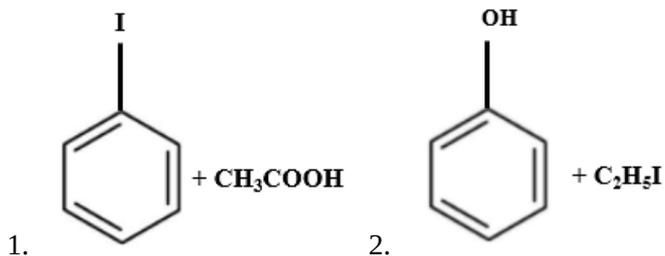


The product will be

1. Phenol
2. Benzol
3. Sodium benzoate
4. Benzal

125.

Anisole on cleavage with HI gives:



126.

The melting point is highest for

1. primary amines
2. secondary amines
3. tertiary amines
4. quaternary amines

127.

Which amine of the following will not give carbylamine reaction?

1. ethylamine
2. dimethylamine
3. methylamine
4. phenylamine

128.

Benzoyl chloride is prepared from benzoic acid by

1. Cl_2, hv
2. SO_2
3. $SOCl_2$
4. Cl_2, H_2O

129.

Oxalic acid when reduced with zinc and H_2SO_4 gives

1. glycol
2. glyoxal
3. glyoxalic acid
4. glycolic acid

130.

The reactivity order of halides for dehydrohalogenation is

1. $R-F > R-Cl > R-Br > R-I$
2. $R-I > R-Br > R-Cl > R-F$
3. $R-I > R-Cl > R-Br > R-F$
4. $R-F > R-I > R-Br > R-Cl$

131.

On warming with silver powder, chloroform is converted into

1. hexachloroethane
2. acetylene
3. ethylene

4. carbon
132. Chloroform is slowly oxidized by air in the presence of light and air to form
1. phosgene
 2. formyl chloride
 3. formaldehyde
 4. trichloroethanol
133. Which of the following compounds gives a positive iodoform test?
1. 2-phenylethanol
 2. pentanal
 3. 3-pentanol
 4. 1-phenylethanol
134. Toluene when refluxed with Br_2 in the presence of light mainly gives
1. p-bromotoluene
 2. benzyl bromide
 3. o-bromotoluene
 4. mixture of o- and p-bromotoluene
135. Toluene on reaction with *N*-Bromosuccinimide gives
1. phenyl bromomethane
 2. o-bromomethyl benzene
 3. p-bromomethyl benzene
 4. m-bromomethyl benzene
136. In Young's double slit experiment the light emitted from source has $\lambda = 6.5 \times 10^{-7}$ m and the distance between the two slits is 1 mm. Distance between the screen and slits is 1 metre. Distance between third dark and fifth bright fringe will be -
1. 3.2 mm
 2. 1.63 mm
 3. 0.585 mm
 4. 2.31 mm
137. An element X decays, first by positron emission and then two α -particles are emitted in successive radioactive decay. If the product nuclei has a mass number 229 and atomic number 89, the mass number and atomic number of element X are
1. 237,93
 2. 237,94
 3. 221,84
 4. 237,92
138. 90% of a radioactive sample is left undecayed after time t has elapsed. What percentage of the initial sample will decay in a total time $2t$?
1. 20%
 2. 19%
 3. 40%
 4. 38%
139. An electron in a hydrogen atom makes a transition from first excited state to ground state. The equivalent current due to circulating electron
1. increases 2 times
 2. increases 4 times
 3. increases 8 times
 4. remains the same
140. Zener breakdown will occur if :
1. Impurity level is low
 2. Impurity level is high
 3. Impurity is less in n-side
 4. Impurity is less in p-side
141. A man is 180 cm tall and his eyes are 10 cm below the top of his head. In order to see his entire height from toe to head, he uses a plane mirror kept at a distance from him. The minimum length of the plane mirror required is -
1. 180 cm
 2. 90 cm

3. 85 cm
4. 170 cm

142.

A fish is a little away below the surface of a lake. If the critical angle is 49° , then the fish could see things above the water surface within an angular range of θ° where

1. $\theta = 49^\circ$
2. $\theta = 90^\circ$
3. $\theta = 98^\circ$
4. $\theta = 24\frac{1}{2}^\circ$

143.

In the Young's double slit experiment, the ratio of intensities of bright and dark fringes is 9. This means that

1. The intensities of individual sources are 5 and 4 units respectively
2. The intensities of individual sources are 4 and 1 units respectively
3. The ratio of their amplitudes is 3
4. The ratio of their amplitudes is 6

144.

The transition from the state $n = 3$ to $n = 1$ in a hydrogen like atom results in ultraviolet radiation. Infrared radiation will be obtained in the transition from :

1. $4 \rightarrow 2$
2. $4 \rightarrow 3$
3. $2 \rightarrow 1$
4. $3 \rightarrow 2$

145.

The reverse bias in a junction diode is changed from 5V to 15V then the value of current changes from $38\mu\text{A}$ to $88\mu\text{A}$. The resistance of junction diode will be:

1. $4 \times 10^5 \Omega$
2. $3 \times 10^5 \Omega$
3. $2 \times 10^5 \Omega$
4. $10^6 \Omega$

146.

In an NPN transistor amplifier if 98% of electrons emitted from the emitter reach the collector, then the value of collector current for base current of $40\mu\text{A}$ will be-

1. 1.96 mA
2. 1.92 mA
3. 1.96 A
4. 1.92 A

147.

If one photon has 25 eV energy and work function of material is 7 eV, then value of stopping potential will be-

1. 32 V
2. 18 V
3. 3.3 V
4. Zero

148.

A glass sphere ($\mu = \frac{3}{2}$) of radius 12 cm has a small mark at a distance of 3 cm from its centre. Where this mark will appear when it is viewed from the side nearest to the mark along the line joining the centre and the mark ?

1. 8 cm inside the sphere
2. 12 cm inside the sphere
3. 4 cm inside the sphere
4. 3 cm inside the sphere

149.

The ratio of de-Broglie wavelengths of a proton and an alpha particle moving with the same velocity is

1. 1
2. 2
3. 4
5. 0.25

150.

In Young's double-slit experiment using the light of wavelength ' λ ', 60 fringes are seen on a screen. If the wavelength of light is decreased by 50%, then the number of fringes on the same screen will be

1. 30
2. 60
3. 120

4. 90

151.

The polarising angle for the material is 60° , then the refractive index of a material is

1. $\frac{1}{\sqrt{3}}$
2. $\frac{3}{2}$
3. $\sqrt{3}$
4. $\frac{\sqrt{3}}{2}$

152.

In Y.D.S.E., the ratio of maximum intensity at a point to the intensity at same point when one slit is closed:

1. 2
2. 3
3. 4
4. 1

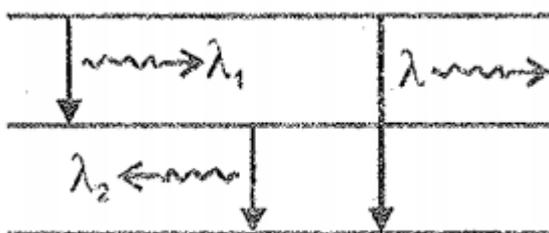
153.

The angular momentum of an electron in H-atom is $\frac{h}{\pi}$, where h is Planck's constant. The kinetic energy of the electron is

1. 13.6 eV
2. 3.4 eV
3. 6.8 eV
4. 27.2 eV

154.

In the diagram shown below, two atomic transitions are shown. If $\lambda_1 = 3000 \text{ \AA}$ and $\lambda_2 = 6000 \text{ \AA}$, then λ will be -



1. 2000 \AA
2. 4000 \AA

A

3. 4500 \AA

4. 9000 \AA

155.

If the half-life of a radioactive substance is 10 hours, then its mean life is

1. 14.4 h
2. 7.2 h
3. 20 h
4. 6.93 h

156.

After two alpha decays and four beta(-ve) decays, the atomic number

1. Decreases by 4 and mass number remains same
2. Remains the same but the mass number increases by 4
3. Remains same but mass number decreases by 8
4. Increases but mass number remains same

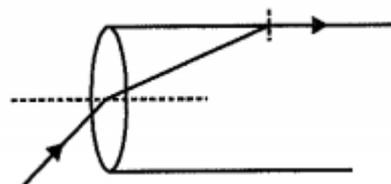
157.

Activity of a radioactive substance decays from 8000 becquerel to 4000 becquerel in 5 days. Activity of the substance after next 10 days will be

1. 500 becquerel
2. 1500 becquerel
3. 2000 becquerel
4. 1000 becquerel

158.

A cylindrical solid rod made up of material of refractive index $\frac{2}{\sqrt{3}}$ is given. A light beam enters from one circular end of the cylinder, and comes out just brushing the outer surface along the length. What should be the angle of incidence on the circular face?



1. $\sin^{-1}\left(\frac{1}{2}\right)$

2. $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

3. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

4. $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$

159.

The magnification of a compound microscope for the final image at least distance of distinct vision is 90. Magnification of objective lens is 15. The value of focal length of eyepiece will be

1. 5 cm
2. 6 cm
3. $\frac{1}{6}$ cm
4. 12 cm

160.

When an object is placed at 10 cm and 30 cm from a convex lens, images obtained are of same magnitude of magnification. The focal length of the lens may be

1. 10 cm
2. 15 cm
3. 20 cm
4. 25 cm

161.

One of the refracting surfaces of a prism is silvered. A ray is incident at an angle 60° , such that it retraces its path. The angle of the prism is-

- $(\mu = \sqrt{3})$
1. 30°
 2. 45°
 3. 60°
 4. 75°

162.

Focal length of a glass ($\mu = 1.5$) lens in air is 20 cm. If it is dipped in water ($\mu = \frac{4}{3}$), its focal length in water will be-

1. 80 cm
2. 40 cm

3. 60 cm

4. 20 cm

163.

When a concave mirror of focal length f is immersed in water, its focal length becomes f' , then

1. $f' = f$
2. $f' < f$
3. $f' > f$
4. The information is insufficient to predict

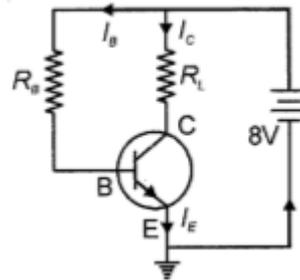
164.

Two convex lenses of focal lengths 10 cm and 30 cm are kept in contact. Then the correct statement is

1. Effective focal length is 15 cm
2. Effective focal length is 7.5 cm
3. Combination behaves like divergent lens
4. All of these

165.

A n-p-n transistor operates in a common emitter mode as shown. Given that $I_C = 4$ mA, $V_{CE} = 4$ V, $V_{BE} = 0.6$ V and $\beta_{dc} = 100$. The value of R_L is



1. $1\text{ k}\Omega$
2. $2\text{ k}\Omega$
3. $3\text{ k}\Omega$
4. $4\text{ k}\Omega$

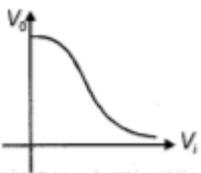
166.

The variation of output potential V_0 with input potential (V_i) in a transistor in CE-mode can be best represented as

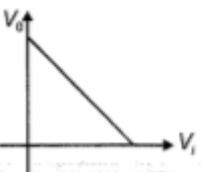
1.



2.



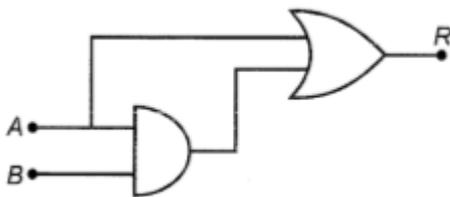
3.



4.

167.

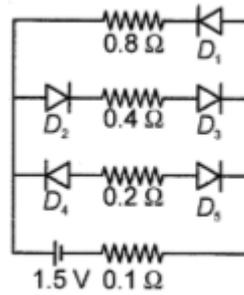
A combination of logic gates is shown in the circuit. If A is at 0 V and B is at 5 V, then the potential of R is



1. 0 V
2. 5 V
3. 10 V
4. Any of these

168.

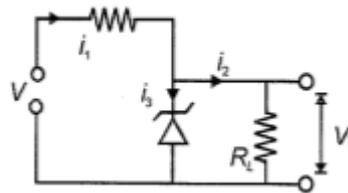
Five diodes and three resistors are connected along with a cell of emf 1.5 V and internal resistance 0.1Ω as shown. The current drawn from the cell is (diodes are ideal).



1. 3 A
2. 0.3 A
3. 5 A
4. 0.5 A

169.

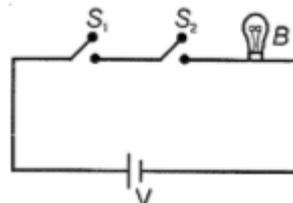
A Zener diode is used to obtain a constant voltage. If applied voltage V changes, then (V is more than Zener voltage)



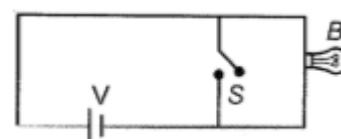
1. i_1 and i_2 change
2. i_2 and V_0 change and i_3 is constant
3. i_2 and V_0 don't change while i_3 changes
4. i_3 and V_0 don't change while i_2 changes

170.

Which one of the following represents analog circuit diagram for OR gate ?

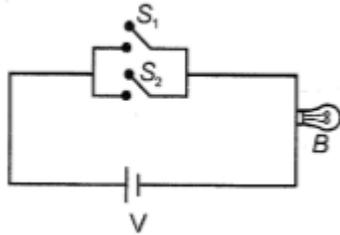


1.

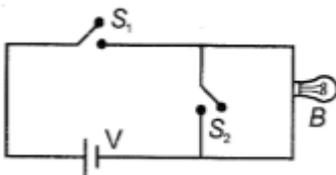


2.

3.



4.



171.

The frequency of incident light falling on a metal plate is doubled. The maximum kinetic energy of the emitted photoelectron is

- 1 Unchanged
- 2 Doubled
- 3 More than double
- 4 Less than double

172.

What is the value of the de-Broglie wavelength of an electron when it is accelerated from rest through a potential difference of 150 V?

1. 0.5 \AA
2. 1.0 \AA
3. 1.5 \AA
4. 2.0 \AA

173.

When a point source of light is at 2 m from a photoelectric cell, the saturation current is 1.5 mA. If the same source is kept at a distance of 1 m from the cell, the saturation current will be

1. 1.5 mA
2. 2.5 mA
3. 4.5 mA
4. 6.0 mA

174.

The saturation photoelectric current depends on

1. Frequency of photon
2. Wavelength of photon
3. Intensity of photon
4. Stopping potential

175.

When monochromatic photons of wavelength 4000 \AA are incident on metal plate of work function 2.1 eV, the stopping potential for the photo current is-

1. 1 V
2. 2.1 V
3. 3.1 V
4. Zero

176.

The de-Broglie wavelength of an electron in the second orbit of hydrogen atom is equal to-

1. Perimeter of the orbit
2. Half of the perimeter of the orbit
3. Half of the diameter of the orbit
4. Diameter of the orbit

177.

The LED

1. Is reverse biased
2. Is forward biased
3. Can be made of GaAs
4. Both (2) & (3) are correct

178.

If the kinetic energy of the electron doubles, its de-Broglie wavelength changes to the factor

1. $\frac{1}{\sqrt{2}}$
2. $\sqrt{2}$
3. $\frac{1}{2}$
4. 2

179.

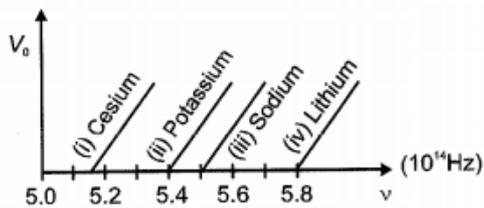
Stopping potential in photoelectric experiment for a given metal surface

1. Increases with increase of wavelength

2. Increases with increase of frequency
3. Increases with increase of intensity
4. All of these

180.

The figure shows different graphs between stopping potential V_0 and frequency ν for photosensitive surface of cesium, potassium, sodium and lithium. The plots are parallel. Which of the following about their work function is correct?



1. (i) > (ii) > (iii) > (iv)
2. (i) > (iii) > (ii) > (iv)
3. (iv) > (iii) > (ii) > (i)
4. (i) = (iii) > (ii) = (iv)

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