1.

After karyogamy followed by meiosis, spores are produced exogenously in

(1) Neurospora

(2) Saccharomyces

(3) Agaricus

(4) Alternaria

2.

Which one of the following plants is monoecious?

(1) Marchantia

(2) Pinus

(3) Cycas

(4) Papaya

3.

The phylum which was earlier considered as a subphylum under chordata but now placed as a separate phylum, in non-chordates is

(1) Urochordata

(2) Hemichordata

(3) Cephalochordata

(4) Vertebrata

4.

Which of the following is correct?

1. All slime moulds are haploid.

2. protozoans lack cell wall.

3. Dinoflagellates are non-motile

4. Pellicle is absent in Euglena

5.

Which of the following statement is incorrect regarding bryophytes?

1. They are dependent on water for sexual reproduction.

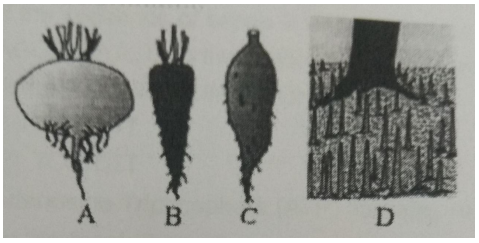
2. The main plat body is diploid

3. They usually occur in damp, humid and shaded localities.

4. They play an important role in plant succession on bare rocks.

6.

Which of the following incorrect about A, B, C and D?



(1) Tap roots of carrot, turnip and adventitious root of sweet potato get swollen and store food.

(2) Pneumatophores help of get oxygen for respiration

(3) Pneumatophores are found in the plants that grow in sandy soil

(4) A, B and C are underground roots but D grows vertically upwards

7.

Study the following statements and choose the correct option.

I. Buds are present in the axil of leaflets of the compound leaf.

II. pulvinus leaf-base is present in some leguminous plants.

III. In Alstonia, the petioles expand, become green and synthesize food.

IV. Opposite phyllotaxy is seen in guava.

(1) II and IV are correct but I and III are wrong

(2) I and III are correct but II and IV are wrong

(3) I and IV are correct but II and III are wrong

(4) II, III and IV are correct but I is wrong

8.

Cell junctions like tight, adhering and gap junctions are mainly present between the neighbouring cells of

(1) Neural tissue

(2) Connective tissue

(3) Muscular tissue

(4) Epithelial tissue

9.

The feature which is common to both heartwood and sapwood is

1. Both are the regions of secondary xylem

2. Both are involved in the conduction of water.

3. Both comprise dead elements with accumulation of aromatic compounds.

4. Both are located in the central layers of the stem.

10.

The statement Omnis cellula e cellula, which means all cells arise from pre-existing cells was given by

(1) Rudolf Virchow

(2) Schleiden

(3) Robert Brown

(4) Anton von Leeuwenhoek

11.

All chromosomes of a cell are directed towards one side and are attached to the nuclear membrane, can be observed in

(1) Leptotene

(2) Zygotene

(3) Pachytene

(4) Diplotene

12.

Supply of excess fertilizer and watering of a grass lawn causes browning of grass leaves due to

(1) Osmosis and death of root

(2) Water-logging of soil

(3) Leaching of fertilizer to lower soil strata

(4) Decreased photosynthesis

13.

Deficiency of which element causes the deficiency of nitrogen

(1) Mo

(2) K

(3) Mn

(4) S

14.

The synthesis of one molecule of glucose during the Calvin cycle requires.

(1) 12 molecules of ATP and 18 molecules of $NADPH_2$

(2) 6 molecules of ATP and 12 molecules of $NADPH_2$

(3) 18 molecules of ATP and 12 molecules of $NADPH_2$

(4) 12 molecules of each of ATP and $NADPH_2$

15.

Interphase is called the resting phase because

1. It is the most active phase of the cell cycle

2. There is no apparent activity related to the cell division.

3. It does not prepare cell for cell division.

4. It is the phase where cell rests before entering into mitosis.

16.

When a cell is placed in a solution whose osmotic concentration is equal to cell sap then

1. Water moves inside the cell.

2. Water moves outside the cell.

3. No net movement of water occurs.

4. Cell will be plasmolysed

17.

When two molecules of glucose is completely oxidized in aerobic respiration. How many ATP generated through $FADH_2$

(1) 6

(2) 15

(3) 8

(4) 4

18.

Which of the following is a modification of mucosa of alimentary canal?

(1) Villi

(2) Microvilli

(3) Rugae

(4) All of these

19.

Diaphragm is a domeshaped muscular structure which separates

(1) Coelomic cavity from pelvic cavity

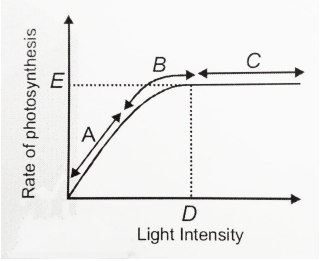
(2) Pleural cavity from thoracic cavity

(3) Thoracic cavity from the abdominal cavity

(4) Pelvic cavity from abdominal cavity

20.

Choose the correct labelling for given figure



1. D-saturation point, E-Maximum photosynthesis.

2. A-achieved at high light intensity.

3. D-10% of total sunlight, E-Compensation point.

4. A-light saturation at 10% of total sunlight.

21.

Nerve fibre gets depolarized when it acquires

(1) positive charges on inner side

(2) positive charges on outer side

(3) negative charges on inner side

(4) Na^+ *and* K^+ from outside

22.

Which of the following hormone is formed in hypothalamus?

(1) Adrenalin

(2) Oxytocin

(3) Insulin

(4) Thyroxine

23.

In monoecious plant like castor and maize

(1) Autogamy and allogamy are not prevented

(2) Geitonogamy is prevented

(3) Autogamy is not prevented

(4) Geitonogamy is not prevented

24.

The main cause of the disintegration of the endometrial lining

(1) LH surge

(2) Degeneration of corpus luteum

(3) Ovulation during mid-cycle

(4) Implantation leads to pregnancy

25.

Physical, psychomotor and mental development is retorted in an individual affected with

(1) Down's syndrome

(2) Sickle cell-anaemia

(3) Turner's syndrome

(4) Colour blindness

26.

Which one of the following statement is correct/

1. The medullary zone of kidney is divided into a few conical masses called medullary pyramids projecting into calyces.

2. Inside the kidney the cortial region extends in between the medullary pyramids as renal pelvis.

3. glomerulus along with Bowman's capsule is called the renal corpuscle.

4. Renal corpuscle, proximal convoluted tubule (PCT) and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of kidney.

27.

In protein synthesis process maximum ambiguously of genetic code is present when genetic code is:-

(1) Singlet

(2) Doublet

(3) Triplet

(4) Quadraplet

28.

Mark the correct match

(1) Secondary consumer - Zooplankton

(2) Primary coloniser - Viruses

(3) Nanoecosystem - Valley and forest

(4) Omnivores - Cockroaches, Crows

29.

An example of protein with quaternary structure is

1. Myoglobin

2. Hemoglobin

3. Keratin

4. All of these

30.

In case of snake bite the injection which is given to patient is example of -

(1) passive immunity

(2) active immunity

(3) both (1) and (2)

(4) natural immunity

31.

Inspiration occurs when intra-pulmonary pressure is

1. Higher than atmospheric pressure

2. Lower than atmospheric pressure.

3. Equal to atmospheric pressure.

4. Zero compared to atmospheric pressure.

32.

The most toxic nitrogenous waste excreted by many bony fishes, aquatic amphibians and aquatic insects is

1. Ammonia

2. Urea

3. Uric acid

4. Both (2) and (3)

33.

Adenohypophysis in humans consists of two portions

1. Pars distalis and Pars nervosa

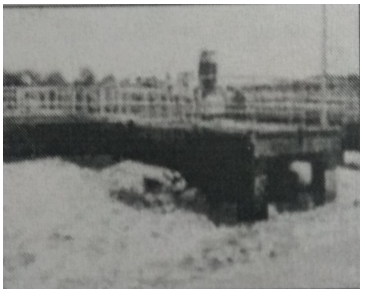
2. Pars intermedia and Pars distalis

3. Pars nervosa and Pars intermedia

4. Anterior and posterior pituitary.

34.

Identify the stage of sewage treatment shown below.



(1) Primary treatment

(2) Secondary treatment

(3) Tertiary treatment

(4) Filtration and sedimentation

35.

Which one of the following statements is correct?

1. Sporogenous tissue is haploid

2. Endothecium produces the microspores.

3. Tapetum nourishes the developing pollen

4. Hard outer layer of the pollen is called intine.

36.

In nature, a given habitat has enough resources to support a maximum possible number, beyond which no further growth is possible. This characteristic feature of nature is known as

(1) Biotic potential

(2) Carrying capacity

(3) Natural selection

(4) Homeostasis

37.

The affected individuals are short saturated in disorders like

1. Turner's syndrome, phenylketonuria

2. Down's syndrome, Turner's syndrome

3. Klinefelter's syndrome, Down's syndrome

4. Turner's syndrome, Klinefelter's syndrome

38.

Select incorrect statement regarding greater biological diversity in tropics

(A) Tropical latitudes have remained relatively undisturbed for millions of years and thus had a long evolutionary time for species diversification.

(B) Tropical environments are more seasonal and less predictable than temperatures.

(C) There is more solar energy available which contributes to lugher productivity.

(1) (A) & (B)

(2) Only (B)

(3) (B) & (C)

(4) Only (A)

39.

Which is not an effect of global warming

(1) more extreme weather condition

(2) melting of polar ice caps

(3) Rise of sea level

(4) Good fungal growth in soil

40.

Which of the following protein product has been used to treat emphysema?

1. α - lactalbumin

2. TPA

3. α - 1 - antitrypsin

4. C-peptide

41.

See the given step that are related to plant breeding:

a. Selection and testing of hybrid

b. Selection of parents

c. Germplasm collection

d. Crossing among selected parents

e. Testing and release of new cultivars.

1. b → c → d → e → a

2. c → b → d → a → e

3. c → b → a → d → e

4. a → b → c → d → e

42.

Match column-I with column-II and choose correct option

Column-I	**Column-II**
a. Aestivation	i. Over wintering
b. Hibernation	ii. Over summer
c. Diapause	iii. Suspended development in zooplanktons

1. a(i), b(ii), c(iii)

2. a(i), b(iii), c(ii)

3. a(ii), b(i), c(iii)

4. a(iii), b(i), c(ii)

43.

More conservative and scientifically sound estimate made by Robert May places the global species diversity at about

1. 1.5 million

2. 7 million

3. 1.7 million

4. 17 million

44.

The wider part of the fallopian tube is

1. Infundibulum

2. Isthmus

3. Ampulla

4. Cervix

45.

Stanley Miller had put the Oparin-Haldane theory to test in 1953 by creating in the laboratory, the probable conditions on the primitive earth. In the experiment simple amino acids were synthesized from which of the following mixtures, as observed after eighteen days?

1. H_2, O_2, N_2 and H_2O

2. CH_4, CN, H and O_2

3. H_2, NH_3, CH_4 and water vapour

4. NH_3, CH_4 and O_2

46.

The parts of nephron situated in cortical region of kidney are

(1) Loop of Henle, PCT and collecting duct

(2) Collecting duct, PCT and malpighian corpuscle

(3) PCT, DCT and Loop of Henle

(4) PCT, DCT and Malpighian corpuscle

47.

Identify the gene and its protein that controls corn borer from the given options

1. cry I Ab and cry I Ab

2. cry I Ac and cry I Ab

3. cry II Ab and cry II Ab

4. cry I Ac and cry I Ac

48.

What do A, B and C represent in the given scientific name respectively?

Mangifera Indica Linn

C B A

(1) Generic name, specific name and author's name

(2) Specific name, generic name and author's name

(3) Author's name, specific name and generic name

(4) Generic name, author's name and specific name

49.

The theory of spontaneous generation says that

(1) Life originated from the decaying and rotting matter like straw, mud etc.

(2) Life came on the earth from outer space

(3) Life comes from pre-existing life only

(4) Life started with the replication of self replicating metabolic capsules

50.

Select the correct statement w.r.t mango and coconut

(1) They develop from monocarpellary superior ovaries.

(2) They develop from monocarpellary inferior ovaries.

(3) They have fibrous epicarp.

(4) They have fleshy edible mesocarp.

51.

What is the function of lateral meristem?

(1) It gives rise to the lateral branches.

(2) It increase girth of the plant axis.

(3) It increases girth as well as length of the plant axis.

(4) It increases only length of the plant axis.

52.

If the initial amount of DNA is 8 C, then after S phase the amount of DNA would be

(1) 4 C

(2) 8 C

(3) 64 C

(4) 16 C

53.

Which group of animals belong to the same phylum?

(1) Earthworm, Pinworm, Tapeworm

(2) Prawn, Scorpion, Locusta

(3) Sponge, Sea anemone, Starfish

(4) Malarial parasite, Amoeba, Mosquito

54.

Enzymes catalyse biochemical reactions by

(1) Lowering the activation energy

(2) Increasing the activation energy

(3) Establishing stable bonds with substrate

(4) Increasing temperature

55.

Which substances when present in high level can activate the chemosensitive area present adjacent to rhythm centre?

(1) CO_2 *and* O_2

(2) HCO_3^- *ions and* O_2

(3) CO_2 *and* H^+ *ions*

(4) H^+ *ions and* HCO_3^-

56.

In which segment of the nephron, reabsorption is minimum?

(1) Proximal convoluted tubule (PCT)

(2) Distal convoluted tubule (DCT)

(3) Ascending limb of loop of Henle

(4) Both (1) & (2)

57.

The association areas are not responsible for

(1) Intersensory associations

(2) Communication

(3) Regulation of sexual behaviour

(4) Memory

58.

Sickle cell-anaemia disorder arises due to

(1) Duplication of a segment of DNA

(2) Substitution in a single base of DNA

(3) Deletion of a segment of DNA

(4) Duplication in a base pair of RNA

59.

Mark the incorrect option w.r.t. lac operon

(1) is under positive as well as negative control

(2) controls catabolic pathway

(3) shows feed back repression

(4) Discovered by Jacob and Monod

60.

In DNA fingerprinting, detection of hybridized DNA

(1) Electrophoresis

(2) Blotting

(3) Autoradiography

(4) Centrifugation

61.

Baculoviruses are/have

(1) Pathogens that attack insects and other arthropods

(2) Members of genus Nucleopolyhedrovirus that are never used as biocontrol

(3) Species-specific, broad spectrum insecticies

(4) Few negative impacts on plants, mammals, birds, fishes or even on non-target insects

62.

Which of the following food chain shows spindle shaped pyramid of number?

(1) Grass → Insects → Frog

(2) Phytoplankton → Zooplankton → Small fish

(3) Tree → Birds → Hawks

(4) Tree → Birds → Insects → Bacteria

63.

Arrange CFC, CH_4, N_2O *and* CO_2 in decreasing order according to their contribution in green house effect

(1) $CO_2 > N_2O > CFC > CH_4$

(2) $CHC > CO_2 > CH_4 > N_2O$

(3) $CH_4 > CFC > N_2O > CO_2$

(4) $CO_2 > CH_4 > CFC > N_2O$

64.

Which of the following have been found to be very effective as-emergency contraceptive as they could be used to avoid possible pregnancy due to rape if given within 72 hours?

A. Cervical caps

B. Progestogen-estrogen combination

C. Vaults

(1) A only

(2) A and B only

(3) B and C only

(4) B only

65.

Out of the following diseases which are caused due to bacterial infection?

a. Typhoid

b. Elephantiasis

c. Cholera

d. Tuberculosis

(1) a & b only

(2) b & c only

(3) a, c & d only

(4) a, b, c & d

66.

Separation and purification by filtration, centrifugation of desired compound produced in bioreactor is a part of

(1) Downstream processing only

(2) Scaling up and downstream processing

(3) Upstream processing

(4) Screening for recombinants and downstream processing

67.

Which carbohydrate splitting enzyme initiates the chemical process of digestion in the oral cavity?

(1) Lysozyme

(2) Salivary amylase

(3) Pepsin

(4) Rennin

68.

Plasma without clotting factor is called

(1) Blood

(2) Plasma

(3) Serum

(4) Lymph

69.

Which of the following match is incorrect ?

(1) Wrist bones - 8 in number

(2) Palm bones - 5 in number

(3) Metatarsals - 7 in number

(4) Ankle bones - 7 in number

70.

The U-shaped bone present at the base of the buccal cavity is

(1) Skull

(2) Hyoid

(3) Incus

(4) Stapes

71.

The stereocilia are projected from which part of the hair cell?

(1) Basal part

(2) Apical part

(3) Lateral part

(4) Front part

72.

Mark the incorrect statement

(1) Outer three layers of anther wall are protective in function

(2) Sporogenous tissue occupies the centre of each microsporangium

(3) Cells of tapetum and endothecium show increase in DNA contents by endomitosis and polyteny

(4) Ploidy level of microspore tetrad is haploid

73.

Which hormone level reaches a peak during the luteal phase of the menstrual cycle?

(1) Luteinizing hormone

(2) Progesterone

(3) Follicle-stimulating hormone

(4) Estrogen

74.

The mammary glands are paired structure (breasts) that contain glandular tissue and a variable amount of fat. The glandular tissue of the breast is divided into

(1) 10-12 mammary lobes

(2) 12-16 mammary tubules

(3) 15-20 mammary alveoli

(4) 15-20 mammary lobes

75.

Which genotype will indicate colour blindness in male?

(1) X^CY

(2) X^CY^C

(3) X^CX^C

(4) A^CA^C

76.

Which group contains insectivorous plants?

1. Bladderwort and Cuscuta

2. Cuscuta and Solanum

3. Venus fly trap and bladderwort

4. Solanum and Venus fly trap

77.

Point out the mammalian characters

1. Diaphragm, four-chambered heart, lungs

2. Hairy skin, viviparity, feathers

3. Fins, gills, viviparity

4. Neural glands, gills, four-chambered heart

78.

In an operon, the RNA polymerase binds to

(1) Regulator

(2) Promoter gene

(3) Operator gene

(4) Constitutive gene

79.

Which of the following is not the lateral branches of the roots?

1. Tertiary roots

2. Secondary roots

3. Primary roots

4. Both (1) and (2)

80.

Internal bleeding, muscular pain, fever, anaemia and blockage of the intestinal passage are the common symptoms of

(1) Amoebiasis

(2) Elephantiasis

(3) Ascariasis

(4) Typhoid

81.

Flattened cells with irregular boundary is character of

1. Squamous epithelium

2. Cuboidal epithelium

3. Ciliated epithelium

4. Compound epithelium

82.

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

1. Forewings with darker tegmina

2. Presence of caudal styles

3. Presence of a boat shaped sternum on the 9th abdominal segment

4. Presence of anal cerci

83.

Which enzyme is required to prevent unwanted self-ligation of vector DNA molecules in recombinant DNA technology

(1) DNA polymerase

(2) DNA ligase

(3) Alkaline phosphatase

(4) Reverse transcriptase

84.

F_1-particles comprise of

1. Head and base

2. Base and stalk

3. Head and stalk

4. Head, base and stalk

85.

Which of the following component provides sticky character to the bacterial cell?

1. Cell wall

2. Nuclear membrane

3. Plasma membrane

4. Glycocalyx

86.

Which of the following is an amide involved in nitrogen metabolism by plants?

1. Methionine

2. Cysteine

3. Serine

4. Asparagine

87.

Which of the following elements are required for chlorophyll synthesis?

1. Fe and Mg

2. Mo and Ca

3. Cu and Ca

4. Ca and K

88.

Which is not true regarding cyclic electron transfer system (ETS) in thylakoid membrane of higher plants?

1. Operates at low light intensity

2. Only PS I is involved

3. Act as a back up for ATP synthesis

4. External electron donor is required

89.

Ubiquinone carries electron from

1. Complex III to complex IV

2. Complex I to complex II

3. Complex II to complex III

4. Complex I or II to complex III

90.

Cucumber and tomato are the examples of

1. Day neutral plants

2. Short day plants

3. Long day plants

4. Long short day plants

91.

Semicarbazide is:

(a) NH_2CONH_2

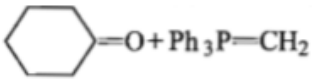
(b) NH_2-NH_2

(c) $NH_2CONHNH_2$

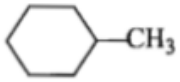
(d) None of these

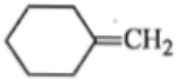
92.

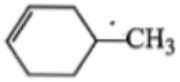
The reaction

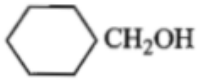


produces:

(a) 

(b) 

(c) 

(d) 

93.

Mercuric chloride is reduced to mercurous chloride by:

(a) acetic acid

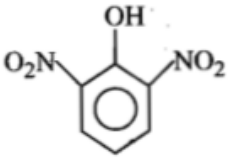
(b) carbon tetrachloride

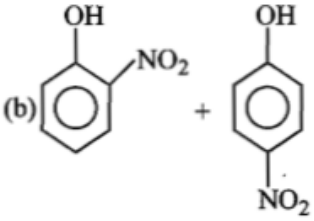
(c) formic acid

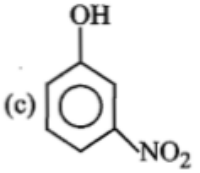
(d) ammonia

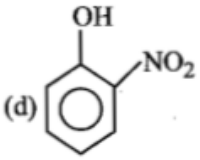
94.

Phenol on treatment with dil.HNO_3 at room temperature gives:

(a) 

(b) 

(c) 

(d) 

95.

The angular momentum of electrons in d orbital is equal to

(a) $\sqrt{6}$ h

(b) $\sqrt{2}$ h

(c) $2\sqrt{3}$ h

(d) 0 h

96.

An aqueous solution containing 1 *g* of urea boils at 100.25°C. The aqueous solution containing 3 *g* of glucose in the same volume will boil at **[BHU 1994, CBSE 2000]**

(1) 100.75°C

(2) 100.5°C

(3) 100°C

(4) 100.25°C

97.

The latent heat of vaporisation of water is 540 cal g^{-1}at 100°*C*. K_b for water is

(A) 0. 562 $K.\ mole^{-1}$

(B) 1. 86 $K.\ mole^{-1}$

(C) 0. 515 $K.\ mole^{-1}$

(D) 5. 12 $K.\ mole^{-1}$

98.

In photoelectric effect, the kinetic energy of photoelectrons increases linearly with the

1. Wavelength of incident light
2. Frequency of incident light
3. Velocity of incident light
4. Atomic mass of an element

99.

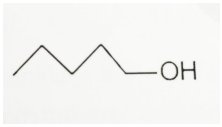
Select the correct option with respect to reversible process

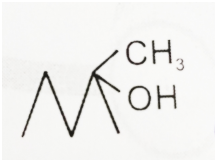
1. ΔG will always be zero for isobaric process.
2. ΔS_{system} will always be greater than zero for a closed system.
3. $\Delta S_{universe}$ will always be zero for a closed system.
4. Both (1) and (3) options are correct.

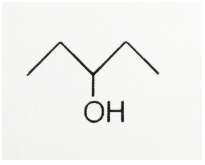
100.

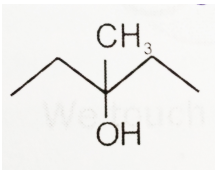
Which if the following alcohols undergo dehydration fast?

1.



2. 

3. 

4. 

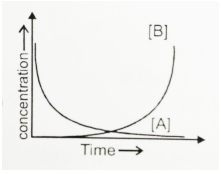
101.

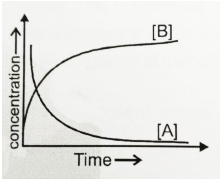
An aqueous solution of a non volatile solute is such that the vapour pressure is 25% lesser than that of water at same temperature. The molality of the solution will be

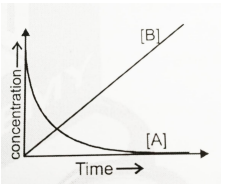
1. $\frac{1000}{54}m$
2. $\frac{1000}{72}m$
3. $\frac{3000}{54}m$
4. $\frac{3000}{72}m$

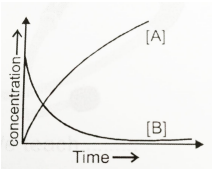
102.

Consider the reaction A ⇌ B. The concentration of both the reactants and the products varies exponentially with time. Which of the following figures correctly describes the change in concentration of reactants and products with time?

1. 

2. 

3. 

4. 

103.

Hydrogen directly combines with

(1) Cu

(2) Au

(3) Ca

(4) Ni

104.

The photoelectric effect is maximum in

(1) Cs

(2) Na

(3) K

(4) Li

105.

Deep sea divers used to respirate in a mixture of

(1) Oxygen and argon

(2) Oxygen and helium and nitrogen

(3) Oxygen and nitrogen

(4) Oxygen and hydrogen

106.

Electronegative of oxygen is more than sulphur yet H_2S is acidic while water is neutral. This is because

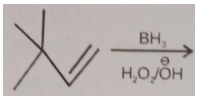
(1) Water is highly associated compound

(2) Molecular mass of H_2S is more than H_2O

(3) H_2O is as while H_2O is a liquid

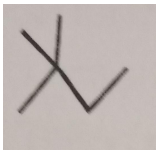
(4) H-S bond is weaker than H-O bond

107.

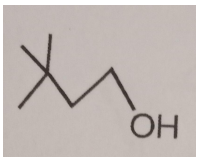


Major product will be-

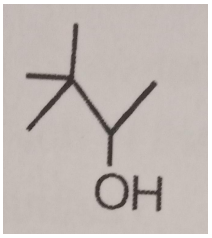
(1)



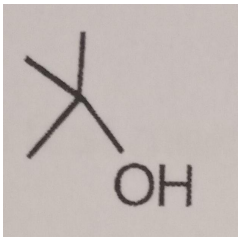
(2)



(3)



(4)



108.

Which compound will have highest boiling point?

(1) CH_4

(2) CH_3OH

(3) C_2H_5OH

(4) HCHO

109.

The number of moles of $KMnO_4$ that will be required to react with one mole SO_3^{2-} ion in acidic medium is

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

2. $\frac{3}{5}$

3. $\frac{4}{5}$

4. 1

110.

Which of the following is the first aldose member of monosaccharides?

(1) $CH_2OH - \overset{\overset{O}{\|}}{C} - CH_2OH$ CH_2OH - C - CH_2OH

(2) CH_2OH - CHOH - CHO

(3) CH_2OH - CHOH - CHOH - CHO

(4) $CH_2OH - CHOH - \overset{\overset{O}{\|}}{C} - CH_2OH$ CH_2OH - CHOH - C

111.

2 g of mixture of CO and CO_2 on reaction with excess I_2O_5 produced 2.54 g of I_2. What would be the mass % of CO_2 in the original mixture?

(1) 60

(2) 30

(3) 70

(4) 35

112.

Correct order of bond length is

(1) $CO_3^{2-} > CO_2 > CO$

(2) $CO_2 > CO > CO_3^{2-}$

(3) $CO > CO_2 > CO_3^{2-}$

(4) None of these

113.

Hydration energy of the given ions follow the order

1. $Li^+ > K^+ > Na^+ > Rb^+ > Cs^+$

2. $Cs^+ > Rb^+ > K^+ > Na^+ > Li^+$

3. $Li^+ > Na^+ > K^+ > Rb^+ > Cs^+$

4. $Na^+ > K^+ > Rb^+ > Cs^+ > Li^+$

114.

The species which acts as a Lewis acid but not a Bronstcd acid is

(1) NH_2^-

(2) O^{2-}

(3) BF_3

(4) OH^-

115.

Which of the following is not a crystalline solid?

(1) Common salt

(2) Sugar

(3) Iron

(4) Rubber

116.

In which of the process, roasting and self reduction is required?

1. $Cu_2S \rightarrow Cu_2O$

2. $Ag_2S \rightarrow Ag$

3. $ZnS \rightarrow Zn$

4. $PbS \rightarrow Pb$

117.

Which of the following an example of additional polymerisation?

1. Proteins

2. Teflon

3. Nylon-6, 6

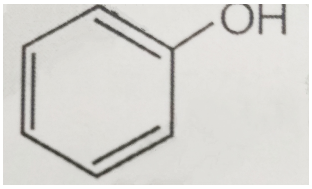
4. Glyptal (Polyester)

118.

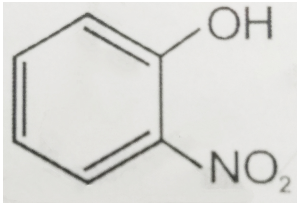
The most acidic among the following compounds is:

(1) $Cl - CH_2 - CH_2 - OH$

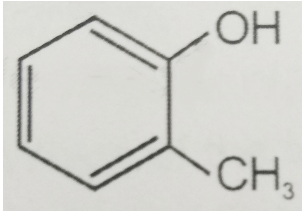
(2)



(3)



(4)



119.

Ozonolysis of an organic compound given formaldehyde as one of the products. This confirms the presence of

(1) Acetylinic group

(2) a vinyl group

(3) an isopropyl group

(4) an acetylenic triple bond

120.

Which of the following statements regarding rate constant is correct?

(1) Rate constant always depends on concentration of reactant.

(2) Rate constant is temperature dependent.

(3) For instantaneous reactions, rate constant will be very small.

(4) Rate constant will always depend on pressure or volume of the container.

121.

The species having tetrahedral shape is

(1) $[PdCl_4]2-$

(2) $[Ni(CN_4)4]2-$

(3) $[Pd(CN_4)]3-$

(4) $[NiCl_4]2-$

122.

An element 'X' which occurs in the first short period has an outer electronic structure s^2p^1.What is the formula and acid-base character of its oxides?

1. XO_3, basic

2. X_2O_3, basic

3. X_2O_3 acidic

4. XO_2 acidic

123.

When SO_2 gas is passed through an acidified solution of $K_2Cr_2O_7$

1. The solution becomes blue

2. The solution becomes colorless

3. SO_2 is reduced

4. Green $Cr_2(SO_4)3$ is formed

124.

The brown ring complex compound is formulated as $\left[\left(Fe_2O\right)_5(NO)\right]SO_4$. The oxidation state of iron is

(1) +1

(2) +2

(3) +3

(4) zero

125.

Which of the following is not a characteristic of transition elements?

1. Variable oxidation states

2. Formation of coloured compounds

3. Formation of interstitial compounds

4. Natural radioactivity

126.

The products of reaction of alcoholic silver nitrite with ethyl bromide is/are

(1) Ethane

(2) Ethene

(3) Nitroethane and ethylnitrite

(4) Ethyl alcohol

127.

Which of the following oxy-acids of nitrogen exists in dimeric form?

(1) Nitrous acid

(2) Hypo nitrous acid

(3) Pernitric acid

(4) Nitric acid

128.

Which of the following compounds exists as polymeric solid at room temperature?

(1) $BeCl_2$

(2) $AlBr_3$

(3) AlI_3

(4) BCl_3

129.

Which of the following complexes is least likely to exist?

(1) $Hg(OH)_2^{2-}$

(2) $Zn(OH)_4^{2-}$

(3) HgI_4^{2-}

(4) $PtCl_4^{2-}$

130.

Chloroxylenol is an important component of

(1) Soap

(2) Antibiotics

(3) Dettol

(4) Pain killing ointments

131.

Hydraulic washing/gravity separation can be used to concentrate.

(1) Ore of Na

(2) Ore of K

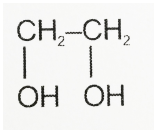
(3) Carnalite

(4) Ore of Fe

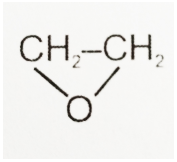
132.

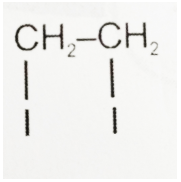
$$CH_2 = CH_2 \xrightarrow{PhCO_3H} A \xrightarrow{H_3O^{\oplus}} B$$

Structure of 'B' is

1. 

2. $CH_2 = CH_2$

3. 

4. 

133.

Picric acid is

1. 2, 4, 6-tribromophenol

2. Sym-trinitrophenol

3. trinitrophenol

4. 2, 4, 6-trinitrotoluene

134.

Dalton's law of partial pressure is not applicable to

1. $O_2 + O_3$

2. $CO + CO_2$

3. $NH_3 + HCl$

4. $I + CO_2$

135.

H_2 cannot be displaced by

1. Li^+

2. Sr^{2+}

3. Al^{3+}

4. Ag^+

136.

If $\left|\vec{v}_1 + \vec{v}_2\right| = \left|\vec{v}_1 - \vec{v}_2\right|$ and $\vec{v}_1$ and $\vec{v}_2$ are non-zero vectors, then :-

1. $\vec{v}_1$ is parallel to $\vec{v}_2$

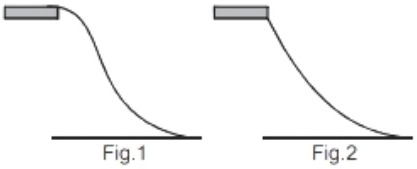
2. $\vec{v}_1 = \vec{v}_2$

3. $\vec{v}_1$ and $\vec{v}_2$ are mutually perpendicular

4. $\left|\vec{v}_1\right| = \left|\vec{v}_2\right|$

137.

A flexible smooth track is fixed in two alternate arrangements, as shown in figure-1 and 2. The length of the track used is the same in each case, and the height through which it falls from the bench to the floor is the
same. A toy car is released at rest and slides down the track. Air resistance can be ignored.



1. The speed at the bottom as well as time taken in both the tracks are the same.

2. The speed at the bottom as well as time taken in both the tracks are different.

3. The speed at the bottom is different but the time taken in both the tracks are the same.

4. The speed at the bottom is same but the time taken in both the tracks are different.

138.

A small object of mass 10.0 g is at rest 30.0 cm from a horizontal disk's center. The disk starts to rotate from rest about its center with a constant angular acceleration of 4.50 rad/s^2 . What is the magnitude of the net
force acting on the object after a time of t = 1/3 s if the object remains at rest with respect to the disk?

1. 0 N

2. 1.5×10^{-2} N

3. 7.4×10^{-3} N

4. 1.8×10^{-2} N

139.

If S is stress and Y is young's modulus of material of a wire, the energy stored in the wire per unit volume is

1. 2Y/S

2. S/2Y

3. $2s^2Y$

4. $\frac{S^2}{2Y}$

140.

A body of mass 2 kg moving with a velocity $\left(\hat{i} + 2\hat{j} - 3\hat{k}\right)$ ms^{-1} collides with another body of mass 3 kg moving with a velocity $\left(2\hat{i} + \hat{j} + \hat{k}\right)$ ms^{-1} . If they stick together, the velocity in ms^{-1} of the composite body is :

1. $\frac{1}{5}\left(8\hat{i} + 7\hat{j} - 3\hat{k}\right)$

2. $\frac{1}{5}\left(-4\hat{i} + \hat{j} - 3\hat{k}\right)$

3. $\frac{1}{5}\left(8\hat{i} + \hat{j} - \hat{k}\right)$

4. $\frac{1}{5}\left(-4\hat{i} + 7\hat{j} - 3\hat{k}\right)$

141.

Two identical parallel plate capacitors are placed in series and connected to a constant voltage source of V_0 volt. If one of the capacitors is completely immersed in a liquid with dielectric constant K, the potential difference between the plates of the other capacitor will change to -

1. $\frac{K+1}{K}V_0$

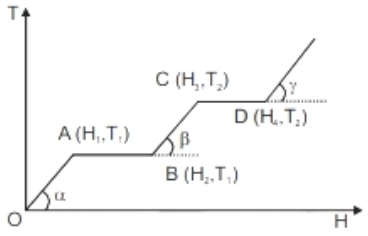
2. $\frac{K}{K+1}V_0$

3. $\frac{K+1}{2K}V_0$

4. $\frac{2K}{K+1}V_0$

142.

The graph shows the variation of temperature (T) of one kilogram of a material with the heat (H) supplied to it. At O, the substance is in the solid state. From the grpah, we can conclude that



1. T_2 is the melting point of the solid.

2. BC represents the change of state from solid to liquid.

3. $\left(H_2 - H_1\right)$ represents the latent heat of fusion of the substance.

4. $\left(H_3 - H_1\right)$ represents the latent heat of vaporization of the liquid.

143.

Two particles X and Y having equal charges, after being accelerated through the same potential difference, enter a region of uniform magnetic field and describe circular paths of radii R_1 and R_2 respectively. The ratio of the mass of X to that of Y is

1. $\left(\frac{R_1}{R_2}\right)^{1/2}$

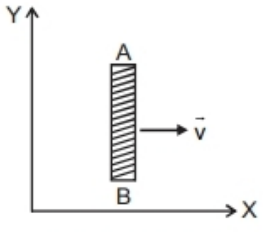
2. $\frac{R_2}{R_1}$

3. $\left(\frac{R_1}{R_2}\right)^{2}$

4. $\frac{R_1}{R_2}$

144.

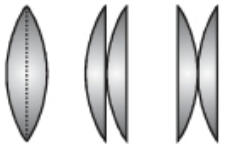
A conductor rod AB moves parallel to X-axis in a uniform magnetic field, pointing in the positive Z-direction. The end A of the rod gets -



1. Positively charged.
2. Negatively charged.
3. Neutral.
4. First positively charged and then negatively charged.

145.

Two similar plano-convex lenses are combined together in three different ways as shown in the adjoining figure. The ratio of the focal lengths in three cases will be -



1. 2 : 2 : 1

2. 1 : 1 : 1

3. 1 : 2 : 2

4. 2 : 1 : 1

146.

For $10^{(at+3)}$, the dimension of a is :

1. $M^0L^0T^0$

2. $M^0L^0T^1$

3. $M^0L^0T^{-1}$

4. None of these

147.

A particle is projected at angle θ with speed u from the ground. The speed of particle when it is moving at angle α from the ground is -

(1) u cos α

(2) $u\cos\theta \cdot \cos\alpha$

(3) $u\cos\theta \cdot sec\alpha$

(4) $u\cos\alpha \cdot sec\theta$

148.

Two masses of 1 g and 4 g are moving with the same kinetic energy, the ratio of their linear momentum will be :-

(1) 4 : 1

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

(3) 1 : 2

(4) 1 : 16

149.

From a same uniform wire, two circular loops are made (i) first P of radius R and (ii) then Q of radius nR by stretching. If the moment of inertia of Q about an axis passing through its centre and perpendicular to its plane is 8 times that of P about a similar axis, the value of n is (diameter of the wire is very much smaller than R or nR)

(1) $8\sqrt{2}$

(2) $6\sqrt{2}$

(3) $4\sqrt{2}$

(4) $2\sqrt{2}$

150.

A small asteroid is orbiting around the sun in a circular orbit of radius r_0 with speed v_0. A rocket is lauched from the asteroid with speed $v = \alpha v_0$, where v is the speed relative to the sun. The least value of v_o for which the rocket will escape from the solar system is (ignoring gravity due to the asteroid and effects of other planets)

(1) $\sqrt{2}$

(2) 2

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

(4) $\frac{1}{\sqrt{2}}$

151.

The rate of emission of heat by an ideal black body at temperature T is H. What will be the rate of emission of heat by another body of same size at temperature 2T and emissivity 0.25 ?

(1) 16 H

(2) 4 H

(3) 8 H

(4) 4.5 H

152.

A transverse progressive wave on a stretched string has a velocity of 10 ms^{-1} and a frequency of 100 Hz. The phase difference between two particles of the string which are 2.5 cm apart will be -

(1) $\frac{\pi}{8}$

(2) $\frac{\pi}{4}$

(3) $\frac{3\pi}{8}$

(4) $\frac{\pi}{2}$

153.

A gas is found to obey the law P^2V= constant. The initial temperature and volume are T_0 *and* V_0. If the gas expands to a volume $2V_0$, its final temperature becomes:

(1) $\sqrt{2}T_0$

(2) $\frac{T_0}{2}$

(3) $2T_0$

(4) $\frac{T_0}{\sqrt{2}}$

154.

Two point charges $4\mu C$ *and* $-1\mu C$ are kept at a distance of 3m from each other. What is the electric potential at the point where the electric field is zero?

(1) 0V

(2) 1500 V

(3) 3000 V

(4) 500 V

155.

The angle of minimum deviation for a prism is 40° and the angle of the prism is 60°. The angle of incidence in this position will be -

(1) 30°

(2) 60°

(3) 50°

(4) 100°

156.

What will be the ratio of the de-broglie wavelengths of proton and a α- particle of same kinetic energy?

(1) 2 : 1

(2) 1 : 2

(3) 4 : 1

(4) 1 : 4

157.

A piece of aluminium and germanium each are cooled from T_1K *to* T_2K. The resistance of

(1) each of them decreases

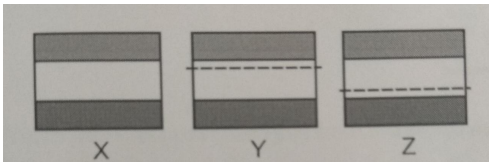
(2) each of them increases

(3) aluminium increases and that of germanium decreases

(4) aluminium decreases and that of germanium increases

158.

The energy band diagrams for semiconductor samples of silicon are as shown. We can then assert that



(1) Sample X is undoped while samples Y and Z have been doped with a third group and a fifth group impurity respectively

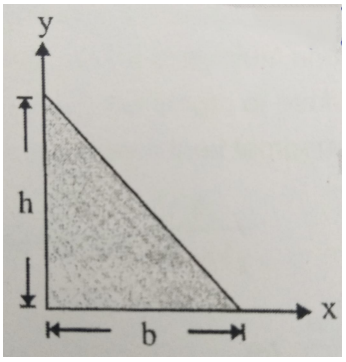
(2) Sample X is undoped while both samples Y and Z have been doped with a fifth group impurity

(3) Sample X has been doped with equal amounts of third and fifth group impurities while samples Y and Z are undoped

(4) Sample X is undoped while samples Y and Z have been doped with a fifth group and a third group impurity respectively.

159.

The centre of mass of the triangle shown in figure has coordinates-



(1) $x = \frac{h}{2},\ y = \frac{b}{2}$

(2) $x = \frac{b}{2},\ y = \frac{h}{2}$

(3) $x = \frac{b}{3},\ y = \frac{h}{3}$

(4) $x = \frac{h}{3},\ y = \frac{b}{3}$

160.

A particle has initial velocity 5 m/s and acceleration 4 ms^{-2} in perpendicular direction. After 3 seconds, its velocity is:

1. 17 ms^{-1}

2. 13 ms^{-1}

3. e12 ms^{-1}

4. 5 ms^{-1}

161.

A lift is moving downwards with an acceleration equal to acceleration due to gravity. A body of mass M kept on the floor of the lift is pulled horizontally. If the co-efficient of friction is μ, then the frictional resistance offered by the body is

1. Mg

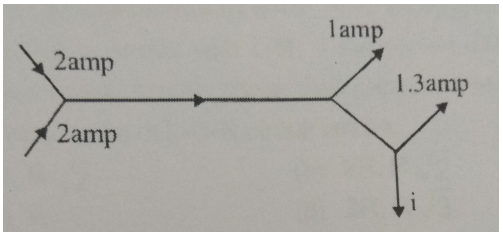
2. μMg

3. 2 μ Mg

4. zero

162.

The figure below shows currents in a part of the electric circuit. The current 'i' is -



(1) 1.7 amp

(2) 3.7 amp

(3) 1.3 amp

(4) 1 amp

163.

If the length of a cylinder on heating increases by 2%, the area of its base will increase by:

1. 0.5%

2. 2%

3. -2%

4. 4%

164.

In a horizontal pipe line the pressure falls by 16 Nm^{-2} between two points separated by a distance of 2 km. Density of oil is 800 kg m^{-3}. Change in kinetic energy per kg of the oil flowing in the tube is:

1. 2×10^{3} J/kg

2. 2×10^{2} J/kg

3. 2×10^{-2} J/kg

4. 2×10^{-3} J/kg

165.

The rate of transfer of energy in a wave depends

1. directly on the square of the wave amplitude and square of the wave frequency

2. directly on the square of the wave amplitude and square root of the wave frequency

3. directly on the wave frequency and square of the wave amplitude

4. directly on the wave amplitude and square of the wave frequency

166.

A charge of μC is divided into two parts such that their charges are in the ratio of 2:3. These two charges are kept at a distance 1 m apart in vacuum. Then the electric force between them (in N) is-

(1) 0.216

(2) 0.00216

(3) 0.0216

(4) 2.16

167.

One mole of a ideal gas at an initial temperature of T K does 6 R joules of work adiabatically. If the ratio of specific heats of this gas at constant pressure and at constant volume is 5/3, the final temperature of gas will be:

1. (T-2.4)K

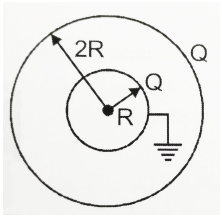
2. (T+4)K

3. (T-4)K

4. (T+2.4)K

168.

Two concentric conducting spherical shells carry charge Q each. The inner shell is earthed. The charge that flows into the earth is -



1. Q

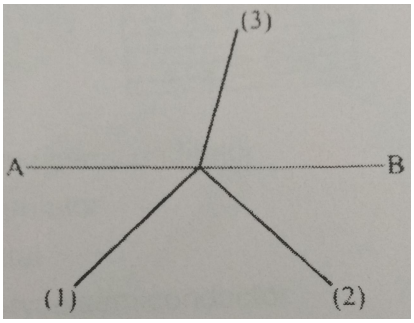
2. $\frac{3Q}{2}$

3. $\frac{-Q}{2}$

4. $\frac{-3Q}{2}$

169.

AB is a boundary separating two media of different refractive indices. A ray is incident on the boundary, partially reflected and partially transmitted. Choose the correct statement



(1) 3 is incident ray and 1 is refracted ray.

(2) 2 is incident ray and 1 is partially reflected ray.

(3) 1 is incident ray and 3 is refracted ray.

(4) 3 is incident ray and 2 is partially reflected ray.

170.

In a Young's double slit experiment the intensity at a point where the path difference is $\frac{\lambda}{6}$ (λ being the wavelength of the light used) is I. If I_0 denotes the maximum intensity, $\frac{I}{I_0}$ is equal to :-

(1) $\frac{1}{\sqrt{2}}$

(2) $\sqrt{3}$

$\frac{}{2}$

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

(4) $\frac{3}{4}$

171.

Two photons each of 2.5 eV energy are incident on a metal surface of work function 4.5 eV then

(1) Kinetic energy of emitted electron is 0.5 eV

(2) Kinetic energy of emitted electron is 2 eV

(3) Kinetic energy of emitted electron is in between 0 to 0.5 eV

(4) Electron emission will not take place

172.

The magnetic induction at a point, distance x from the center, on the axis of a circular current carrying coil is proportional to (if x>>radius of coil).

1. x

2. x^2

3. x^{-3}

4. $x^{3/2}$

173.

In a semiconducting material the mobilities of electrons and holes are μ_e *and* μ_h respectively. Which of the following is true

(1) $\mu_e > \mu_h$

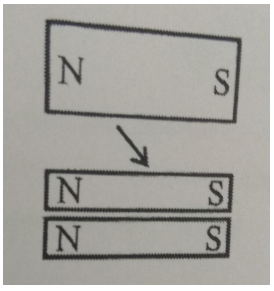
(2) $\mu_e < \mu_h$

(3) $\mu_e = \mu_h$

(4) $\mu_e < 0;\ \mu_h > 0$

174.

A bar magnet is cut into two equal halves by a plane as shown. Of the following physical quantities the one which remains unchanged is



(1) Pole strength

(2) Magnetic moment

(3) Intensity of magnetization

(4) Moment of inertia

175.

An electromagnetic wave moving along positive x direction has an electric field given by the expression (in Cartesian co-ordinates)

$\vec{E}\left(x, t\right) = 6.0 \cos\left(1.14 \times 10^{7} x - 33.43 \times 10^{15} t\right)\hat{z}$

What is the direction of the magnetic field at time t = 0 and position x = 0?

(1) -x

(2) +x

(3) -y

(4) +y

176.

If an alternating current $i = i_m \sin \omega t$ is flowing through an inductor ,then voltage drop ΔV_L across inductor L will be

1. $i_m \omega L \sin \omega t$

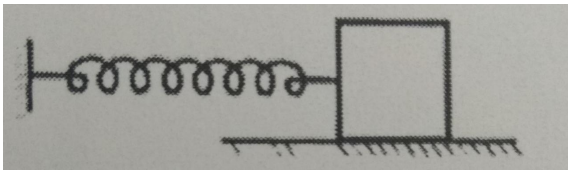
2. $i_m \omega L \cos \omega t$

3. $i_m \omega L \sin\left(\omega t + \frac{\pi}{4}\right)$

4. $i_m \omega L \cos\left(\omega t - \frac{\pi}{4}\right)$

177.

A block is connected to a relaxed spring and kept on a smooth floor. The block is given a velocity towards the right. Just after this



(1) The speed of block starts decreasing but acceleration starts increasing.

(2) The speed of the block as well as its acceleration starts decreasing.

(3) The speed of the block starts increasing but its acceleration starts decreasing.

(4) The speed of the block as well as acceleration start increasing.

178.

The count rate of a radioactive source at t=0 was 1600 count/s and at t=8sec, it was 100 counts/s The count rate (in counts) at t=6 sec will be-

1. 150

2. 200

3. 300

4. 400

179.

The component of vector $\vec{A} = 3\hat{i} + \hat{j} + \hat{k}$ along the direction of $\hat{i} - \hat{j}$ is -

(1) $\sqrt{2}$

(2) 2

(3) $\sqrt{3}$

(4) 3

180.

An ideal gas is taken through the a cycle A → B → C → A. If the net heat supplied to the gas in the cycle is 5J, the work done by the gas is -

(1) – 5J

(2) – 10J

(3) 5J

(4) – 20J

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