1. Which stage of interphase involves duplication of most organelles?
   (1) G_1- phase
   (2) S-phase
   (3) G_2-phase
   (4) G_0 – phase
2. Which of the following is a proteolytic enzyme with zinc as metal ion co-factor?
   (1) Hexokinase
   (2) Catalase
   (3) Peroxidase
   (4) Carboxypeptidase
3. A type of Vitamin B-complex, niacin is associated with
   (1) NAD
   (2) NADP
   (3) FAD
   (4) 1 and 2
4. Splitting of centromere and separation of chromatids occurs during
   (1) Prophase
   (2) Metaphase
   (3) Anaphase
   (4) Telophase
5. Match the following

List I	List II
(A) Ligases	i) Catalyse inter conversion of optical isomers
(B) Hydrolases	ii) Catalyse transfer of a group
(C) Transferases	iii) Break of C-C, P-N bonds
(D) Isomerases	iv) Join C-S, C-N bonds

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

6. The transiently bound co-factor in a conjugated enzyme is
   (1) Fe
   (2) NAD
   (3) Haem part
   (4) Zn
7. Malonate is structurally similar to
   (1) Succinic acid
   (2) Succinic dehydrogenase
   (3) NADP
   (4) NAD
8. Correct statement for exothermic reaction is
   (1) Substrate has less potential energy than product
   (2) Substrate gains energy while product is formed
   (3) Substrate has more energy than product
   (4) More than one options correct

9. In our skeletal muscles under anaerobic conditions glucose is converted into
   (1) Alcohol
   (2) Succinic acid
   (3) Malic acid
   (4) Lactic acid
10. A molecule of carbonic anhydrase can form how many molecules of carbonic acid in a minute
   (1) 6,00,000
   (2) 60,000
   (3) 60,00,000
   (4) 3,60,00,000
11. Rate of a reaction in general can be measured as
   (1) ½ Vmax
   (2) Vmax
   (3) rate = $\frac{\delta p}{\delta t}$
   (4) Km
12. The enzymes are active even at 80-90^{0}C in organisms of
   (1) Hot vents
   (2) Sulphur springs
   (3) Temperate regions
   (4) 1 and 2
13. Ribozyme is a
   (1) Proteinaceous enzyme
   (2) Non-proteinaceous enzyme
   (3) Nucleic acid behaving as enzyme
   (4) More than one options is correct
14. Inverse of reaction rate with reference to temperature increase is noticed in relation to enzyme activity
   (1) When reaches more than optimum temperature
   (2) When it is below optimum temperature
   (3) When it is in initial rate and low temperature
   (4) After the enzyme is inactivated at low temperature
15. Correct statement(s) related to enzymes is / are
   (1) Enzyme catalysts differ from inorganic catalysts in many ways
   (2) Major difference of enzyme catalysts and inorganic catalysts is efficiency at high temperature
   (3) Inorganic catalysts are efficient at high temperature
   (4) All of these
16. Active site of an enzyme represents
   (1) Crevice
   (2) Pocket
   (3) 1 and 2
   (4) Primary structure
17. Which structure of proteins enables more of enzymatic nature?
   (1) Primary
   (2) Secondary
   (3) Tertiary
   (4) Quaternary
18. A very significant contribution of mitosis is
   (1) Genetic recombination
   (2) Variation
   (3) Cell repair
   (4) Growth

19. Cytokinesis in plant cells is marked by
    (1) Furrowing in cell membrane
    (2) Cell plate formation
    (3) Asters
    (4) 1 and 3
20. Mitosis enables replacement of
    (1) Cells of epidermis
    (2) Cells of lining of gut
    (3) Blood cells
    (4) All of these
21. Haploid cells also divide by mitosis in these animals
    (1) Higher animals
    (2) Reptiles
    (3) Social insects
    (4) 1 and 3
22. Nucleo-cytoplasmic ratio of the cell is maintained by
    (1) Growth in plant body
    (2) Mitosis
    (3) Reproduction
    (4) Meiosis –I
23. Match the following

List I	List II
(A) Telophase	i) Chromosomes move to equator
(B) Metaphase	ii) E.R and golgi complex donot appear
(C) Anaphase	iii) Chromatids move to opposite poles
(D) Late prophase	iv) E.R and golgi complex reform

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

24. Cells of this stage are metabolically active but donot proliferate any more
    (1) G_1
    (2) G_2
    (3) G_0
    (4) S
25. Attached spindle fibres with kinetochore is seen during
    (1) Metaphase
    (2) Early Anaphase
    (3) Late Anaphase
    (4) All of these
26. Nuclear envelope and nucleoli disappear in
    (1) Prophase
    (2) Telophase
    (3) Inter kinesis
    (4) Cytokinesis
27. G_2- phase is associated with
    (1) Most organelles duplication
    (2) RNA and protein synthesis
    (3) Chromosomal doubling
    (4) Chromatids doubling
28. Small disc shaped structures at the surface of centromere are
    (1) Chromatids
    (2) Kinetochores
    (3) Secondary constrictions
    (4) More than one options correct
29. Which of the following represents quiescent stage
    (1) G_1
    (2) G_2
    (3) G_0
    (4) S

30. Correct statement related to 'S' phase of interphase of cell division is
(1) DNA synthesis in nucleus and centrioles doubling in cytoplasm
(2) DNA synthesis and centrioles doubling in the nucleus
(3) DNA synthesis and centrioles doubling in the cytoplasm
(4) DNA synthesis in cytoplasm and centrioles doubling in the nucleus

31. How many cell cycles can an yeast cell undergo in the duration of one cell cycle of human cell
(1) 12 cycles
(2) 14 cycles
(3) 16 cycles
(4) 24 cycles

32. The interval between mitosis and initiation of DNA replication is
(1) 'S' phase
(2) G_2 phase
(3) G_0 phase
(4) G_1 phase

33. Diploid cells only undergo mitosis commonly in
(1) Plants
(2) Animals
(3) Fungi
(4) Algae

34. Centrosome duplication occurs during
(1) Metaphase
(2) Telophase
(3) Prophase
(4) Interphase

35. Mitotic apparatus represents
(1) Two asters and spindle fibres together
(2) One aster and spindle fibres together
(3) Several asters and spindle fibres together
(4) All of these

36. Each chromosome with two chromatids is seen in
(1) Metaphase
(2) Anaphase of mitosis
(3) Late Metaphase
(4) 1 and 3

37. Incorrect statement for mitotic cell cycle is
(1) Disappearance of one nucleus and reappearance of two nuclei
(2) DNA is doubled once
(3) Doubling of nucleous and cell
(4) DNA doubled in daughter cells

38. Animal cells during interphase exhibit RNA and protein synthesis in
(1) G_1 phase
(2) S-phase
(3) G_2 phase
(4) More than one options correct

39. Daughter nuclei appear in
(1) Cytokinesis
(2) Telophase
(3) Interphase
(4) Interkinesis

40. A general rule of thumb for enzymes is when temperature change by 10^0C, it leads to
(1) Doubling the rate only
(2) Decrease of rate by half only
(3) 1 or 2
(4) Denaturation of enzyme

41. The centromere of each chromosome is at leading edge during
    (1) Prophase
    (2) Metaphase
    (3) Anaphase
    (4) Cytokinesis
42. Animal cells which do not appear to exhibit division are
    (1) Skin cells
    (2) cells of lining of gut
    (3) Heart cells
    (4) Blood cells
43. Chromosomal identity is lost during this stage of mitosis
    (1) Prophase
    (2) Telophase
    (3) Metaphse
    (4) Anaphase
44. Correct statement for Mitosis is
    (1) One nuclear disappearances and one nuclear reappearances
    (2) One nucleus disappearance and one nucleus reappearance
    (3) One nuclear disappearance and two nuclear reapparances
    (4) Two nuclear disapparances and one nuclear reapperance
45. The longest stage of cell cycle is
    (1) Interphase
    (2) Metaphase I
    (3) Prophase II
    (4) Metaphase II

ZOOLOGY

46. Most abundant plasma proteins are
    (1) collagens
    (2) globulins
    (3) albumins
    (4) fibrinogen
47. Slight increase in WBC count is known as
    (1) leucopoiesis
    (2) leucocytosis
    (3) leukemia
    (4) leucopenia
48. Leucocytes which resist infections and involved in allergic reactions are
    (1) eosinophils
    (2) basophils
    (3) neutrophils
    (4) lymphocytes
49. Non phagocytic agranulocytes are
    (1) monocytes
    (2) basophils
    (3) lymphocytes
    (4) erythrocytes
50. Identify the incorrect statement about fluid connective tissues.
    (1) Blood is specialised connective tissue.
    (2) Intercellular matrix is without fibres.
    (3) Blood and lymph together are called mucous connective tissues.
    (4) Blood is considered vascular tissue.
51. In blood, most abundant formed elements are
    (1) neutrophils
    (2) erythrocytes
    (3) thrombocytes
    (4) lymphocytes
52. Contractile proteins in myofilamensts of muscle fibres are
    (1) collagen and elastin
    (2) actin and myosin

(3) elastin and myosin

(4) actin and collagen

53. Blood is derivative of the germ layer

(1) ectoderm

(2) endoderm

(3) mesoderm

(4) both endoderm and mesoderm

54. Involuntary striated muscles are found in the organ

(1) tongue

(2) stomach

(3) heart

(4) urinary bladder

55. Skeletal muscle fibres are

(1) uninucleated and unbranched

(2) syncytial and branched

(3) uninucleated and branched

(4) multi nucleated and unbranched

56. Which of the following are absent in lymph?

(1) Lymphocytes

(2) Thrombocytes

(3) small proteins

(4) Leucocytes

57. Decrease in platelet count is called

(1) anaemia

(2) leucocytopenia

(3) thrombocytopenia

(4) erythrocytopenia

58. Intercalated discs are characteristic feature of

(1) voluntary muscles

(2) non-striated muscles

(3) cardiac muscles

(4) involuntary smooth muscles

59. Statement I: All striated muscles are voluntary muscles.

Statement II: Voluntary muscles undergo quick contractions.

(1) Both SI and SII are correct

(2) Both SI and SII are incorrect

(3) SI is correct, SII is incorrect

(4) SI is incorrect, SII is correct

60. Leucocytes with kidney shaped nucleus are

(1) neutrophils

(2) lymphocytes

(3) monocytes

(4) eosinophils

61. Maximum number of mitochondria are found in muscle fibres of

(1) skeletal muscles

(2) cardiac muscles

(3) smooth muscles

(4) voluntary muscles

62. Smallest formed elements are

(1) erythrocytes

(2) neutrophils

(3) lymphocytes

(4) platelets

63. Identify the CORRECT statement from the following.

(1) Blood plasma without any plasma proteins is serum.

(2) Blood without formed elements but with all plasma proteins is serum.

(3) Blood without erythrocytes, leucocytes and plasma proteins is lymph.

(4) Blood plasma without clotting factors is serum.

64. Smooth muscles are absent in

(1) pharynx

(2) urinary bladder

(3) stomach

(4) intestine

65. Formed elements involved in inflammatory reactions are

(1) eosinophils

(2) basophils

(3) neutrophils

(4) platelets

66. Match the following

Epithelial tissue	Example
(A) Compound epithelium	i) Germinal epithelium
(B) Simple cuboidal	ii) Mucosa of gut
(C) Simple squamous	iii) Endothelium
(D) Simple columnar	iv) Pancreatic duct

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

67. Cell junctions that prevent leakage of substances into surrounding tissues are

(1) desmosomes

(2) tight junctions

(3) anchoring junctions

(4) gap junctions

68. Select the INCORRECT match from the following.

(1) Epidermis of vertebrates

– Keratinized stratified squamous epithelium

(2) Dermis of skin

– non keratinized stratified squamous epithelium

(3) Subcutaneous layer

– areolar and adipose tissue

(4) Stratum corneum apical layers

– dehydrated and keratinized cells

69. The tissue that is absent in trachea and bronchi is

(1) smooth muscles

(2) hyaline cartilage

(3) elastic cartilage

(4) ciliated epithelium

70. Haversian systems are found in

(1) skull and ribs

(2) vertebrae

(3) diaphysis of long bones

(4) metaphysis of long bones

71. Which of the following is not made of elastic cartilage?

(1) Epiglottis

(2) Eustachian tube

(3) Ear pinna

(4) Epiphyseal plate

72. Toughest cartilage is seen in

(1) intervertebral ligaments

(2) intervertebral discs

(3) intercalated discs

(4) epiphyseal plates

73. Which of the following is not made of connective tissue?

(1) Perichondrium

(2) Periosteum

(3) Pericardium

(4) Peritoneum

74. Major organic substance of bones is

(1) chondroitin

(2) collagen

(3) elastin

(4) hydroxyapatite

75. Most common cells in connective tissue are

(1) macrophages

(2) mast cells

(3) fibroblasts

(4) leucocytes

76. Unipolar neurons are found in

(1) retina of eye

(2) olfactory epithelium

(3) inner ear

(4) embryonic stages

77. Select the incorrect statement from the following.

(1) Multipolar neurons are found only in the cerebral cortex.

(2) Most of the motor neurons are multipolar neurons.

(3) Bipolar neurons are sensory neurons.

(4) Pseudo unipolar neurons are sensory neurons.

78. Match the following

List I	List II
(A) Nissl bodies	i) Neurotransmitters
(B) Synaptic vesicles	ii) Immunoglobulins
(C) Gap junctions	iii) Intercalated discs
(D) Antibodies	iv) Protein synthesis

	A	B	C	D
(1)	II	I	III	IV
(2)	IV	I	III	II
(3)	IV	III	II	I
(4)	III	I	IV	II

79. Which of the following is not true about astrocytes?

(1) Star shaped cells

(2) Blood-brain barrier

(3) Phagocytes

(4) Present between neurons and blood capillaries

80. Unmyelinated axons in PNS have

(1) oligodendrocytes

(2) Nissl bodies

(3) myelin sheath

(4) Schwann cells

81. Oligodendrocytes are present in

(1) grey matter of brain

(2) white matter of brain

(3) cranial nerves

(4) spinal nerves

82. Statement I: The complexity in organ and organ systems displays certain discernable trend(evolutionary trend).

Statement II: The basic tissues organized to form organs which inturn associate to form organ systems in multicellular organisms

(1) Both SI and SII are correct

(2) Both SI and SII are incorrect

(3) SI is correct, SII is incorrect

(4) SI is incorrect, SII is correct

83. Articular cartilage is made of

(1) calcified cartilage

(2) elastic cartilage

(3) fibrocartilage

(4) hyaline cartilage

84. “Nuclei” of nervous tissue are aggregations of neuronal cell bodies in

(1) sympathetic nervous system

(2) parasympathetic nervous system

(3) peripheral nervous system

(4) central nervous system

85. Ventricles of brain are lined by

(1) simple squamous epithelium

(2) simple cuboidal epithelium

(3) ciliated epithelium

(4) compound epithelium

86. Select the incorrect statement from the following.

(1) Blood plasma filtered through blood capillaries into tissues is called interstitial fluid or tissue fluid.

(2) Tissue fluid flowing in the lymphatic system is called lymph.

(3) Lymphatic ducts open into subclavian veins.

(4) Right lymphatic duct is also called thoracic duct.

87. Which one of the following act as internal scavengers?

(1) Basophil

(2) B.Lymphocyte

(3) Macrophages

(4) Erythrocyte

88. Unicellular glands from the following are

(1) salivary glands

(2) sweat glands

(3) sebaceous glands

(4) Goblet cells

89. Neurons that carry impulses to muscles and glands are called

(1) interneurons

(2) afferent neurons

(3) motor neurons

(4) sensory neurons

90. Which of the following organs is lined internally by simple squamous epithelium?

(1) Bowman's capsule of nephrons

(2) Proximal convoluted tubules of nephrons

(3) Distal convoluted tubules of nephrons

(4) Urinary bladder

PHYSICS

91. Let the angle between two non zero vectors $\vec{A}$ and $\vec{B}$ be 120° and resultant be $\vec{C}$ then

(1) $\left|\vec{C}\right|$ must be equal to $\left|\vec{A}-\vec{B}\right|$

(2) $\left|\vec{C}\right|$ must be less than $\left|\vec{A}-\vec{B}\right|$

(3) $\left|\vec{C}\right|$ must be greater than $\left|\vec{A}-\vec{B}\right|$

(4) $\left|\vec{C}\right|$ may be equal to $\left|\vec{A}-\vec{B}\right|$

92. The resultant of $\vec{A}$ and $\vec{B}$ makes an angle α with $\vec{A}$ and β with $\vec{B}$,

(1) $\alpha < \beta$

(2) $\alpha < \beta$ *if* $A < B$

(3) $\alpha < \beta$ *if* $A > B$

(4) $\alpha < \beta$ *if* $A = B$

93. A particle is moving with speed 6 m/s along the direction of $\vec{A} = 2\hat{i} + 2\hat{j} - \hat{k}$, then its velocity is

(1) $\left(4\hat{i} + 2\hat{j} + 4\hat{k}\right)$ m/s

(2) $\left(4\hat{i} + 4\hat{j} - 2\hat{k}\right)$ m/s

(3) $\left(4\hat{i} + 4\hat{j} + 2\hat{k}\right)$ m/s

(4) $\left(4\hat{i}+4\hat{j}-6\hat{k}\right)$ m/s

94. The magnitudes of vectors $\vec{A}$, $\vec{B}$ and $\vec{C}$ are respectively 12, 5 and 13 units, if $\vec{A}+\vec{B}+\vec{C}=0$, then the angle between $\vec{A}$ and $\vec{B}$ is :

(1) 0

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

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

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

95. The initial velocity of a projectile is $\vec{u}=\left(4\hat{i}+3\hat{j}\right)m/s$ it is moving with uniform acceleration $\vec{u}=\left(4\hat{i}+3\hat{j}\right)m/s$ The magnitude of its velocity after 10s is

(1) 3 m/s

(2) $7\sqrt{2}$ m/s

(3) 5 m/s

(4) 10 m/s

96. The vector sum of two forces is perpendicular to their vector differences. In that case, the forces

(1) are equal to each other.

(2) are having equal magnitude.

(3) are not equal to each other in magnitude.

(4) Cannot be predicted.

97. A truck travelling due north at 20m/s turns westwards and travels at the same speed. The change in velocity will be

(1) $40\ m/s\ N-W$

(2) $20\sqrt{2}\ m/s\ N-W$

(3) $40\ m/s\ S-W$

(4) $20\sqrt{2}\ m/s\ S-W$

98. Statement A : A null vector is a vector whose magnitude is zero and its direction is arbitrary.

Statement B : A null vector does not exist.

(1) A true, B false

(2) A and B false

(3) A and B are true

(4) A false b true

99. When n vectors of different magnitudes are added, we get a null vector. Then the value of n cannot be

(1) 11

(2) 4

(3) 3

(4) 2

100. Given that $\vec{A}+\vec{B}+\vec{C}=\vec{0}$. Out of these three vectors two are equal in magnitude and the magnitude of the third vector is $\sqrt{2}$ times as that of either of the two having equal magnitude. Then the angles between vectors are given by :

(1) $30^o, 60^o, 90^o$

(2) $45^o, 45^o, 90^o$

(3) $90^o, 45^o, 45^o$

(4) $90^o, 135^o, 135^o$

101. The angle between $\hat{i}+\hat{j}+\hat{k}$ and Z-axis is

(1) $\tan^{-1}\left[\frac{1}{\sqrt{3}}\right]$

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

(3) $\text{cosec}^{-1}\left[\frac{1}{\sqrt{3}}\right]$

(4) $\cos^{-1}\left[\frac{1}{\sqrt{3}}\right]$

102. A particle is situated at the origin of a coordinate system. The following forces begin to act on the particle simultaneously,
$\vec{F}_1 = 5\hat{i} - 5\hat{j} + 5\hat{k}$, $\vec{F}_2 = 2\hat{i} + 8\hat{j} + 6\hat{k}$,
$\vec{F}_3 = -6\hat{i} + 4\hat{j} - 7\hat{k}$, $\vec{F}_4 = -\hat{i} - 3\hat{j} - 2\hat{k}$.
Then the particle will move:
(1) in X–Y plane
(2) in Y–Z plane
(3) in Z–X plane
(4) along X–axis

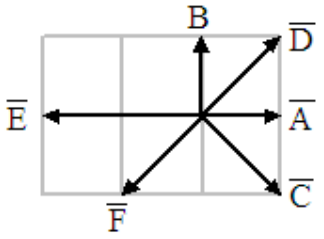
103. If $\vec{a} = 3\hat{i} + 4\hat{j}$ *and* $\vec{b} = 7\hat{i} + 24\hat{j}$ then the vector having the same magnitude as $\vec{b}$ and same direction as $\vec{a}$ is _____.
(1) $15\hat{i} + 25\hat{j}$
(2) $14\hat{i} + 20\hat{j}$
(3) $10\hat{i} + 20\hat{j}$
(4) $15\hat{i} + 20\hat{j}$

104. Two forces, each of magnitude F have a resultant of the same magnitude F. The angle between the two forces is
(1) 45°
(2) 120°
(3) 150°
(4) 60°

105. For a particle in motion in a plane, if the angle between the velocity vector and acceleration vector is a right angle always, then the particle
1) is speeding up along its path
2) is slowing down along its path
3) may be speeding up or slowing down
4) is neither speeding up nor slowing down

106. The magnitude of sum of two vectors compared to sum of their individual magnitudes
(1) is always less
(2) is always more
(3) is less or equal
(4) is more or equal

107. Which vector sum is equal to the vector $\bar{A}$ in the diagram?



1) $\bar{C} + \bar{D}$
2) $\bar{C} + \bar{D} + \bar{E}$
3) $\bar{C} + \bar{F}$
4) $\bar{B} + \bar{C}$

108. From a point on the ground a particle of mass m is projected with initial velocity $\bar{u} = a\hat{i} + b\hat{j} + c\hat{k}$, its speed in the X-Y plane
(1) $\sqrt{a^2 + b^2}$
(2) $\sqrt{c^2 + b^2}$
(3) $\sqrt{c^2 + a^2}$
(4) $\sqrt{a^2 + b^2 + c^2}$

109. If $\bar{A} = \bar{a} + \bar{b}$ and $\bar{B} = \bar{a} - \bar{b}$, given that the angle between the vectors $\bar{a}$ and $\bar{b}$ is 60°, then the angle between the vectors $\bar{A} + \bar{B}$ and $\bar{A} - \bar{B}$ is
1) 30^0
2) 60^0
3) 90^0

4) 120^0

110. The x and y coordinates of the particle at any time are $x=5t-2t^2$ and $y=10t$ respectively, where x and y are in meters and t in seconds. The acceleration of the particle at t=2s is

1) 5 m/s^2

2) -4 m/s^2

3) -8 m/s^2

4) 0

111. Which of the following group of concurrent forces may be in equilibrium (R=0)?

	A	B	C
1)	10	20	40
2)	3	5	1
3)	20	20	20
4)	40	30	5

112. Is it possible to add three equal-magnitude vectors and obtain a vector sum of zero? If yes, what are the angles between them, pair by pair?

1) No,Not possible

2) 60^0, 60^0, 60^0

3) 120^0, 120^0, 120^0

4) 60^0, 120^0, 180^0

113. If $\bar{a}$ and $\bar{b}$ are two vectors, then $|\bar{a}-\bar{b}|=\sqrt{a^2+b^2-2ab\cos\theta}$. In this formula θ is the angle between

1) $\bar{a}$ and $\bar{b}$

2) $\bar{a}$ and $-\bar{b}$

3) $-\bar{a}$ and $\bar{b}$

4) $(\bar{a}+\bar{b})$ and $(\bar{a}-\bar{b})$

114. Two forces of equal magnitude are acting at a point with an angle of 60^0 between them. If the resultant force is equal to $40\sqrt{3}N$, the magnitude of each force is

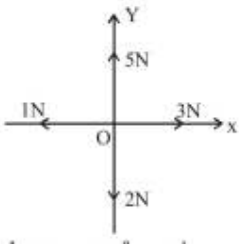
1) 40N

2)20N

3)80N

4)30N

115. In the shown figure what amount of force and in which direction we should apply so that net force acts along x-axis only



1) 3N along –ve of y-axis

2)3N along +ve of y-axis

3)2N along –ve of x-axis

4)2N along +ve of x-axis

116. Given $\vec{a}+\vec{b}=2\hat{i}$, if $\vec{b}=3\hat{j}-\hat{k}$ then find out vector $\vec{a}$

1) $2\hat{i}+3\hat{j}+\hat{k}$

2) $2\hat{i}-3\hat{j}+\hat{k}$

3) $\hat{j}+\hat{k}$

4) $2\hat{i}-\hat{j}-\hat{k}$

117. The magnitude of pairs of displacement vectors are given. Which pairs of displacement vectors cannot be added to give a resultant vector of magnitude 13 cm

i) 4cm, 12 cm ii) 4cm, 8cm

iii) 6cm, 8cm iv) 1 cm, 15 cm

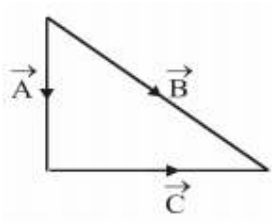
1) ii,iv

2)i,ii

3)i,iii

4)ii,iii

118. For the given vectors, which of the following option is correct



1) $\vec{A}+\vec{B}=\vec{C}$

2) $\vec{A}+\vec{C}=\vec{B}$

3) $\vec{B}+\vec{C}=\vec{A}$

4) None of these

119. True statements in the following is/are

a) for a vector $\vec{P}$, $\left|\vec{P}\right|$ can be -5 unit

b) $\left|\hat{N}\right|=1$

c) Magnitude of any vector is a scalar

d) Unit vectors of parallel vectors are equal

1) a only

2) a,b,c only

3) b,c,d only

4) a,c,d only

120. The magnitude of a vector cannot be

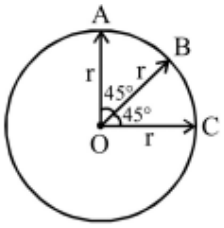
1) Positive

2) Unity

3) negative

4) zero

121. The resultant of the three vectors $\overrightarrow{OA},\overrightarrow{OB}$ and $\overrightarrow{OC}$ shown in figure



1)r

2) 2r

3) $r\left(1+\sqrt{2}\right)$

4) $r\left(\sqrt{2}-1\right)$

122. The angle between the vectors $\left(\hat{i}+\hat{j}\right)$ and $\left(\hat{j}+\hat{k}\right)$ is

1) 90^0

2) 180^0

3) 0^0

4) 60^0

123. Two vectors $\vec{A}=4i+\alpha j+2k$ and $\vec{B}=2i+j+k$ are parallel if

1) $\alpha=0$

2) $\alpha=1$

3) $\alpha=2$

4) $\alpha=4$

124. A lift is moving up. The distance between the floor and top of lift is H. A coin is projected up from the floor. The coin hits back the floor. What is the displacement of coin with respect to lift?

1) H down

2) H up

3) zero

4) none

125. Velocity of A is 4 m/s east. Velocity of B is $4\sqrt{2}m/s$ north east. What is the actual velocity of A wrt B?

1) 4 m/s north

2) 4m/s south

3) 8m/s south

4) 8m/s north

126. Eleven forces each equal to 5N act on a particle simultaneously. If each force makes an angle 30^0 with the next one, the resultant of all forces is

1)15N

2) 55N

3) 5N

4) zero

127. A vector $3\hat{i}+4\hat{j}$ rotates about its tail through an angle 37^0 in anticlockwise direction then the new vector is

1) $-3\hat{i}+4\hat{j}$

2) $3\hat{i}-4\hat{j}$

3) $5\hat{i}$

4) $5\hat{j}$

128. A boy is hanging from a horizontal branch of a tree. The tension in the arms will be maximum when the angle between the arms is

1) 0^0

2)30^0

3) 60^0

4) 120^0

129. IF $\vec{P}+\vec{Q}=\vec{R}$ and $\vec{P}-\vec{Q}=\vec{S}$, then R^2+S^2 is equal to

1) P^2+Q^2

2) $2\left(P^2-Q^2\right)$

3) $2\left(P^2+Q^2\right)$

4) $4PQ$

130. A particle is moving eastwards with a velocity of $5ms^{-1}$. In 10S, the velocity changes to $5ms^{-1}$ north wards. The average acceleration in this time is

1) $\frac{1}{\sqrt{2}}ms^{-2}$ towards north east

2) $\frac{1}{2}ms^{-2}$ towards north

3) zero

4) $\frac{1}{\sqrt{2}}ms^{-2}$ towards northwest

131. Wind is blowing from the south at $5ms^{-1}$. To a cyclist it appears to be blowing from the east at $5ms^{-1}$. The velocity of the cyclist is

_____

1) $5\sqrt{2}ms^{-1}$ towards north-west

2) $5\sqrt{2}ms^{-1}$ towards north-east

3) $5\sqrt{2}ms^{-1}$ towards south – west

4) $5\sqrt{2}ms^{-1}$ towards south – east

132. Maximum and minimum magnitudes of the resultant of two vectors of magnitudes P and Q are found to be in the ratio 3:1. Which of the following relations is true?

1)P=Q

2) P=2Q

3)P=4Q

4)P=Q/3

133. A mass M kg is suspended by a weightless string. The horizontal force required to hold the mass at 60^0 with the vertical is

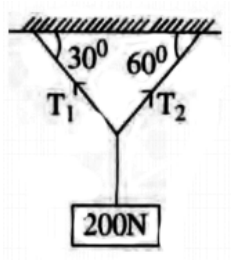
1) Mg

2) $Mg\sqrt{3}$

3) $Mg\left(\sqrt{3}+1\right)$

4) $\frac{Mg}{\sqrt{3}}$

134. From the figure, if the mass is at equilibrium then find T_1 and T_2



1) 100N, $100\sqrt{3}N$

2) 200N, $100\sqrt{3}N$

3) $100\sqrt{3}N$ N, 200N

4) $100\sqrt{3}N$, 100N

135. Two stones are projected from the top of a tower in opposite directions, with the same velocity V but at 30^0 and 60^0 with horizontal respectively. The relative velocity of first stone relative to second stone is

1) 2V

2) $\sqrt{2}V$

3) $\frac{2V}{\sqrt{3}}$

4) $\frac{V}{\sqrt{2}}$

CHEMISTRY

136. The atomic number of the element unnilennium is

(1) 109

(2) 102

(3) 108

(4) 119

137. For which of the following orbitals m=0

(1) 2s

(2) $3p_x$

(3) $3d_{z^2}$

(4) Both 1 and 3

138. The IUPAC symbol for the element with atomic number 119 would be

(1) une

(2) unh

(3) uun

(4) uue

139. The element with Z= 120 (not yet discovered) will be an / a

(1) inner – transition metal

(2) alkaline earth metal

(3) Alkali metal

(4) Transition metal

140. In the long form of the periodic table, the valence shell electronic configuration of $5s^25p^4$ corresponds to the element present in

(1) Group 16 and period 6

(2) Group 17 and period 5

(3) Group 16 and period 5

(4) Group 17 and period 6

141. Arrange in decreasing order, the energy of 2s orbital in the following atoms H,Li,Na and K

(1) $E_{2s}(H) > E_{2s}(Li) > E_{2s}(Na) > E_{2s}(K)$

(2) $E_{2s}(H) > E_{2s}(Na) > E_{2s}(Li) > E_{2s}(K)$

(3) $E_{2s}(H) > E_{2s}(Na) = E_{2s}(K) > E_{2s}(Li)$

(4) $E_{2s}(K) > E_{2s}(Na) > E_{2s}(Li) > E_{2s}(H)$

142. The longest and shortest periods in modern periodic table are

(1) 1 and 6

(2) 2 and 6

(3) 6 and 1

(4) 1 and 7

143. The element which can be placed in two different groups of the periodic table., i.e 1(I A) and 17(VII A), also called as Rouge element is

(1) Oxygen

(2) Flourine

(3) Lithium

(4) Hydrogen

144.

List-I (At No)	List II (block)
A) 56	P) p
B) 53	Q) f
C) 80	R) s
D) 64	S) d

The correct match is

(1) A-P, B-R, C-S, D-Q

(2) A-R, B-P, C-S, D-Q

(3) A-Q, B-P, C-R, D-S

(4) A-Q, B-R, C-P, D-S

145. Which of the following is a d-Block element but not a transition element

(1) Sc

(2) Zn

(3) Mn

(4) Ni

146. The general electronic configuration of p-block is

(1) $ns^{1\,to\,2}$

(2) $ns^2np^{1\,to\,6}$

(3) $(n-1)d^{0\,to\,1}ns^2$

(4) $(n-1)d^{1\,to\,10}ns^2$

147. The element with the electronic configuration $[Rn]7s^2 6d^2$ belongs to _____ block (At. No. of Rn = 86)

(1) f

(2) d

(3) s

(4) p

148. Non metals are mostly present in _____ block

(1) s

(2) f

(3) p

(4) d

149. In ψ_{321}, the sum of orbital angular momentum, spherical nodes and Angular node is

(1) $\frac{\sqrt{6}h+4\pi}{2\pi}$

(2) $\frac{\sqrt{6}h}{2\pi}+3$

(3) $\frac{\sqrt{6}h+2\pi}{2\pi}$

(4) $\frac{\sqrt{6}h+8\pi}{2\pi}$

150. Element with atomic number 30 belongs to

(1) s- block

(2) d-block

(3) p-block

(4) f-block

151. The group in which all the elements do not have same number of electrons in there valence shell is

(1) 18^{th}

(2) 2^{nd}

(3) 1^{st}

(4) 7^{th}

152. The 4d-transition series contains elements having atomic numbers from

(1) 21 to 30

(2) 39 to 48

(3) 57 to 80

(4) 89 to 112

153. The period that contains solids, liquid and gaseous element is

(1) 1

(2) 2

(3) 3

(4) 4

154. The long form of periodic table is graphical representation of _____ principle

(1) Pauli's

(2) Hund's

(3) Aufbau's

(4) Uncertainty

155. The outer shell configuration of elements present in the IVA group and 3^{rd} period is

(1) $4s^2 4p^2$

(2) $4s^2 4p^4$

(3) $3s^2 3p^2$

(4) $3s^2 3p^4$

156. The elements with atomic number 34 belongs to

(1) IV-A group, 4^{th} period

(2) IV-A group , 5^{th} period

(3) IV-A group, 6^{th} period

(4) VI-A group, 4^{th} period

157. The period that includes all blocks of elements is

(1) 1

(2) 2

(3) 3

(4) 6

158. The position of the element with Z=106 in the periodic table is

(1) d-block

(2) s-block

(3) f-block

(4) p-block

159. If n and l are respectively the principal and Azimuthal quantum numbers, then the expression for the calculation of the total number of electrons in any energy level is

(1) $\sum_{l=0}^{l=n} 2(2l+1)$

(2) $\sum_{l=n+1}^{l=n-1} 2(2l+1)$

(3) $\sum_{l=0}^{l=n+1} 2(2l+1)$

(4) $\sum_{l=0}^{l=n-1} 2(2l+1)$

160. First element in f-block is present in ____ period

(1) 3^{rd}

(2) 4^{th}

(3) 5^{th}

(4) 6^{th}

161. Lanthanum (Z=57) belongs to

(1) s-block

(2) p- block

(3) d-block

(4) f-block

162. All the following elements are f-block except

(1) Z=82

(2) Z=90

(3) Z=64

(4) Z=71

163. Number of elements in III-B (3^{rd} group) is

(1) 4

(2) 32

(3) 28

(4) 18

164. Electronic configuration of an element is $[Ne]3s^2 3p^6 3d^5 4s^1$. It belongs to _____ block

(1) s- block

(2) p-block

(3) d-block

(4) f-block

165. Rare earths are generally

(1) d-block

(2) Pnicogens

(3) Halogens

(4) Lanthanides

166. In the sixth period, the orbitals being filled with electrons are

(1) $5s, 5p, 5d$

(2) $6s, 6p, 6d, 6f$

(3) $6s, 5f, 6d, 6p$

(4) $6s, 4f, 5d, 6p$

167. Which of the following is not Dobereiner's triad?

(1) Li, Na, K

(2) C,N,F

(3) Ca,Sr, Ba

(4) Cl,Br, I

168. Eka aluminium is

(1) Ge

(2) B

(3) Ga

(4) Si

169. The pair of elements with the following atomic numbers have the similar chemical properties

(1) 13, 22

(2) 3,11

(3) 4,24

(4) 2,1

170. Total number of orbitals that are possible with (n+l) value equal to 6 are

(1) 4

(2) 9

(3) 16

(4) 7

171. The impossible set of Quantum number is

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

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

(3) $n = 2, l = 0, m = 1, s = -1/2$

(4) $n = 3, l = 1, m = -1, s = -1/2$

172. According to Newland's law of octaves, carbon resembles in its properties with

(1) Mg

(2) Si

(3) P

(4) S

173. According to Schrodinger model, nature of electron in an atom is as

(1) Particles only

(2) Wave only

(3) Both 1 and 2 simultaneously

(4) Some times waves and some times particles

174. Nitrogen atom has 3 un-paired electrons in its ground state. It can be explained by

(1) Aufbau's principle

(2) Pauli's principle

(3) Hund's rule

(4) Heisenberg uncertainty principle

175. The starting element of fifth period is

(1) K

(2) Rb

(3) Kr

(4) Na

176. Which among the following is an anomalous pair in Mendeleev's periodic table

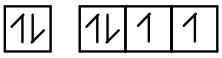
(1) Te, I

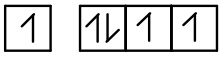
(2) Na, Mg

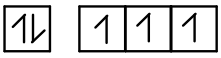
(3) P,S

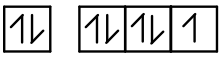
(4) C,N

177. In which of the following only Aufbau's principle is violated?

(1) 

(2) 

(3) 

(4) 

178. The incorrect statement regarding d-block elements is

(1) The elements are electropositive and are metals

(2) Most of the elements possess catalytic activity

(3) They forms alloy and interstitial compounds

(4) All are solids at room temperature

179. Which element in long form of periodic table has pseudo-inert configuration, i.e 18 electrons in outer most shell

(1) Ag

(2) Cu

(3) Ne

(4) Pd

180. Second period consists of Eight elements, as four orbitals, i.e 2s(one) and 2p(three) are filled .How many elements will be present in 2^{nd} period, if let us assume spin quantum number takes three values, $+\frac{1}{2}, 0, -\frac{1}{2}$.

(1) 8

(2) 12

(3) 18

(4) 9