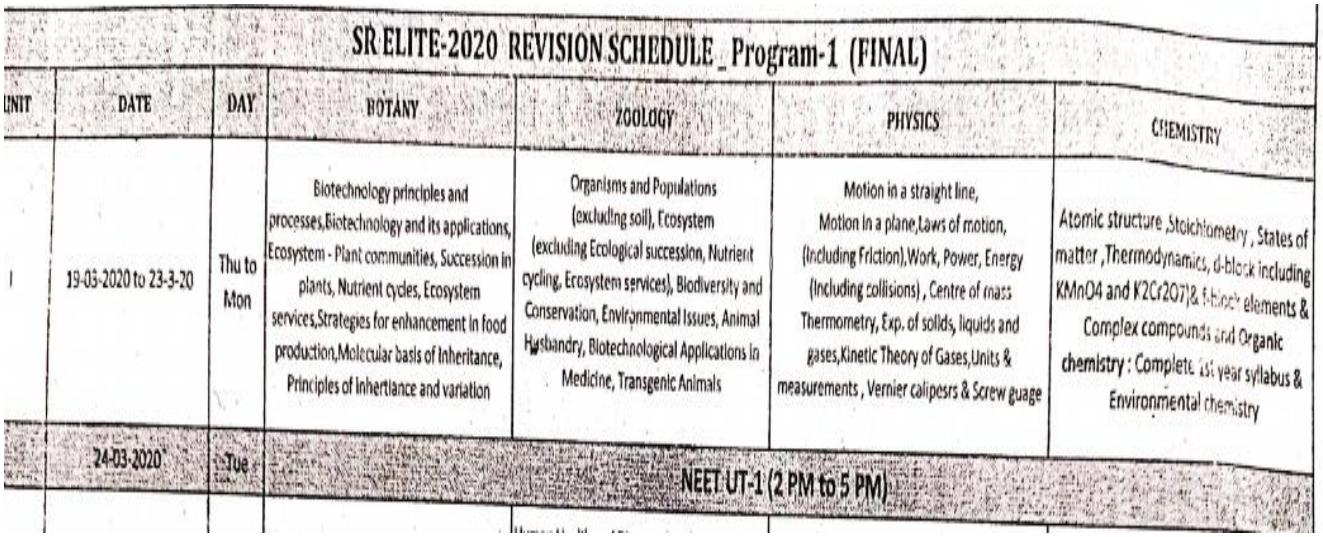
SYLLABUS

SR ELITE SRICHAITANYA 23.03.2020



SR ELITE-2020 REVISION SCHEDULE _ Program-1 (FINAL)

UNIT	DATE	DAY	BOTANY	ZOOLOGY	PHYSICS	CHEMISTRY
I	19-03-2020 to 23-3-20	Thu to Mon	Biotechnology principles and processes,Biotechnology and its applications, Ecosystem - Plant communities, Succession in plants, Nutrient cycles, Ecosystem services,Strategies for enhancement in food production,Molecular basis of Inheritance, Principles of inheritance and variation	Organisms and Populations (excluding soil), Ecosystem (excluding Ecological succession, Nutrient cycling, Ecosystem services), Biodiversity and Conservation, Environmental Issues, Animal Husbandry, Biotechnological Applications in Medicine, Transgenic Animals	Motion in a straight line, Motion in a plane,Laws of motion, (Including Friction),Work, Power, Energy (Including collisions) , Centre of mass Thermometry, Exp. of solids, liquids and gases,Kinetic Theory of Gases,Units & measurements , Vernier calipesrs & Screw guage	Atomic structure ,Stoichiometry , States of matter ,Thermodynamics, d-block including KMnO4 and K2Cr2O7)& f-block elements & Complex compounds and Organic chemistry : Complete 1st year syllabus & Environmental chemistry
	24-03-2020	Tue	NEET UT-1 (2 PM to 5 PM)			

SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA.

NARAYANAGUDA

SEC : SR ELITE **PRE NEET UNIT TEST - 1**

SUB: BOTANY **Max. Marks :720**

IMPORTANT INSTRUCTIONS :

- **Pattern of the Entrance Examination**:-
  Paper containing 180 objective type questions ,from Biology, Physics and Chemistry
- **Use Blue/Black Ball Point Pen only** to darken the appropriate circle. Answers marked with pencil would not be evaluated.
- Each item carries **4marks**. For each correct response the candidate will get 4 marks. For each incorrect response **1mark** will be deducted from the total score

01. Biotechnology is the integration of natural science and
(1) Organism
(2) Cell
(3) Parts of cells
(4) All the above

02. Which of the following core technique enabled birth of modern biotechnology
(1) Genetic engineering
(2) Maintenance of sterile ambience in chemical engineering processes
(3) Bioinformatics
(4) Both 1 & 2

03. Which of the following processes or techniques are included under biotechnology
(1) *invitro* fertilization leading to a test tube baby
(2) synthesising a gene and using it
(3) developing DNA vaccine
(4) all the above

04. Which of the following is the operational technique in biotechnological process where one or more nutrients are supplied in incremental manner
(1) Batch culture
(2) Continuous culture
(3) Fed batch culture
(4) Both 2 and 3

05. Which of the following is currently the most popular vector for cloning large pieces of DNA
(1) BAC
(2) YAC
(3) PAC
(4) Fosmids

06. Which of the following is absent in P^{BR322}
(1) Bam HI
(2) Hind III
(3) 'Cos' site
(4) rop

07. In PCR what is the correct sequence of events
(1) Extension → Annealing → Denaturation
(2) Denaturation → Polymerisation → Annealing
(3) Denaturation → Annealing → proof reading
(4) Denaturation → Annealing → Extension

08. Which of the following is not considered as critical research areas of biotechnology
(1) providing best catalyst in form of improved organism
(2) creating optimum conditions for catalyst
(3) creating suitable host
(4) downstreaming processes

09. Cry IAc and cry IIAb control the
(1) Cotton borers
(2) Cotton stem borers
(3) Cotton bollworms
(4) all types of cotton insects

10. Which of the following is/are the drawback of GMP
(1) unintended harm to other organisms
(2) gene transfer in non target organism
(3) Allergies
(4) all the above

11. In F2 of mendelian dihybrid cross, how many plants are double homozygous
(1) 1/16
(2) 2/16
(3) 4/16
(4) 8/16

12. In plant breeding programmes, selected hybrid progeny is immediately followed by
(1) Testing / evaluation
(2) Selfing
(3) Hardening
(4) Commercialisation

13. During green revolution, which of the following rice varieties were introduced in India
(1) Jaya & Ratna
(2) IR – 8 & TN – 1
(3) IR – 8 & Padama
(4) Reimei & Aromatica

14. Resistance to yellow mosaic virus in Parbhani Kranti variety was developed by
(1) mutation breeding
(2) cross hybridisation with wild relatives
(3) Genetic engineering
(4) Somaclonal variations

15. Which of the following wheat variety is associated with high protein content
(1) Himgiri
(2) Sonalika
(3) Atlas – 66
(4) Kalyam sona

16. In nucleic acid, the bases in two strands are paired through
(1) Phosphodiester bond
(2) Phosphoester bond
(3) Hydrogen bonds
(4) Glycosidic bond

17. The unequivocal proof that DNA is a genetic material came from the experiments of
(1) Griffith
(2) Avery, Macleod & Mc Carti
(3) Hershey & Chase
(4) Watson & Crick

18. Inheritance of character affected by
(1) Structural gene
(2) Promoter
(3) Regulatory sequences of structural gene
(4) All the above

19. Which of the following play structural and catalytic role during translation
(1) r – RNA
(2) m – RNA
(3) t – RNA
(4) Sc – RNA

20. Which of the following is not an event of gene expression
(1) Replication of DNA
(2) Transcription
(3) Processing of hnRNA
(4) Translation

21. Which of the following genetic code has dual functions in Eukaryotic code
(1) GUG
(2) AUG
(3) UAA

(4) UAG

22. UTRs are present at
(1) $5'$ end
(2) $3'$ end
(3) both $5'$ end and $3'$ end
(4) either on $5'$ and or $3'$ end

23. In *lac operon* β - galactosidase synthesised by
(1) i - gene
(2) z – gene
(3) y – gene
(4) a – gene

24. Which enzyme is responsible for SnRNA formation?
(1) RNA polymerase I
(2) RNA polymerase II
(3) RNA polymerase III
(4) DNA ligase

25. 'Sonalika' is the improved variety of a crop namely
(1) Maize
(2) Pea
(3) Rice
(4) Wheat

26. Wheat variety resistant to leaf and stripe rust is
(1) Sonalika
(2) Himgiri
(3) HUW 468
(4) Sonora 64

27. Match the right option

	Column–I		Column-II
A.	Dee geo – Woo - gen	i.	Rice
B.	Sharbati Sonora	ii.	Mutation
C.	Cow pea	iii.	Pusa komal
D.	Chilli	iv.	Pusa Sadabahar

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

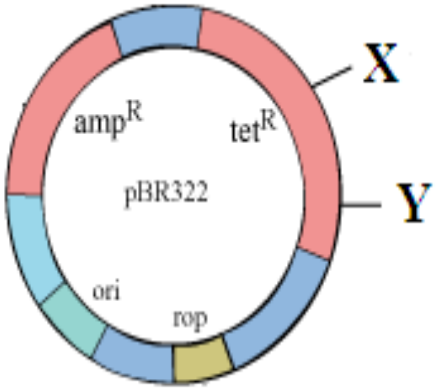
28. In successive seral stages there is change in the
(1) diversity of species
(2) number of species
(3) total biomass
(4) all the above

29. DNA of a bacterium is not cleaved by its own restriction enzymes because the recognition DNA sequences are
(1) Methylated
(2) Deleted
(3) Bound by inhibitory proteins
(4) All of the above

30. In an experiment individual homozygous for ab genes were crossed with wild type (++). The F_1 hybrid thus produced was test crossed and progenies produced in following ratio ++540, ab 360, +a 40, +b 60. Calculate the distance between b and a genes
(1) 10 m.u.
(2) 20 m.u.
(3) 44 m.u.
(4) 45 m.u.

31. A heterozygous round seeded non pleotrophic pea plant is crossed with wrinkled seeded pea plant. How many plants produce large sized starch grain out of 2000 progenies obtained?
(1) 1000
(2) 0
(3) 1500
(4) 750

32. Identify the restruction enzyme used to cut the site 'X', 'Y' respectively.



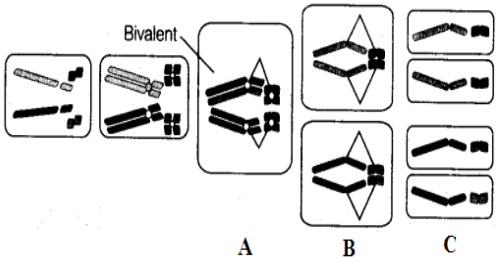
(1) Pvu I, Pst I
(2) Bam H I, Sal I
(3) Pvu II, Pst I
(4) Sal I, Bam H I

33. 'Central dogma' of molecular biology was proposed by
(1) Watson
(2) F. Crick
(3) Hershey and Chase
(4) Nirenberg

34. Find out the correct statements from the followings List
a) In *lac* – operon structural gene is regulated by a common promoter and regulatory gene
b) In *lac* – operon one regulatory gene (the i gene) is present, here the term i refers to the inducer
c) Lactose is the substrate for the enzyme *beta galactosidase* and it regulates switching on and off of the operon
d) The y – gene codes for *beta – galactosidase.*
e) The z – gene of lac – operon codes for *transacetylase*.
(1) a and c
(2) a, b and e
(3) a. c and e
(4) a, c, d and e

35. Presence of sampling ports in a bioreactor is meant for
(1) Facilitating even maxing of culture
(2) Enhancing oxygen availability throughout bioreactor
(3) Collection of raw material used in preparation of culture
(4) Withdrawing small volume of culture periodically

36. Label the stages B, C, A respectively



(1) Anaphase I, Anaphase II, Germ cells
(2) Anaphase II, Anaphase I, Germ cells
(3) Anaphase II, Germ cells, Anaphase I
(4) Anaphase I, Germ cells, Anaphase II

37. 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) It is *in-vitro* amplification of DNA

38. Which of the following is/ are true?
I. Biowar is the use of biological weapons against human and /or their crops and animals.
II. Biopiracy is the unauthorised use of bioresources and traditional knowledge related to bioresources for commercial benefits
III. Biopatent is exploitation of bioresources of other nations without proper authorization.
(1) II and III
(2) I and III
(3) I and II
(4) I, II and III

39. Chemical method, that was instrumental in synthesising RNA molecules with defined combinations of bases was developed by
(1) Marshal Nirenberg
(2) H.G. Khorana
(3) Severo Ochoa
(4) Crick

40. In which of the following aspect phosphorus cycle is different from carbon cycle
(1) respiratory release
(2) atmospheric input
(3) types of biogeochemical cycle
(4) all the above

41. Which of the following vector is used extensively for genetic engineering in animals?
(1) *E. coli*
(2) Ti plasmid
(3) *Bacillus thuringiensis*
(4) Retrovirus (disarmed)

42. Which of the following bacterial RNA act as ribozyme?
(1) 16S r-RNA
(2) 5S r – RNA
(3) 23S r – RNA
(4) 18S r – RNA

43. Select incorrect statement
(1) Modified alleles can produce dominant trait
(2) 3 : 1 ratio in F_2 explain purity of gametes
(3) Recessive trait is generally seen due to modified gene
(4) Unmodified allele produces non functional enzyme

44. Choose the incorrect match.
(1) *Ori* – Responsible for controlling the copy number of linked DNA.
(2) *Rop* – Codes for the protein involved in replication of plasmid.
(3) *Hind* III – Restriction site on pBR322
(4) Normal *E.coli* - resistance for ampicillin and tetracyclin.

45. Post transcription processing is required for synthesis of functional
(1) r – RNA
(2) m - RNA
(3) t – RNA
(4) all the above

46. To attract the bees for pollination the flowers of plants show the following adaptations
(1) Bright colouration of petals
(2) Emission of electric currents
(3) Alluring fragrance
(4) All of these

47. A migratory fish is 'X' with respect to tolerance to temperature and 'Y' with respect to tolerance to salinity.
'X' and 'Y' are
(1) X-Eurythermal; Y-Stenohaline
(2) X-Eurythermal; Y-Euryhaline
(3) X-Stenothermal; Y-Euryhaline
(4) X-Stenothermal; Y-Stenohaline

48. In different population interactions when cattle interacts with 'A', 'B' and 'C' respectively, the cattle likely to be 'Beneficiary', 'Neutral' and 'Detrimental' in
(1) A-Cellulolytic bacteria; B-Cattle egret; C-Ticks
(2) A-Cattle egret; B-Cellulolytic bacteria; C-Ticks
(3) A-*Sterpotococcus* bacteria; B-Cattle egret; C-Ticks
(4) A-Streptococcus bacteria; B-Cattle egret; C-Cellulolytic bacteria

49. In animals, all are mostly influenced by photoperiod except
(1) Respiration
(2) Breeding

(3) Migration
(4) Reproduction

50. Shorter ears and limbs in mammals of colder region mainly help in
(1) Minimizing heat production
(2) Minimizing heat loss
(3) Maximizing the light absorbency
(4) Minimizing the light absorbency

51. Read the following
(a) Geometric growth pattern results in J-shaped curves
(b) Exponential growth model is considered a more realistic curve
(c) Any species growing exponentially under unlimited resource conditions can reach enormous population densities in a short time
(d) The exponential growth equation is

$$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$$

In the above, the set of correct statements with respect to exponential growth curve is
(1) (a) and (b)
(2) (a) and (c)
(3) (b) and (d)
(4) (b) and (c)

52. Pacific salmon breeds ---- in its life time
(1) Once
(2) Twice
(3) Three times
(4) Many times

53. The mechanism that promotes co-existence rather than competitive exclusion can be explained in
(1) *Balanus* and *Chthamalus*
(2) Goat and Abingdon tortoise
(3) Yellow-rumped and Blackburnian warblers
(4) Visiting flamingos and Resident fishes

54. Though both predation and parasitism are '+' and '–' relationships, the predators differ from parasites by showing
(1) Multicellular nature
(2) Free living mode of life
(3) Aerobic respiration
(4) Decrease in their size than to preys

55. Match the column-I with column-II and select the correct option using the codes given below pertaining to pond ecosystem

Column-I	Column-II
A. Marginal plant	I. *Azolla*
B. Submerged plant	II. *Batrachospermum*
C. Floating plant	III. *Vallisneria*
D. Phytoplankton	IV. *Sagittaria*

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

56. Detrivorous annelids are
(1) Bristle worms
(2) Millipedes
(3) Earthworms
(4) Leeches

57. PP, PC, SC and TC are the codes of different trophic levels from bottom to top in a pyramid of numbers. Identify the correct with respect to the above codes
(1) PC = SC in parasitic pyramid
(2) TC > PP in seawater pyramid
(3) PP > PC in lake pyramid
(4) PC < SC in grassland pyramid

58. The following factor(s) is/are reason(s) for limited productivity in oceanic ecosystems
(1) The amount of light reaching the ocean surface decreases with the increasing depth of the ocean

(2) Deficiency of nitrogen in oceans, an important mineral in the growth of plants.
(3) Both 1 and 2
(4) Availability of more carbon in water

59. Read the following with respect to pyramid of biomass
(a) In terrestrial ecosystems, it is inverted
(b) In aquatic ecosystems, always upright
Select the correct answer from the following codes
(1) (a) and (b) are true
(2) (a) is true but (b) is false
(3) (a) and (b) are false
(4) (a) is false but (b) is true

60. By the following process the water soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts
(1) Fragmentation
(2) Leaching
(3) Catabolism
(4) Mineralization

61. Identify the incorrect statement from the following with respect to an ecosystem
(1) DFCs are major conduit of energy flow in an aquatic ecosystem
(2) Flow of energy is always unidirectional
(3) Nutrients are cyclic between living beings and environment
(4) It is self sustainable unit

62. Assuming that the energy transfer efficiency between trophic levels is 10%, how much 'productivity' of plants is required to produce 100 kg of tiger biomass if the plants are eaten by deer and deer in turn are eaten by tiger?
(1) 100 kg
(2) 1000 kg
(3) 10, 000 kg
(4) 1, 00, 000 kg

63. Cockroach and crow are similar
(1) In showing homology w.r.t to wings
(2) In having homeothermy
(3) In possessing omnivorous nature
(4) In lacking light weight for flight

64. For the preservation of biological diversity in India, the Biological Diversity Act was introduced by the Parliament in the year
(1) 2002
(2) 1992
(3) 2012
(4) 1974

65. Read the following statements
(A) Biodiversity conservation is a collective responsibility of all nations.
(B) Biodiversity knows no political boundaries.
(1) A is only correct
(2) Both A and B are correct
(3) B is only correct
(4) Both A and B are incorrect

66. We have a moral duty to care for their well-being and pass on our biological legacy in good order to future generations – This argument comes under
(1) Ethical
(2) Broadly Utilitarian
(3) Narrowly Utilitarian
(4) Both 2 and 3

67. According to IUCN Red List (200(4) documents the extinction of 784 species in the last 500 years. In them which were in maximum in their number of extinction?
(1) Plants
(2) Vertebrates
(3) Invertebrates

(4) All are equal in their numbers

68. All of the following are extinct pairs of mammals except
(1) Quagga and Thylacine
(2) Steller's sea cow and Bali tiger
(3) Javan and Caspian tigers
(4) Columbian grebe and Dodo

69. Which of the following is not an 'Evil Quartet'?
(1) Habitat loss
(2) Co-evolution
(3) Alien species invasion
(4) Over-exploitation

70. In which of this approach, the threatened animals and plants are taken out from their natural habitat and placed in special setting where they can be protected and given special care?
(1) *In situ* conservation: National Parks
(2) *Ex situ* conservation: Sanctuaries
(3) Offsite conservation: Zoological parks
(4) Onsite conservation: Botanical gardens

71. Endemic species are
(1) Species under threatened state in a many regions
(2) Species confined to a specific region not found anywhere else
(3) Species protected only in *ex situ* conservation
(4) Species that declared by IUCN as critically endangered

72. Species area relationship was explained by
(1) Alexander Fleming
(2) Tillman
(3) Weismann
(4) Alexander von Humboldt

73. Consider the following statements regarding the suggested measures to minimize global warming by reducing emission of greenhouse gases especially CO_2
i. Increased fuel efficiency in power plants
ii. Implementation of non-fossil fuel alternatives
iii. Halting deforestation
Which of the above statements are correct?
(1) i only
(2) i and ii
(3) ii and iii
(4) i, ii and iii

74. Which one of the following pairs is mismatched?
(1) Nuclear power plants – Radioactive wastes
(2) Solar energy – Greenhouse effect
(3) Thermal power plants – SO_2 pollution
(4) Domestic sewage – Decreased BOD

75. Release of CO by automobiles prevent transport oxygen in the body tissues by
(1) Forming a stable compound with Hb
(2) Increasing affinity between of O_2 & Hb
(3) By changing O_2 into CO_2
(4) By destroying Hb

76. Match the following and choose the correct

List-I	List-II
A. Biomagnification	I. Natural aging of lake
B. Eutrophication	II. DDT pollution
C. Ozone depletion	III. DNA damage
D. El Nino effect	IV. Odd climatic change
E. Jhum cultivation	V. Deforestation

(1) A-I, B-II, C-III, D-IV, E-V

(2) A-III, B-IV, C-I, D-II, E-V
(3) A-III, B-II, C-IV, D-I, E-V
(4) A-II, B-I, C-III, D-IV, E-V

77. Hot waste water discharged from industries into water bodies
(1) Increase nutrients in water body
(2) Is regarded as a water pollutant
(3) Increases DO of water
(4) Decreases BOD of water

78. The following pollutant in a water body that accumulated by a primary consumer cannot be metabolized or excreted
(1) Creatinine
(2) Mercury
(3) Sewage
(4) CO_2

79. Snow blindness is due to the inflammation of
(1) Lens
(2) Iris
(3) Retina
(4) Cornea

80. Ramesh Chandra Dagar, a farmer of Sonipat has created the Haryana Kisan welfare club, it is related to
(1) Integrated organic farming
(2) Uses of fertilizer
(3) Limited use of pesticides
(4) Case study of remedy for plastic waste

81. Montreal Protocol was signed at Montreal, Canada to control the emission of
(1) Greenhouse gases
(2) Ozone depletion substances
(3) Hospital wastes
(4) Automobiles

82. A transgenic animal will surely have 'foreign DNA' in its all cells if the 'foreign DNA' is
(1) Introduced into gametes
(2) Introduced into zygote
(3) Introduced into trophoblast of morula
(4) Introduced into inner cell mass of blastocyst

83. Mule
(1) Is a cross breed
(2) Is a cloned animal
(3) Has considerable economic value
(4) More reproductive efficiency than to its parents

84. Identify the mismatched combination from the following

A	B (Lack of)
(1) Mature insulin	C peptide
(2) SCID	ADA
(3) Emphysema	α-antitrypsin
(4) Rosie	α-lactalbumin

85. Which of the following is true regarding Hisardale?
(1) Bikaneri-Male parent; Marino-Female parent
(2) Stallion-Male parent; Mare-Female parent
(3) Bikaneri-Female parent; Marino-Male parent
(4) Stallion-Female parent; Mare-Male parent

86. Which of the following sets of Mendelian disorders is attempted to treat by using transgenic animals?
(1) Cystic fibrosis; Phenylketonuria
(2) Daltonism; Turner syndrome
(3) Albinism; Myasthenia gravis
(4) Alkaptanuria; Haematuria

87. The technique(s) that serve the purpose of early diagnosis of diseases is/are
(1) rDNA technology
(2) Polymerase Chain Reaction
(3) Enzyme Linked Immuno-sorbent Assay
(4) All of these

88. Read the following sets of fishes
Set A: Mackerel; Pomfret
Set B: *Hilsa*; Sardine
Set C: Catfish; Katla

Set D: Rohu; Common carp

Sekhar and Ravi have thrown fish gear into 'sea water' and 'freshwater' respectively. Which of the following is likely true with respect to catching the fishes?

(1) Sekhar: Sets A & C; Ravi: Sets B & D
(2) Sekhar: Sets A & B; Ravi: Sets C & D
(3) Sekhar: Sets C & D; Ravi: Sets A & B
(4) Sekhar: Sets B & D; Ravi: Sets A & C

89. Read the following

(a) ELISA

(b) Eli Lily

Identify the correct related to (a) and (b)

(1) (a) is discovered by (b)
(2) (a) is conducted for the first time by(b)
(3) (a) is a screening test of AIDS; (b) is a company developed humulin
(4) (a) is not used in pregnancy test; (b) company extracted insulin from pig

90. The "nectar collecting bees" in beehive are

(1) Fertile females
(2) Haploid males
(3) Polyploid females
(4) Diploid females

91. The speed of a body moving with uniform acceleration is u. This speed is doubled while covering a distance S. When it covers an additional distance S, its speed would become

(1) $\sqrt{3}u$
(2) $\sqrt{5}u$
(3) $\sqrt{11}u$
(4) $\sqrt{7}u$

92. A balloon rises from rest with a constant acceleration g/8. A stone is released from it when it has risen to height h. The time taken by the stone to reach the ground is

(1) $4\sqrt{\frac{h}{g}}$
(2) $2\sqrt{\frac{h}{g}}$
(3) $\sqrt{\frac{2h}{g}}$
(4) $\sqrt{\frac{g}{h}}$

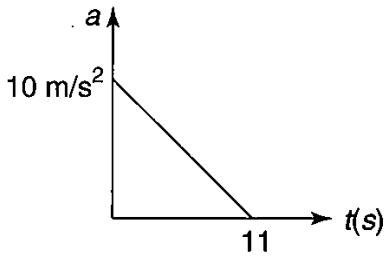
93. A body is fired vertically upwards with an initial velocity u. After an interval of T seconds , a second body is fired vertically upwards, also with initial velocity u. They meet at time t after the first body is projected then t =

(1) $\frac{u}{g}$
(2) $\frac{u}{g}+\frac{T}{2}$
(3) $\frac{u}{g}-\frac{T}{2}$
(4) They never meet

94. An object moving with a speed of 6.25 m/s, is decelerated at a rate given by $\frac{\mathbf{dv}}{\mathbf{dt}} = \mathbf{-2.5\sqrt{v}}$; where v is instantaneous speed. The time taken by the object, to come to rest, would be

(1) 1 s
(2) 2 s
(3) 4 s
(4) 8 s

95. A particle starts from rest. Its acceleration (a) versus time (t) is as shown in the figure.The maximum speed of the particle will be



(1) 110 m/s
(2) 55 m/s
(3) 550 m/s
(4) 660 m/s

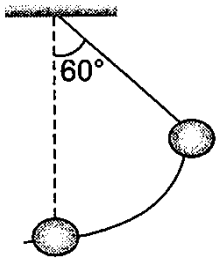
96. A stationary man observes that the rain is falling vertically downward. When he starts running with a velocity of 12 km/h , he observes that the rains is falling at an angle 60^0 with the vertical. The actual velocity of rain is
(1) $12\sqrt{3}\,km/h$
(2) $6\sqrt{3}\,km/h$
(3) $4\sqrt{3}\,km/h$
(4) $2\sqrt{3}\,km/h$

97. The maximum horizontal range of a projectile is 400 m. The maximum height attained by that projectile will be
(1) 200 m
(2) 100 m
(3) 400 m
(4) 800 m

98. A ball is rolled off the edge of a horizontal table at a speed of 4 m/second. It hits the ground after 0.4 second. Which statement given below is true
a) It hits the ground at a horizontal distance 1.6m from the edge of the table
b) The speed with which it hits the ground is 4.0 m/second
c) Height of the table is 0.8 m
d) It hits the ground at an angle of 60° to the horizontal
(1) a and b are true
(2) b and c are true
(3) a and c are true
(4) all are true

99. A man can swim in still water at a speed of 6 kmph and he has to cross the river and reach just opposite point on the other bank. If the river is flowing at a speed of 3 kmph, and the width of the river is 2km, the time taken to cross the river is (in hours)
(1) $\frac{2}{27}$
(2) $\frac{2}{\sqrt{27}}$
(3) $\frac{2}{3}$
(4) $\frac{2}{\sqrt{45}}$

100. A pendulum of length 1 m is released from $\boldsymbol{\theta_0 = 60°}$. The rate of change of speed of the bob at $\boldsymbol{\theta = 30°}$ is (g = 10 m/s²)



(1) $5\sqrt{3}m/s^2$
(2) $5m/s^2$
(3) $10m/s^2$
(4) $2.5m/s^2$

101. A coin is dropped in a lift. It takes time $\mathbf{t_1}$ to reach the floor when lift is stationary. It takes time $\mathbf{t_2}$ when the same lift is moving up with constant acceleration. Then
(1) $t_1 > t_2$
(2) $t_2 > t_1$

(3) $t_1 = t_2$

(4) we cannot say

102. A satellite in force-free space sweeps stationary interplanetary dust at a rate **dM/dt = αv** where M is the mass, v is the velocity of the satellite and **α** is a constant. What is the deacceleration of the satellite

(1) $-2\alpha v^2 / M$

(2) $-\alpha v^2 / M$

(3) $+\alpha v^2 / M$

(4) $-\alpha v^2$

103. A bullet is fired from a gun. The force on the bullet is given by $\mathbf{F = 600 - \left(2\times10^5\right)t}$, where F is in newtons and t in seconds. The force on the bullet becomes zero as soon as it leaves the barrel. What is the average impulse imparted to the bullet

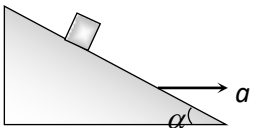
(1) 9 Ns

(2) zero

(3) 0.9 Ns

(4) 1.8 Ns

104. A block is kept on a frictionless inclined surface with angle of inclination 'α'. The incline is given an acceleration 'a' to keep the block stationary oin the incline. Then 'a' is equal to



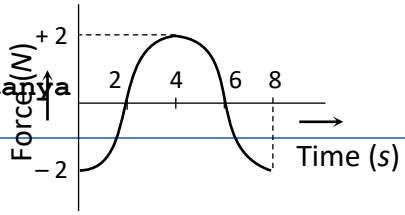
(1) g

(2) g tan α

(3) g / tan α

(4) g cosec α

105. The force-time (F – t) curve of a particle executing linear motion is as shown in the figure. The momentum acquired by the particle in time interval from zero to 8 second will be



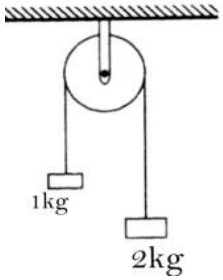
(1) – 2 N-s

(2) + 4 N-s

(3) 6 N-s

(4) Zero

106. Two unequal masses are connected on two sides of light string passing over a light and smooth pulley as shown. The system is released from rest. The larger mass is stopped for a moment, 1.0 sec after the system is in motion. The time elapsed before the string is tight again is (in sec)



(1) 1/4

(2) 1/2

(3) 2/3

(4) 1/3

107. A block of mass 0.1 kg is held against a wall by applying a horizontal force of 5 N on the block. If the coefficient of friction between the block and the wall is 0.5, the magnitude of the frictional force acting on the block is

(1) 2.5 N

(2) 0.98 N

(3) 4.9 N

(4) 0.49 N

108. The force required just to move a body up an inclined plane is double the force required just to prevent the body sliding down. If the coefficient of friction is 0.25, the angle of inclination of the plane is

(1) 36.8°

(2) 45°
(3) 30°
(4) 42.6°

109. A wooden block of mass M rests on a horizontal surface. A bullet of mass m moving in the horizontal direction strikes and gets embedded in it. The combined system covers a distance x on the surface. If the coefficient of friction between wood and the surface is $\boldsymbol{\mu}$, the speed of the bullet at the time of striking the block is (where m is mass of the bullet)

(1) $\sqrt{\frac{2Mg}{\mu m}}$

(2) $\sqrt{\frac{2\mu(M+m)x}{m}}$

(3) $\sqrt{2\mu gx}\left(\frac{M+m}{m}\right)$

(4) $\sqrt{2\mu gx}\left(\frac{M+m}{m}\right)^2$

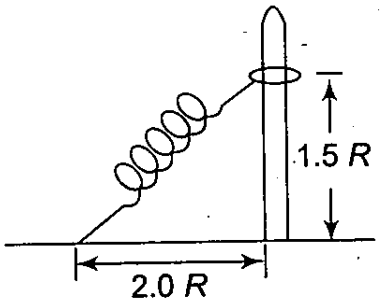
110. The slope of kinetic energy - displacement curve of a particle moving in a straight line motion is
(1) Equal to the acceleration of the particle
(2) Inversely proportional to the acceleration
(3) Directly proportional to the acceleration
(4) None of the above

111. A body of mass $\mathbf{m_1}$ moving with uniform velocity of 40 m/s collides with another mass $\mathbf{m_2}$ at rest and then the two together begin to move with uniform velocity of 30 m/s. The ratio of their masses $\frac{\mathbf{m_1}}{\mathbf{m_2}}$ is

(1) 0.75
(2) 1.33
(3) 3.0
(4) 4.0

112. A bucket full of water is revolved in vertical circle of radius 2m. What should be the maximum time-period of revolution so that the water doesn't fall off the bucket(nearly)
(1) 1 sec
(2) 0.5 sec
(3) 3 sec
(4) 5 sec

113. A ring of mass m can slide over a smooth vertical rod as shown in figure. The ring is connected to a spring of force constant k = 4mg/R, where 2R is the natural length of the spring. The other end of spring is fixed to the ground at a horizontal distance 2R from the base of the rod. If the mass is released at a height 1.5 R, then the velocity of the ring as it reaches the ground is



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

114. A man is riding on a cycle with velocity 7.2 km/hr up a hill having a slope 1 in 20. The total mass of the man and cycle is 100 kg. The power of the man is
(1) 200 W
(2) 175 W
(3) 125 W
(4) 98 W

115. A bullet is fired from a rifle. If the rifle recoils freely, then the kinetic energy of the rifle is
(1) Less than that of the bullet
(2) More than that of the bullet
(3) Same as that of the bullet
(4) Equal or less than that of the bullet

116. A particle moves in a straight line with retardation proportional to its displacement. Its loss of kinetic energy for any displacement x is proportional to
(1) x^2
(2) e^x
(3) x
(4) $\log_e x$

117. Two blocks of masses 10 kg and 4 kg are connected by a spring of negligible mass and placed on a frictionless horizontal surface. An impulse gives a velocity of 14 m/s to the heavier block in the direction of the lighter block. The velocity of the centre of mass is
(1) 10 m/s
(2) 14 m/s
(3) 4 m/s
(4) 20 m/s

118. The acceleration of center of mass of system of two blocks of masses $\mathbf{m_1}$ and $\mathbf{m_2}$ $(\mathbf{m_1} > \mathbf{m_2})$ in Atwood's machine is
(1) $\left(\frac{m_1 - m_2}{m_1 + m_2}\right) g$
(2) g
(3) $\frac{m_1 m_2}{(m_1 + m_2)^2} g$
(4) $\left(\frac{m_1 - m_2}{m_1 + m_2}\right)^2 g$

119. A uniform wire of length 'L' is bent in the form of a circle. The shift in its centre of mass is
(1) $\frac{L}{\pi}$
(2) $\frac{2L}{\pi}$
(3) $\frac{L}{2\pi}$
(4) $\frac{L}{3\pi}$

120. A shell moving in a parabolic path explodes in air. The centre of mass of the fragments move
(1) In the same parabolic path
(2) Vertically upwards
(3) Horizontally
(4) Vertically down wards

121. Arrange the following physical quantities in the decreasing order of dimension of length

I) Density	II) Pressure
III) Power	IV) Impulse

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

122. If 1 kg, 1 meter and 1 minute are taken as the units of mass, length and time then the numerical value of force of 1000 dyne is
(1) 300 units
(2) 3600 units
(3) 0.36 units
(4) 36 units

123. When two resistors of (100 ± 2) ohms and $(300 \pm 1\%)$ ohms are connected in series. Value of equivalent resistance is
(1) $400\,\text{ohm} \pm 3\%$
(2) $400\,\text{ohm} \pm 5$
(3) $400\,\text{ohm} \pm 3$
(4) $400\,\text{ohm} \pm 8\%$

124. The value of (2.2+4.08+3.125+6.3755) with due regard to significant places is

(1) 15.78
(2) 15.7805
(3) 15.780
(4) 15.8

125. The least count of the main scale a 'screw guage' is 1 mm.The minimum number of divisions on its circular scale required inorderto measure $5\mu m$ diameter of a wire is
(1) 50
(2) 200
(3) 100
(4) 500

126. A centigrade and a Fahrenheit thermometer are dipped in boiling water. The water temperature is lowered until the Fahrenheit thermometer registers 140°. What is the temperature as registered by the Centigrade thermometer
(1) 30°
(2) 40°
(3) 60°
(4) 80°

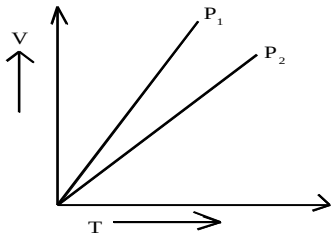
127. A solid ball of metal has a concentric spherical cavity within it. If the ball is heated, the volume of the cavity will
(1) Increase
(2) Decrease
(3) Remain unaffected
(4) None of these

128. A uniform metal rod is used as a bar pendulum. If the room temperature rises by $10\,^{\circ}C$, and the coefficient of linear expansion of the metal of the rod is 2×10^{-6} per $^{\circ}C$, the period of the pendulum will have percentage change of
(1) -2×10^{-3}
(2) -1×10^{-3}
(3) 2×10^{-3}
(4) 1×10^{-3}

129. A glass flask of volume one litre at 0°C is filled, level full of mercury at this temperature. The flask and mercury are now heated to $100\,^{\circ}C$. How much mercury will spill out, if coefficient of volume expansion of mercury is $1.82\times10^{-4}/^{\circ}C$ and linear expansion of glass is $0.1\times10^{-4}/^{\circ}C$ respectively
(1) 21.2 cc
(2) 15.2 cc
(3) 1.52 cc
(4) 2.12 cc

130. When a liquid, taken in a long cylindrical vessel of material with linear coefficient of expansion a is heated, the level of liquid did not change. The volume coefficient of expansion of liquid is
(1) $3a$
(2) $2a$
(3) a
(4) $4a$

131. For an ideal gas V-T curves at constant pressures P_1, P_2 are shown in figure, from the figure



(1) $P_1 > P_2$
(2) $P_1 < P_2$
(3) $P_1 = P_2$
(4) we cannot say.

132. A faulty barometer tube is 90 cm long and it contains some air above mercury. The reading is 74.5 cm when the true atmospheric pressure is 76 cm. The true atmopsheric pressure if the reading on this barometer is 74 cm will be

(1) 75.45 cm
(2) 74.8 cm
(3) 74.3 cm
(4) 76.95 cm

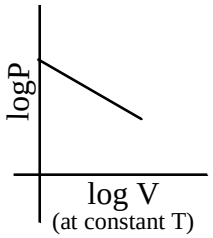
133. If pressure of an ideal gas contained in a closed vessel is increased by 0.5% , the increase in temperature is $2\,^{\circ}\mathbf{C}$ the initial temperature of the gas is
(1) $400\,^{\circ}C$
(2) $127\,^{\circ}C$
(3) $300\,^{\circ}C$
(4) $600\,^{\circ}C$

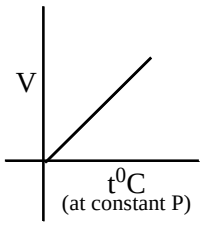
134. A gas mixture consists of 2 moles of oxygen and 4 moles of argon at temperature 'T'. Neglecting all vibrational modes, the total internal energy of the system is (R = Universal gas constant)
(1) 4 R T
(2) 15 R T
(3) 9 R T
(4) 11 R T

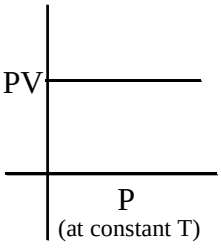
135. Three closed vessels A,B and C at the same temperature T and contain gases which obey the Maxwellian distribution of velocities. Vessel A contains only $\mathbf{O_2}$, vessal B only $\mathbf{N_2}$ and vessal C consists a mixture of equal quantities of $\mathbf{O_2}$ and $\mathbf{N_2}$ .If the average speed of the $\mathbf{O_2}$ molecules in vessel A is $\mathbf{v_1}$, that of the $\mathbf{N_2}$ molecules in vessel B is $\mathbf{v_2}$, the average speed of the $\mathbf{O_2}$ molecules in vessel C is
(1) $\frac{(v_1+v_2)}{2}$
(2) v_1
(3) $(v_1v_2)^{1/2}$
(4) $\sqrt{\frac{(v_1+v_2)}{2}}$

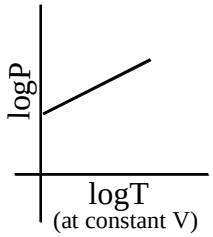
136. Which of the following is a set of intensive properties
(1) Heat capacity, P^H
(2) Specific heat, temperature
(3) Boiling point, internal energy
(4) Density, volume

137. A subatomic particle of de-Broglie's wavelength 10^{-8}m is moving with a velocity 10^4 m/s. If the uncertainity in measuring it's position is $\frac{1}{4\pi}$ m then the uncertainity in finding it's velocity will be _____m/s
(1) 10^{-2}
2) 10^{-3}
(3) 10^{-4}
(4) 10^{-6}

138. Which of the following is not a proper graphical representation for an ideal gas
(1)


(2)


(3)


(4) 

139. Incorrect statement of the following is
(1) In aqueous solution reducing power of $Cr^{+2}>Fe^{+2}$
(2) In aqueous solution stability of $Cu^{+2}>Cu^{+}$
(3) CoF_3 is stable due to high Lattice energy
(4) MnF_7 exists but not Mn_2O_7

140. $(CH_3)_3COH \xrightarrow[\Delta]{Conc.H_2SO_4} C \xrightarrow[\Delta]{KMnO_4/H^+} D+E$
D and E are
(1) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CHO, HCOOH$
(2) $CH_3-CO-CH_3, CO_2$
(3) $CH_3-CH_2-CHO, HCHO$
(4) $CH_3-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2OH$

141. As gas is allowed to expand in a well insulated container against a constant pressure of 2.5 atm from an initial volume of 2.5 litres to a final volume of 4.5 litres. Change in internal energy of the gas will be
(1) -500 J
(2) -505 J
(3) +505 J
(4) 1136 J

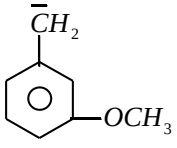
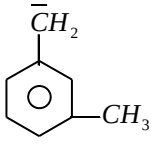
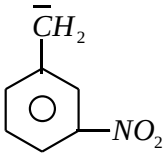
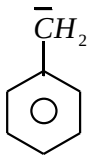
142. Correct representation of vander waal's equation for one mole of gas at very high pressure is
(1) $\left(P+\frac{a}{V^2}\right)V=RT$
(2) PV = RT
(3) $\left(P+\frac{a}{V^2}\right)(V-nb)=RT$
(4) $PV=Pb+RT$

143. $O_2N-CH_2-C\equiv CH \xrightarrow[H_2SO_4]{H_2O,Hg^{+2}} C$. C is
(1) $H_2N-CH_2CO-CH_3$
(2) $OHC-CH_2-CH_2NO_2$
(3) $CH_3-CO-CH_2NO_2$
(4) $OHC-CH_2-CH_2NH_2$

144. Consider a sample of hydrogen gas in which electronic transitions are occurring from 6th state to ground state in all possible ways. Assuming no line is observed in Brackett series then the number of spectral lines will be
(1) 15
(2) 12
(3) 10
(4) 6

145. $A+2B\rightarrow 2C+3D$. Entropy values of A,B,C,D at 300K are 10,20,5,30 JK^{-1} $mole^{-1}$ respectively. Energy not available to do useful work is
(1) 45 KJ
(2) 30 KJ
(3) 15 KJ
(4) 7.5 KJ

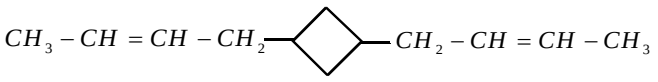
146. Energy of 2s orbital will be highest in
(1) Hydrogen
(2) Lithium
(3) Sodium
(4) Potassium

147. Correct increasing order of stability of carbanions in
I) 
II) 
III) 
IV) 
(1) II,IV,I,III

(2) IV,II,I,III
(3) IV,I,II,III
(4) II,I,IV,III

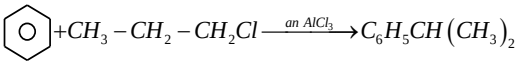
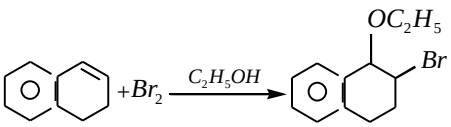
148. At 600K pressure exerted by a moist gas is 400mm. Aqueous tension of the gas at 600K is 40mm. If this moist gas is transferred to a vessel double it's volume at 600K then it's pressure becomes
(1) 180mm
(2) 140mm
(3) 220mm
(4) 170mm

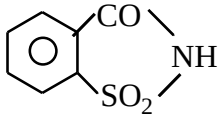
149.



Number of geometrical isomers possible are
(1) 16
(2) 3
(3) 4
(4) 6

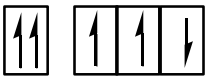
150. Which of the following in aqueous solution can act as a reductant?
(1) Ce^{+4}
(2) MnO_4^-
(3) Eu^{+2}
(4) $Cr_2O_7^{-2}$

151. Which of the following reaction is not proper
(1) 
(2) $CH_3CH_3 \xrightarrow[(CH_3COO_2)Mn]{O_2} CH_3COOH$
(3) 
(4) $(CH_3)_3CH \xrightarrow[an.AlCl_3]{HCl} CH_3CH_2CH_2CH_3$

152. Organic compound $(X) \xrightarrow[fusion]{Na}$ sodium fusion extract $\xrightarrow[H_2SO_4]{FeSO_4}$ prussian blue. "X" is
(1) $H_2N-NH_2.HCl$
(2) 
(3) $NH_2-CO-NH_2$
(4) $C_6H_5N=N-C_6H_5$

153. Standard enthalpies of Graphite, Hydrogen and Benzene are -390, -285 and +60 KJ/mole respectively. Enthalpy of combustion of benzene will be _____KJ/mole
(1) -3135
(2) -3255
(3) -3355
(4) -3145

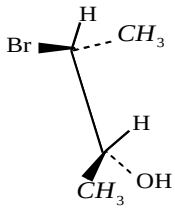
154. Number of electrons possible with n = 4, m = 0 with $S = \frac{-1}{2}$
(1) 8
(2) 12
(3) 4
(4) 2

155 The configuration  violates
A) Hund's rule
B) Pauli's principle
C) Aufbau's principle
(1) A,B,C
(2) A,B only
(3) A,C only
(4) B only

156. Which among the following has highest RMS velocity at 300K?
(1) Dioxygen
(2) Sulphurdioxide
(3) Methane
(4) Dinitrogen

157. Four water samples A,B,C,D contain 0.1 ppm of Fe, 0.01 ppm of Cd, 2 ppm of Cu and 4 ppm of Zn respectively. Toxic, sample is
(1) A

(2) B
(3) C
(4) D

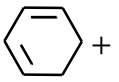
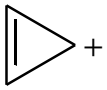
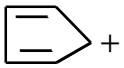
158.  IUPAC name of the compound is
(1) (2R,3S) 3-bromo-2-butanol
(2) (2S,3R) 3-bromo-2-butanol
(3) (2R,3R) 3-bromo-2-butanol
(4) (2S,3S) 3-bromo-2-butanol

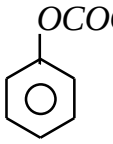
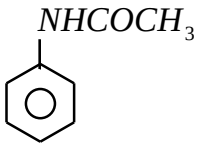
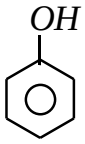
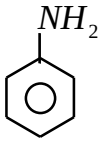
159. Spin only magnetic moment is not zero for
(1) $ZnSO_4.7H_2O$
(2) $K_4\left[Fe(CN)_6\right]$
(3) $TiCl_3.6H_2O$
(4) $CoCl_3.6NH_3$

160. Equivalent weight of ferrous oxalate acting as reducing agent is
(1) $\frac{M}{1}$ (2) $\frac{M}{6}$
(3) $\frac{M}{2}$ (4) $\frac{M}{3}$

161. Central metal ion in Wilkinson's catalyst is
(1) Co^{+3}
(2) Pt^{+2}
(3) Zn^{+2}
(4) Rh^{+}

162. Incorrect statement is
(1) Greater the COD for a water sample higher will be its toxicity
(2) Troposphere is turbulent dusty zone containing air, water vapour and clouds
(3) $CH_2=CH_2 \xrightarrow[Pd^{+2},Cu^{+2}]{O_2} CH_3CHO$ is an environment friendly reaction
(4) $CCl_2=CCl_2$ is an environmental friendly solvent that can be used in dry cleaning

163. I =  , II=  ,
III =  Correct order of stability is
(1) I>II>III
(2) III>II>I
(3) II>III>I
(4) II>I>III

164. Which of the following is least reactive towards electrophilic substitution
(1) 
(2) 
(3) 
(4) 

165.

A	B
I) $\left[Cr(en)_3\right]^{+3}$	a) Geometrical isomerism only
II) $\left[Co(en)_2Cl_2\right]^{+}$	b) Ionisation isomerism
III) Sq. planar $\left[Pt(Br)(Cl)(Py)(NH_3)\right]$	c) Optical & geometrical isomerism
IV) $\left[Co(NH_3)_5Br\right]Cl$	d) Optical isomerism only

Correct match is

	I	II	III	IV
(1)	a	c	d	b
(2)	a	b	d	c
(3)	d	c	a	b
(4)	d	c	d	a

166. Which of the following is not a proper reaction

(1) $MnO_4^{-2} \xrightarrow{H^+} MnO_4^- + MnO_2$

(2) $MnO_4^- + I^- \xrightarrow{OH^-} Mn^{+2} + I_2$

(3) $MnO_4^- + Mn^{+2} \xrightarrow{ZnSO_4} MnO_2$

(4) $MnO_4^- + S^{-2} \xrightarrow{H^+} Mn^{+2} + S$

167. In $CH_2 = \overset{\ominus}{C}H$ the lone pair of electrons of carbanion are present in ____orbital

(1) 2P

(2) Sp^2

(3) SP

(4) SP^3

168. Sink to carbon monoxide is

(1) Haemoglobin

(2) Trees

(3) Human beings

(4) Micro organisms of soil

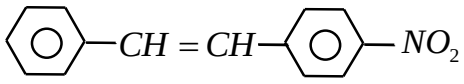
169. Pka is least for

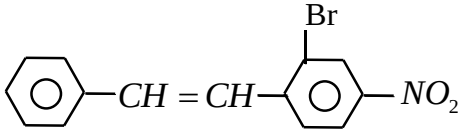
(1) NH_3

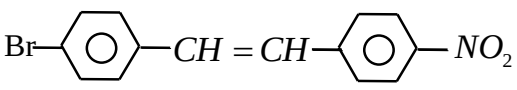
(2) C_2H_5OH

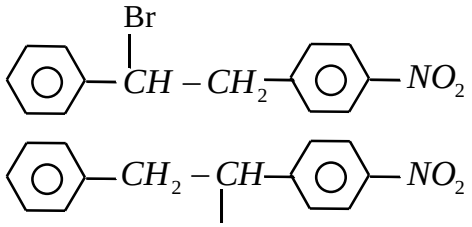
(3) $CH \equiv CH$

(4) H_2O

170.  $\xrightarrow{HBr} X\,(major)$. X is

(1) 

(2) 

(3) 

(4)

171. The element with configuration $[Xe]6s^2 5d^0 4f^7$ is

(1) Yb

(2) Eu

(3) Pr

(4) Tb

172. $2Cu^+ \rightarrow Cu^{+2} + Cu.$ Number of moles of electrons participating in the reaction are

(1) 1

(2) 3

(3) 4

(4) it is not a redox reaction

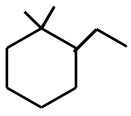
173. Number of moles of phosphorous in two moles of phosophonic acid is 'x'. Number of mole of sulphur in one mole of sulphuric acid is 'y'. Relation between x and y is

(1) x=y

(2) 2y=x

(3) y=8x

(4) x=4y

174. IUPAC name  is

(1) 2,2-dimethyl-1-ethyl cyclo hexane

(2) 2-ethyl-1-, 1-dimethyl cyclohexane

(3) 2,2-dimethyl cyclo hexyl ethane

(4) 2-ethyl cyclo hexyl dimethane

175. Which of the following is a set of bidentate ligands

(1) gly, ox, dien, acac

(2) ox, acac, trien, en

(3) gly, acac, en, ox

(4) py, gly, oxo, en

176. Wrong match is
(1) Cu > Au > Ag ……melting point
(2) Ni > Cu > Zn …… atomic size
(3) Sc > Y > La ……. IP_1
(4) Cr > V> Ti …. Valency w.r.t fluorine

177. Wrong match is
(1) Ninhydrin….. detection of amino acids
(2) Paper chromatography… stationary phase is liquid
(3) Glycerol ……..purified by simple distillation
(4) Nitro benzene……..purified by steam distillation

178. Three homoleptic octahedral complexes are formed by a metal with ligands L_1, L_2, L_3 respectively by absorbing Blue, red and green light. Correct increasing field strength of ligands will be
(1) L_2, L_3, L_1
(2) L_1, L_3, L_2
(3) L_1, L_2, L_3
(4) L_2, L_1, L_3

179. Statement –I : Emperical formula of acetylene and benzene is same
Statement-II : Molecular formula of acetylene and benzene is same
(1) I and II are true
(2) I is true, II is false
(3) I is false, II is true
(4) I & II are false

180. Number of isomeric alkenes possible for C_4H_8
(1) 2
(2) 3
(3) 4
(4) 6

SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA

A.P,TELANGANA,KARNATAKA,TAMILNADU,MAHARASHTRA,DELHI,RANCHI

SR ELITE **PRE UNIT TEST – 1 KEY**

BOTANY

1) **4**	2) **4**	3) **4**	4) **3**	5) **1**	6) **3**	7) **4**	8) **3**	9) **3**	10) **4**
11) **3**	12) **2**	13) **2**	14) **2**	15) **3**	16) **3**	17) **3**	18) **4**	19) **1**	20) **1**
21) **2**	22) **3**	23) **2**	24) **3**	25) **4**	26) **2**	27) **1**	28) **4**	29) **1**	30) **1**
31) **0**	32) **2**	33) **2**	34) **1**	35) **4**	36) **3**	37) **3**	38) **3**	39) **2**	40) **4**
41) **4**	42) **3**	43) **4**	44) **4**	45) **4**					

ZOOLOGY

46) **4**	47) **3**	48) **1**	49) **1**	50) **2**	51) **2**	52) **1**	53) **3**	54) **2**	55) **3**
56) **3**	57) **3**	58) **2**	59) **3**	60) **2**	61) **1**	62) **3**	63) **3**	64) **1**	65) **2**
66) **1**	67) **3**	68) **4**	69) **2**	70) **3**	71) **2**	72) **4**	73) **4**	74) **4**	75) **1**
76) **4**	77) **2**	78) **2**	79) **4**	80) **1**	81) **2**	82) **2**	83) **3**	84) **4**	85) **3**
86) **1**	87) **4**	88) **2**	89) **3**	90) **4**					

PHYSICS

46) **4**	47) **2**	48) **2**	49) **2**	50) **2**	51) **3**	52) **2**	53) **3**	54) **2**	55) **2**
56) **1**	57) **3**	58) **3**	59) **2**	60) **4**	61) **4**	62) **2**	63) **1**	64) **3**	65) **3**
66) **3**	67) **3**	68) **2**	69) **4**	70) **1**	71) **1**	72) **1**	73) **4**	74) **3**	75) **1**
76) **4**	77) **4**	78) **2**	79) **4**	80) **2**	81) **3**	82) **1**	83) **4**	84) **2**	85) **2**
86) **2**	87) **1**	88) **2**	89) **4**	90) **2**					

CHEMISTRY

136) **2**	137) **3**	138) **2**	139) **4**	140) **2**	141) **2**	142) **4**	143) **2**	144) **3**	145) **3**
146) **1**	147) **1**	148) **3**	149) **4**	150) **3**	151) **4**	152) **3**	153) **0**	154) **3**	155) **2**
156) **3**	157) **2**	158) **3**	159) **3**	160) **4**	161) **4**	162) **4**	163) **4**	164) **1**	165) **3**
166) **2**	167) **2**	168) **4**	169) **4**	170) **3**	171) **2**	172) **1**	173) **4**	174) **2**	175) **3**
176) **2**	177) **3**	178) **1**	179) **2**	180) **3**					

91. As $v^2 = u^2 + 2as \Rightarrow (2u)^2 = u^2 + 2as \Rightarrow 2as = 3u^2$

Now, after covering an additional distance *s*, if velocity becomes *v*, then,

$v^2 = u^2 + 2a(2s) = u^2 + 4as = u^2 + 6u^2 = 7u^2$

$\therefore\ v = \sqrt{7}u$ ..

92. The velocity of balloon at height *h*,

$v = \sqrt{2\left(\frac{g}{8}\right)h}$

When the stone released from this balloon, it will go upward with velocity $v = \frac{\sqrt{gh}}{2}$ (Same as that of balloon). In this condition time taken by stone to reach the ground

$t = \frac{v}{g}\left[1 + \sqrt{1 + \frac{2gh}{v^2}}\right] = \frac{\sqrt{gh}/2}{g}\left[1 + \sqrt{1 + \frac{2gh}{gh/4}}\right]$

$= \frac{2\sqrt{gh}}{g} = 2\sqrt{\frac{h}{g}}$

93. For first projectile, $h_1 = ut - \frac{1}{2}gt^2$

For second projectile, $h_2 = u(t-T) - \frac{1}{2}g(t-T)^2$

When both meet *i.e.* $h_1 = h_2$

$ut - \frac{1}{2}gt^2 = u(t-T) - \frac{1}{2}g(t-T)^2$

$\Rightarrow uT + \frac{1}{2}gT^2 = gtT \Rightarrow t = \frac{u}{g} + \frac{T}{2}$

94. $\frac{dv}{dt} = -2.5\sqrt{v}$

$dv = -2.5\sqrt{v}\,dt$

$\int \sqrt{v}\,dv = -2.5\int dt$

At t=0, v= 6.25

If v=0 then t=?

Simplifying we get t=2sec

95. area in the graph = v-u

55=v-0

V=55m/s

96. $\tan 60^0 = \frac{12}{V_R}$

$V_R = 4\sqrt{3}$ m/s

97. $R_{\max} = \frac{u^2}{g} = 400m$ (For $\theta = 45°$)

$H_{\max} = \frac{u^2 \sin^2 45^0}{2g} = \frac{400}{4} = 100m$

98. Vertical component of velocity of ball at point *P*

$v_V = 0 + gt = 10 \times 0.4 = 4\ m/s$

Horizontal component of velocity = initial velocity

$\Rightarrow v_H = 4\ m/s$

So the speed with which it hits the ground

$v = \sqrt{v_H^2 + v_V^2} = 4\sqrt{2}\ m/s$

and $\tan\theta = \frac{v_V}{v_H} = \frac{4}{4} = 1 \Rightarrow \theta = 45°$

It means the ball hits the ground at an angle of $45°$ to the horizontal.

Height of the table $h = \frac{1}{2}gt^2 = \frac{1}{2} \times 10 \times (0.4)^2 = 0.8\ m$

Horizontal distance travelled by the ball from the edge of table $h = ut = 4 \times 0.4 = 1.6\ m$

99. $t = \frac{d}{\sqrt{v^2{}_b - v^2{}_r}} = \frac{2}{\sqrt{36-9}} = \frac{2}{\sqrt{27}}$

100. $a_t = g\sin 30^0 = 5$

101. For stationary lift $t_1 = \sqrt{\frac{2h}{g}}$

and when the lift is moving up with constant acceleration $t_2 = \sqrt{\frac{2h}{g+a}}\ \ \therefore\ t_1 > t_2$

102. $F = \frac{dp}{dt} = v\left(\frac{dM}{dt}\right) = \alpha v^2$

$a = \frac{F}{M} = \frac{\alpha v^2}{M}$

103. $F = 600 - 2 \times 10^5 t = 0 \Rightarrow t = 3 \times 10^{-3}$ sec

Impulse $I = \int_0^t F\,dt = \int_0^{3\times10^{-3}} (600 - 2\times10^3 t)dt$

$= [600t - 10^5 t^2]_0^{3\times10^{-3}} = 0.9\ N \times \sec$

104. Let the mass of a block is *m*. It will remains stationary if forces acting on it are in equilibrium *i.e,*

$ma\cos\alpha = mg\sin\alpha \Rightarrow a = g\tan\alpha$

105. area in the graph=0

106. attwoods machine, $a = \left(\frac{2-1}{2+1}\right)g = \frac{g}{3}$

V=u+at=0+(g/3)1=g/3

For 1 kg mass: $h_1 = vt - \frac{1}{2}gt^2 = \left(\frac{g}{3}\right)t - \frac{1}{2}gt^2$

For 1 kg mass: $h_2 = \frac{1}{2}gt^2$

If $h_2 = h_1$ then t=1/3sec

107. Limiting friction $F_l = \mu_s R = 0.5 \times (5) = 2.5\ N$

Since downward force is less than limiting friction therefore block is at rest so the static force of friction will work on it.

F_s = downward force = Weight

$= 0.1 \times 9.8 = 0.98\ N$

108. Retardation in upward motion
$= g(\sin\theta + \mu\cos\theta)$

$\therefore$ Force required just to move up $F_{up} = mg(\sin\theta + \mu\cos\theta)$

Similarly for down ward motion $a = g(\sin\theta - \mu\cos\theta)$

$\therefore$ Force required just to prevent the body sliding down

$F_{dn} = mg(\sin\theta - \mu\cos\theta)$

According to problem $F_{up} = 2F_{dn}$

$\Rightarrow mg(\sin\theta + \mu\cos\theta) = 2mg(\sin\theta - \mu\cos\theta)$

$\Rightarrow \sin\theta + \mu\cos\theta = 2\sin\theta - 2\mu\cos\theta$

$\Rightarrow 3\mu\cos\theta = \sin\theta \Rightarrow \tan\theta = 3\mu$

$\Rightarrow \theta = \tan^{-1}(3\mu) = \tan^{-1}(3\times 0.25) = \tan^{-1}(0.75) = 36.8°$

109. Let speed of the bullet = v
Speed of the system after the collision = V
By conservation of momentum $mv = (m+M)V$

$\Rightarrow V = \frac{mv}{M+m}$

So the initial K.E. acquired by the system

$= \frac{1}{2}(M+m)V^2 = \frac{1}{2}(m+M)\left(\frac{mv}{M+m}\right)^2 = \frac{1}{2}\frac{m^2v^2}{(m+M)}$

This kinetic energy goes against friction work done by friction = $\mu R \times x = \mu(m+M)g \times x$

By the law of conservation of energy

$\frac{1}{2}\frac{m^2v^2}{(m+M)} = \mu(m+M)g \times x \Rightarrow$

$v^2 = 2\mu g x\left(\frac{m+M}{m}\right)^2$

$\therefore\ v = \sqrt{2\mu g x}\left(\frac{M+m}{m}\right)$

110

$$\frac{dE}{dx} = \frac{1}{2}m \times 2v\frac{dv}{dx} = mv \times \frac{dv}{dt} \times \frac{dt}{dx} = mv \times \frac{a}{v} = ma$$

111. Initial momentum of the system = $m_1 \times 40 + m_2 \times 0$

Final momentum of the system = $(m_1 + m_2) \times 30$

By the law of conservation of momentum

$m_1 \times 40 + m_2 \times 0 = (m_1 + m_2) \times 30$

$\Rightarrow 40m_1 = 30m_1 + 30m_2 \Rightarrow 10m_1 = 30m_2 = \frac{m_1}{m_2} = 3$

112 Minimum angular velocity $\omega_{\min} = \sqrt{g/R}$

$\therefore T_{\max} = \frac{2\pi}{\omega_{\min}} = 2\pi\sqrt{\frac{R}{g}} = = 2\pi\sqrt{\frac{2}{10}} = 2\sqrt{2} \cong 3s$

113. extension in the spring

x= $\sqrt{(1.5R)^2 + (2R)^2} - 2R = 0.5R$

FROM CONSERVATION OF ENERGY

$mg(1.5)R + \frac{1}{2}Kx^2 = \frac{1}{2}mv^2$

Where k=4mg/R

Simplifying we get,

114. $v = 7.2\frac{km}{h} = 7.2 \times \frac{5}{18} = 2\ m/s$

Slope is given 1 in 20

$\therefore\ \sin\theta = \frac{1}{20}$

When man and cycle moves up then component of weight opposes it motion *i.e.* $F = mg\sin\theta$

So power of the man $P = F \times v = mg\sin\theta \times v$

$= 100 \times 9.8 \times \left(\frac{1}{20}\right) \times 2 = 98\ Watt$

115. $E = \frac{P^2}{2m}$.

If P = constant then

$E \propto \frac{1}{m}$ *i.e.* kinetic energy of heavier body will be less. As the mass of gun is more than bullet therefore it possess less kinetic energy

116. This condition is applicable for simple harmonic motion. As particle moves from mean position to extreme position its potential energy increases according to expression $U = \frac{1}{2}kx^2$ and accordingly kinetic energy decreases

117. Just after collision

$$V_c = \frac{10\times 14 + 4\times 10}{10+4} = 10\ m/s$$

Since spring force is internal force, It cannot change the linear momentum of the (two mass + spring) system. Therefore V_c remains the same.

118.

$$a_{cm} = \left(\frac{m_1 a - m_2 a}{m_1 + m_2}\right) = \left(\frac{m_1 - m_2}{m_1 + m_2}\right) a$$

$$= \left(\frac{m_1 - m_2}{m_1 + m_2}\right)^2 g$$

119. $L = 2\pi r$

Shift=r= $L/2\pi$

120. theory concept.

121. conceptual memory

122. $n_1\ u_1 = n_2\ u_2$

123. absolute errors should be added. But not percentage errors

124. Rounding off to least number of decimal places.

125.L.C.= (Value of 1 MSD) / (No of HSD)

$5\,\mu$m= (1mm) n

n=200

126. $\frac{C}{5} = \frac{F-32}{9}; \frac{C}{5} = \frac{(140-32)}{9}; C = 60°$

127. theory concept

128. Fractional change in period

$$\frac{\Delta T}{T} = \frac{1}{2}\alpha\Delta\theta = \frac{1}{2}\times 2\times 10^{-6}\times 10 = 10^{-5}$$

$$\%\ \text{change} = \frac{\Delta T}{T}\times 100 = 10^{-5}\times 100 = 10^{-3}\ \%$$

129. Due to volume expansion of both liquid and vessel, the change in volume of liquid relative to container is given by $\Delta V = V_0[\gamma_L - \gamma_g]\Delta\theta$

Given V_0 = 1000 *cc*, $\alpha_g = 0.1\times 10^{-4}/°C$

$\therefore \gamma_g = 3\alpha_g = 3\times 0.1\times 10^{-4}/°C = 0.3\times 10^{-4}/°C$

$\therefore \Delta V = 1000\,[1.82\times 10^{-4} - 0.3\times 10^{-4}]\times 100$

$= 15.2\ cc$

130. $V_2 = V_1(1+\gamma_R\Delta t)$

$a_2 h = a_1 h(1+\gamma_R\Delta t)$

$a_1(1+\beta\Delta t)h = a_1 h(1+\gamma_R\Delta t)$

$\beta = \gamma_R$

131. At constant temperature, if Volume is high then Pressure is low

132. (90-74.5)(76-74.5)=(90-74)(H-74)

H=75.45 cm

133. $\frac{\Delta P}{P}\times 100 = \frac{\Delta T}{T}\times 100$

$0.5 = \frac{4}{T}\times 100$

T=400 K=127 °*C*

134. $U = n_1 C_{V_1} T + n_2 C_{V_2} T$

$= 2\left(\frac{5R}{2}\right)T + 4\left(\frac{3R}{2}\right)T = 11RT$

135. Conceptual