SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA.

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

SEC : SR. ELITE *& AIIMS SUPER 60* **DATE:12-01-2019**

SUB: BOTANY **NEET PART TEST - 03** **Max. Marks :180**

IMPORTANT INSTRUCTIONS :

- **Pattern of the Entrance Examination**:-
  Paper containing 180 objective type questions, from BIOLOGY, PHYSICS, 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. In young anther centre of each microsporangium is occupied by

(1) Microspores

(2) Pollen grains

(3) Sporogenous tissue

(4) Tapetum

02. Which of the following is innermost wall layer of anther

(1) Endothecium

(2) Middle layers

(3) Tapetum

(4) Epidermis

03. In majority of angiosperms pollen grains released in

(1) 2 celled stage

(2) 3 celled stage

(3) 4 celled stage

(4) 5 celled stage

04. Which of the following reprents to basal part of ovule

(1) Micropyle

(2) Chalaza

(3) Embryosae

(4) Funicle

05. Which of the following represents to female gametophyte

(1) Ovary

(2) Ovule

(3) Embryo sac

(4) Nucellus

06. A typical angiospermic embryo sac at maturity is

(1) 7 celled

(2) 8 nucleate

(3) 8 celled

(4) both 1 & 2

07. In which of the following water pollination is absent

(1) *Hydrilla*

(2) *Vallisneria*

(3) *Amorphophallus*

(4) *Zostera*

08. Which of the following not included in pollen pistil interaction

(1) Pollen deposition on stigma

(2) Pollen germination

(3) Entery of pollentube in ovule

(4) Entery of pollentube in embryo sac

09. In which of the following plant, endosperm is not completely consumed by developing embryo
(1) Pea
(2) Coconut
(3) Beans
(4) Groundnut

10. Which of the following is not a post fertilization structure
(1) Embryo
(2) Endosperm
(3) Embryosac
(4) Suspensor

11. What is crucial for storage of seeds
(1) dehydration
(2) dormancy
(3) genetic variatbility
(4) both 1 & 2

12. What is life span of crocodile
(1) 100 – 150 years
(2) 60 years
(3) 15 years
(4) 20 – 25 years

13. Asexual reproduction in *Penicillium* generally occur by
(1) Buds
(2) Gemmules
(3) Conidia
(4) Zoospores

14. Which of the following regulate reproductive processes and associated behavioural expression of organisms
(1) Hormone
(2) Certain environmental factors
(3) Temperature
(4) Both 1 and 2

15. Which of the following produces two types of flowers, staminate and pistilate
(1) Cucurbits
(2) Coconut
(3) Papaya
(4) All the above

16. How many chromosomes remain present in meiocyte of apple
(1) 34
(2) 24
(3) 16
(4) 48

17. Gregor Mendel conducted hybridisation experiments in
(1) 1863 - 1875
(2) 1880 - 1885
(3) 1956 - 1963
(4) 1856 – 1863

18. In pea plant which of the following express only in homozygous condition
(1) Tallness
(2) Axial position of flower
(3) Yellow pod colour
(4) Yellow seedcolour

19. Mendelian dihybrid cross, explains
(1) Law of dominance
(2) Law of segregation
(3) Law of independent assortment
(4) All the above

20. In F_2 generation of dihybrid cross what is the proportion of double homozygous dominant plants
(1) 1 / 16
(2) 2 / 16
(3) 4 / 16
(4) 8 / 16

21. AaBbCCddEe plant will produce, how many types of gametes

(1) 4

(2) 8

(3) 16

(4) 32

22. In which of the following, one gene pair exhibit multiple phenotypic expression

(1) Polygenic inheritance

(2) Pleiotropy

(3) Multiple allelism

(4) Lethality

23. Human skin colour is controlled by how many gene pairs

(1) 2

(2) 3

(3) 5

(4) 25

24. What is the genotype of F_2 generation of monohybrid Mendelian cross

(1) 3 : 1

(2) 1 : 2 : 1

(3) 9 : 3 : 3 : 1

(4) 2 : 1

25. Who among the following did experimental verification of chromosomal theory of inheritance

(1) Sutton & Boveri

(2) Morgan

(3) Mendel

(4) Bateson & Punnet

26. If a character is controlled by six alleles of gene, then the possible number of genotype would be

(1) 21

(2) 129

(3) 64

(4) 42

27. Dihybrid test cross ratio with 82% parental type and 8% recombinants, shows that genes have

(1) Incomplete dominance

(2) Incomplete linkage

(3) Independent assortment

(4) double crossing over

28. The backbone of polynucleotide chain is formed due to

(1) Sugar

(2) Phosphates

(3) Nitrogen bases

(4) Both 1 & 2

29. Distance between two polynucleotide chains in DNA remain almost constant due to

(1) Antiparallel nature

(2) Pairing between purine & pyrimidine

(3) Phosphodiester bond

(4) Hydrogen bonding

30. The unequivocal proof that DNA is the genetic material came from the experiment of

(1) Hershey

(2) Chase

(3) Avery Macleod, Mc Carty

(4) Both 1 & 2

31. Replication of DNA is

(1) Semi conservative

(2) Semi discontinuous

(3) Semi autonomous

(4) Both 1 & 2

32. What is the average rate of polymerisation of deoxyribonucleotides in E. coli

(1) 2000 bp / second

(2) 2000 bp / minute

(3) 20000 bp / second

(4) 20000 bp / minute

33. Which of the following strand act as template for DNA synthesis

(1) $5' \rightarrow 3'$

(2) $3' \rightarrow 5'$

(3) Both of the strands

(4) Either of the strands

34. A transcription unit in DNA is defined primarily by how many regions in DNA

(1) One

(2) Two

(3) Three

(4) Four

35. How many types of DNA dependent RNA polymerase found in prokaryotes for all kind of RNAs

(1) 1

(2) 2

(3) 3

(4) 4

36. Elongation step of transcription is catalysed by

(1) RNA polymerase + σ factor

(2) RNA polymerase

(3) RNA polymerase + ρ factor

(4) RNA polymerase + Y factor

37. Which of the following represents the dominance of RNA world

(1) Splicing

(2) Capping

(3) Tailing

(4) Unusual nitrogen bases

38. Which of the following is not a property of genetic code

(1) Degeneracy

(2) Unambiguity

(3) Contiguous fashion of reading

(4) Overlapping

39. Mostly which of the following nitrogen base of anficodon shows wobbling

(1) Ist

(2) IInd

(3) IIIrd

(4) Both 2 and 3

40. Lac operon is consist of how many structural genes

(1) One

(2) Two

(3) Three

(4) Four

41. Central dogma of molecular science was proposed by

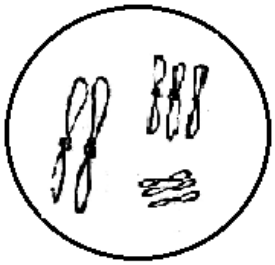
(1) Watson

(2) Crick

(3) Jacob & monad

(4) Hershey & chase

42. Given condition of chromosomes can be represent as



(1) 2n + 2

(2) 2n + 1 + 1

(3) 2n + 4

(4) 2n – 1 - 1

43. Development of wheat (*Triticum aestivum*) is an example of

(1) Autopolyploidy

(2) Allopolyploidy

(3) Aneuploidy

(4) Hypoploidy

44. Joining of amino acids by peptide bond is catalysed by

(1) Peptidase

(2) Peptidyl transferase

(3) Translocase

(4) Amino aryl synthetase

45. Joining of amino acyl – t- RNA on 'A' site of ribosome observed in which of the following step

(1) Initiation

(2) Elongation

(3) Termination

(4) Both 1 and 2

46. If the gametes produced by a female differ in their sex chromosomes, it could be related to

(1) Human

(2) Pigeon

(3) Grasshopper

(4) *Drosophila*

47. Flying squirrel, lemur, mouse and ant eater are mammals found in Australia. They represent this evolution

(1) Convergent evolution

(2) Parallel evolution

(3) Adaptive radiation

(4) Directional selection

48. Which of the following genetic disorder of mother can affect a child?

(1) AIDS

(2) Syphilis

(3) Cushing syndrome

(4) Thalassemia

49. Bovine insulin was used earlier to treat diabetes. It is not safe due to this reason

(1) It is a pro-hormone

(2) It is a foreign protein which can mount an immune response

(3) It can not affect cellular uptake of glucose

(4) It causes insulin shock

50. Match the contents of column – I with column – II and identify correct set.

Column – I	Column – II
A) B-lymphocytes	i)Passive immunity
B) Antivenom	ii) Cell mediated immunity
C) T – lymphocytes	iii) Artificial active immunity
D) Vaccination	iv) Humoral immunity
E) NK cells	v) Innate immunity

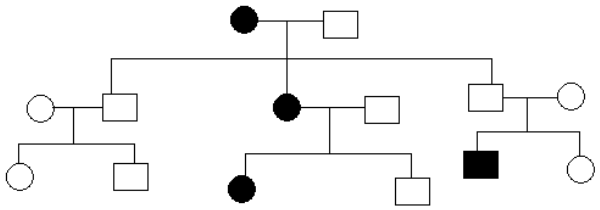
(1) A – iv, B – i, C – v, D – ii, E - iii

(2) A – v, B – i, C – ii, D – iii, E - iv

(3) A – iv, B – i, C – ii, D – iii, E - v

(4) A – iv, B – ii, D – i, D – v, E – iii

51. Observe the pedigree analysis of a genetic disorder which is represented below and identify the disorder.



(1) Colour blindness

(2) Myotonic dystrophy

(3) Incontinentia pigmenti

(4) Phenylketonuria

52. Which of the following cells are not related to innate immunity?

(1) Paneth cells

(2) Neutrophils

(3) Oxyntic cells

(4) Lymphocytes

53. Cri-du-chat syndrome is due to

(1) trisomy of 5^{th} chromosome

(2) partial monosomy of 9^{th} chromosome

(3) trisomy of 13^{th} chromosome

(4) Partial monosomy of 5^{th} chromosome

54. Which of the following does not support Darwin's theory of natural selection?

(1) Survival of melanised moths in industrial areas

(2) Diversity of beaks in finches

(3) Presence of vestigeal organs

(4) Antibiotic resistance in bacteria

55. A man with 'O' blood group and colour blindness married a normal woman with 'AB' blood group who has colourblind mother. The probability of a normal female child with 'O' blood group is

(1) 100%

(2) 50 %

(3) 25 %

(4) 0 %

56. Free living nematode

(1) *Drosophila*

(2) *Dugesia*

(3) *Caenorhabditis*

(4) *Arabidopsis*

57. Choose incorrect statement about satellite DNA.

(1) Exhibits high degree of polymorphism

(2) Repetitive DNA sequences

(3) Forms basis of DNA fingerprinting

(4) Represents expressed sequence tags

58. Release of histamine and serotonin from the mast cells in a person with asthma is mediated by these antibodies

(1) IgE

(2) IgG

(3) IgM

(4) IgA

59. Which of the following molecular diagnosis is based on antigen and antibody interaction?

(1) PCR

(2) Autoradiography

(3) Southern blotting

(4) ELISA

60. <u>Statement A:</u> Transgenic mice are used to test safety of polio vaccine.
<u>Statement B:</u> Transgenic animals are used for testing toxicity of drugs.

(1) Both statements are correct.

(2) Statement-I is incorrect and Statement-II is correct.

(3) Statement-I is correct and Statement-II is incorrect.

(4) Both Statements are incorrect.

61. Milk yield in cows is primarily dependent on

(1) Quality of breeds

(2) Quantity of fodder

(3) Farm hygiene

(4) Visits by veterinary doctor

62. An edible shell fish captured in fresh water

(1) *Hilsa*

(2) Pomfret

(3) *Cyprinus carpio*

(4) *Macrobrachium rosenbergii*

63. What is true about T – lymphocytes?

(1) They originate in thyroid

(2) They engulf pathogens

(3) They play a role in graft rejection

(4) They secrete immunoglobulins

64. The wide spread of rabies through dog bite can be prevented by vaccinating dogs with rabies vaccine. The type of immunity developed in dogs is

(1) artificial active immunity

(2) natural active immunity

(3) natural passive immunity

(4) artificial passive immunity

65. Which of the following indicates molecular homology?

(1) anatomical similarity due to common ancestry

(2) biochemical similarity of hemoglobin and the gene coding for it in chimpanzee and human

(3) presence of gills slits in the vertebrate embryos

(4) biochemical recapitulation in chick embryo

66. Arrhenotoky is related to

(1) male fruit flies

(2) worker honey bees

(3) male honey bees

(4) male grass hoppers

67. The ovum of *Drosophila* has an additional set of chromosomes. If it is fertilized by a normal sperm, it would develop into

(1) intersex or super female

(2) normal female or meta female

(3) triploid female or inter sex

(4) normal female or meta male

68. Which of the following type of cancer differs from the other types?

(1) Leukemia

(2) Breast cancer

(3) Hepatocellular carcinoma

(4) Prostate cancer

69. Choose incorrect combination with reference to evolution of human

(1) *Homo habilis* – ate meat – 650-800 cc

(2) *Home sapiens* – language skills – 1650 to 1800 cc

(3) *Homo erectus* – ate fruit – 900 cc

(4) *Homo neanderthalensis* – robust body – 1400 cc

70. Identify the flying dinosaur

(1) *Tyrannosaurus*

(2) *Pteranodon*

(3) *Ichthyosaur*

(4) *Stegosaurus*

71. The largest human gene is located on

(1) 1st chromosome

(2) X – chromosome

(3) 2nd chromosome

(4) 13th chromosome

72. Variable number of tandem repeats in the DNA are highly useful in

(1) animal cloning

(2) r – DNA technology

(3) DNA finger printing

(4) hybridoma technology

73. The chromosomal analysis revealed XXY karyotype in a person. Which of the following description does not fit to this abnormality?

(1) Gynaecomastism

(2) Short stature

(3) Presence of Barr body

(4) Allosomal trisomy

74. Genetic disorder leading to progressive degeneration of skeletal muscle

(1) Myasthenia gravis

(2) Tetany

(3) Osteoarthritis

(4) Duchenne muscular dystrophy

75. Which of the following set of statements is correct with reference to mutations in cancer cells?

(a) Mutations leading to activation of cellular oncogenes

(b) Mutations causing inactivation of tumour suppressor genes

(c) Mutations that inhibit production of telomerase

(d) Mutations leading to production of cadherins

(1) a, b

(2) b, c

(3) c, d

(4) a, d

76. Read the following and select the option which correctly fills up the blanks.

(a) The first amphibians evolved from __A__

(b) Variations in gene frequencies that occur by chance cause ___B___

(c) Fossils of Homo erectus were discovered in ___C___

(d) According to deVries speciation is due to ___D___.

	A	B	C	D
(1)	Ostraco derms	Genetic drift	Java	Mutation
(2)	Lobe fins	Genetic drift	Java	Saltation
(3)	Jawless fish	Genetic drift	East Aftrica	Variation
(4)	Coela canth	Gene migration	East Asia	mutation

77. Sabin's oral polio vaccine contains

(1) inactivated polio bacteria

(2) attenuated polio virus

(3) killed polio virus

(4) gammaglobulins against polio virus

78. Which of the following is not a correct pair with reference to vector borne diseases?

(1) *Glossina palpalis* – African sleeping sickness

(2) *Culex pipens* – Filariasis

(3) *Aedes aegypti* – Dengue fever

(4) *Phlebotamus* – Chikungunya

79. The most apparent change in the evolutionary history of *Homo sapiens* is

(1) loss of body hair

(2) increasing cranial capacity

(3) erect posture

(4) stereoscopic vision

80. Identity correct set of matching.

Column – I	Column – II
A)Flippers of whale and fins of shark	i) Connecting link
B) Tail in newly born child	ii) Lobe finned fish
C) Fore limbs of mammals	iii) Atavism
D) Archaeopteryx	iv) Analogous organs
E) Coelacanth	v) Homology

(1) A – iv, B – ii, C – v, D – iii, E - i

(2) A – iv, B – iii, C – v, D – i, E – ii

(3) A – iv, B – iii, C – i, D – v, E – ii

(4) A – v, B – iii, C – iv, D – ii, E – i

81. 'Smack' is obtained from

(1) Latex of poppy plant

(2) Resins of *Cannabis* plant

(3) Leaves of coca plant

(4) Fruits of *Datura*

82. Viral disease that spreads through droplets released by an infected person

(1) Pneumonia

(2) Tuberculosis

(3) Hepatitis

(4) Common cold

83. Most commonly seen opportunistic bacterial infection in HIV patients is caused by

(1) *Microsporum*

(2) *Toxoplasma*

(3) *Mycobacterium*

(4) *Cryptosporidium*

84. Adenosine deaminase deficiency causes

(1) autoimmunity

(2) immunodeficiency

(3) anaphylaxis

(4) leukemia

85. Mating of two varieties of the cattle breed Sahiwal which have no common ancestry is an example of

(1) Out crossing

(2) Line breeding

(3) Cross breeding

(4) In breeding

86. Which of the following genetic disorder differs from the remaining?

(1) Huntington's chorea

(2) Sickle cell anaemia

(3) Cystic fibrosis

(4) Phenyl ketonuria

87. Lymph nodes contain a large number of

(1) Erythrocytes

(2) Phagocytes and erythrocytes

(3) Lymphocytes and erythrocytes

(4) Lymphocytes

88. Mescaline is

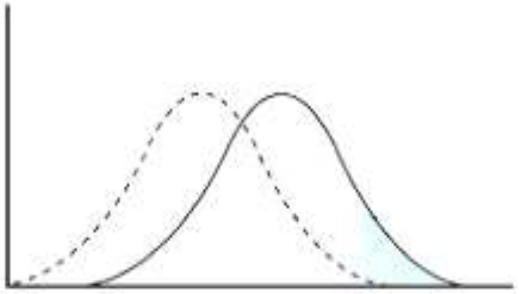
(1) Hallucinogen

(2) Barbiturate

(3) Depressant

(4) Stimulant

89. Observe the given picture related to the evolutionary force operating on phenotype distribution and choose the set that explains it.



(a) Artificial selection of high milk yielding cows.

(b) Variant forms of Darwin's finches

(c) Penicillin resistance in *Staphylococcus* bacteria

(d) Adaptive radiation in dinosaurs

(e) Pesticide resistance in cotton boll worms

(1) a, c, e

(2) b, d, e

(3) b, c, d

(4) a, b, e

90. Choose correct combination

	Disorder	Cause	Treatment
(1)	Lung cancer	Cigarette smoking	α - Lactalbumin
(2)	Asthma	Allergens	Taxol
(3)	Liver cirrhosis	Alcoholism	Cyclosporin
(4)	AIDS	HIV infection	Zidovudine

91. A short pulse of white light is incident from air to a glass slab at normal incidence. After travelling through the slab, the first colour to emerge is

(1) blue

(2) green

(3) violet

(4) red

92. A point object is placed in front of a plane mirror. If the object and the mirror start moving away from each other with speed υ along a straight line, then speed of the image w.r.t., ground is

(1) 2υ

(2) 3υ

(3) 5υ

(4) 6υ

93. The radius of curvature of the curved surface of a plano – convex lens is 20 cm. If the refractive index of the material of the lens be 1.5, it will

(1) act as a convex lens only for the objects that lie on its curved side.

(2) act as a concave lens for the objects that lie on its curved side.

(3) act as a convex lens irrespective of the side on which the object lies.

(4) act as a concave lens irrespective of side on which the object lies.

94. Let XY – plane be the boundary between two transparent media. Medium – 1 in $z \geq 0$ has a refractive index of $\sqrt{2}$ and medium – 2 with $z < 0$ has a refractive index of $\sqrt{3}$. A ray of light in medium – 1 given by the vector $\vec{A} = 6\sqrt{3}\hat{i} + 8\sqrt{3}\hat{j} - 10\hat{k}$ is incident on the plane of separation. The angle of refraction in medium – 2 is

(1) 45^0

(2) 60^0

(3) 75^0

(4) 30^0

95. A microscope is focused on a mark on a piece of paper and then a slab of glass of thickness 3 cm and refractive index 1.5 is placed over the mark. How should the microscope be moved to get the mark in focus again?

(1) 2 cm upward

(2) 1 cm upward

(3) 4.5 cm downward

(4) 1 cm downward

96. A prism is filled with a liquid of refractive index of $\sqrt{2}$. If angle of prism is 60^0, the angle of minimum deviation is

(1) 75^0

(2) 60^0

(3) 45^0

(4) 30^0

97. A telescope with objective of focal length 60 cm and eyepiece of focal length 5 cm is focused on a far off distant object such that parallel rays emerge from the eyepiece. If object subtends an angle of 2^o on the objective, angular width of the image will be

(1) 10^o

(2) 30^o

(3) 24^o,

(4) 60^o

98. When an unpolarised light of intensity I_0 is incident on a polarising sheet, the intensity of the light which does not get transmitted is

(1) $\frac{I_0}{2}$

(2) $\frac{I_0}{4}$

(3) Zero

(4) I_0

99. Consider sunlight incident on a slit of width $10^4 A$. The image seen through the slit shall

(1) be a fine sharp slit white in colour at the centre.

(2) a bright slit white at the centre diffusing to zero intensities at the edges.

(3) a bright slit white at the centre diffusing to regions of different colours.

(4) only be a diffused slit white in colour

100. In Young's double – slit experiment, the intensity at a point where path difference is $\lambda/6$ (λ being the wavelength of light) is I'. If I_0 denotes the maximum intensity, then I'/I_0 is equal to

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

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

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

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

101. A double – slit experiment is performed with light of wavelength 500 mm. A thin film of thickness $2\mu m$ and refractive index 1.5 is introduced in the path of the upper beam. The location of the central maximum will

(1) remain unshifted

(2) shift downward by nearly two fringes

(3) shift upward by nearly two fringes

(4) shift downwards by ten fringes

102. In a single slit diffraction, the width of slit is 0.5 cm, focal length of lens is 40 cm and wavelength of light is 4890Å. The distance of first dark fringe from central maxima is

(1) $20\mu m$

(2) $40\mu m$

(3) $60\mu m$

(4) $80\mu m$

103. An astronaut is looking down on Earth's surface from a space shuttle at an altitude of 400 km. Assuming that the astronaut's pupil diameter is 5 mm and the wavelength of visible light is 500 mm, the astronaut will be able to resolve linear objects of the size of about

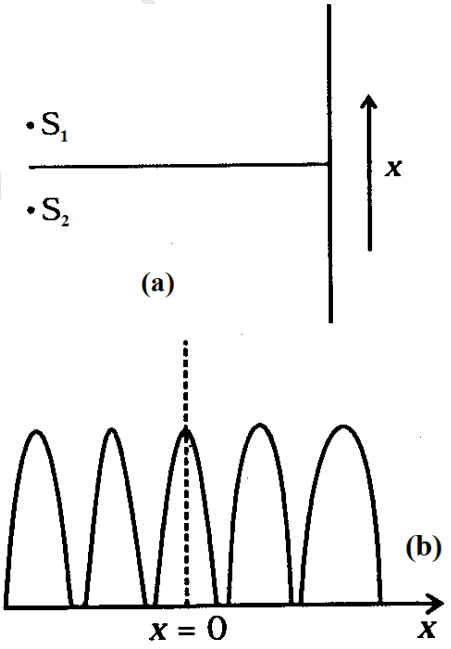
(1) 0.5 m

(2) 5 m

(3) 50 m

(4) 500 m

104. Two sources S_1 and S_2 of intensity I_1 and I_2 are placed in front of a screen (a). The patteren of intensity distribution seen in the central portion is given by (b).



In this case which of the following statements are true.

a) S_1 and S_2 have the same intensities.

b) S_1 and S_2 have a constant phase difference.

c) S_1 and S_2 always have the same phase.

d) S_1 and S_2 have the same wavelength.

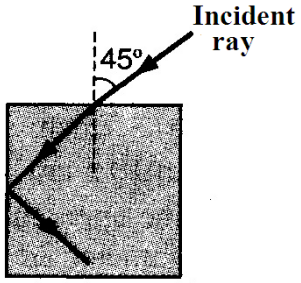
(1) a and b are correct

(2) a, b and c are correct

(3) a, b and d are correct

(4) b and d are correct

105. For the given incident ray as shown in fig. the condition of total internal reflection of ray will be satisfied if the min. refractive index of block will be



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

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

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

(4) $\sqrt{\frac{7}{6}}$

106. In Young's double – slit experiment, the spacing between the sits is d and wavelength of light used is $6000\overset{o}{A}$. If the angular width of a fringe formed on a distant screen is 1^o, then value of d is

(1) 1 mm

(2) 0.05 mm

(3) 0.03 mm

(4) 0.01 mm

107. In Young's double – slit experiment, one of the slits is wider than other, so that amplitude of the light from one slit is double of that from other slit. If I_m be the maximum intensity, the resultant intensity I when they interfere at phase difference ϕ is given by

(1) $\frac{I_m}{9}\left(4+5\cos\phi\right)$

(2) $\frac{I_m}{3}\left(1+8\cos^2\frac{\phi}{2}\right)$

(3) $\frac{I_m}{5}\left(1+4\cos^2\frac{\phi}{2}\right)$

(4) $\frac{I_m}{9}\left(1+8\cos^2\frac{\phi}{2}\right)$

108. A photocell is illuminated by a source of light, which is placed at a distance d from the cell. If the distance becomes d/2, then number of electrons emitted per second will be

(1) same

(2) four times

(3) two times

(4) one – fourth

109. An electron is moving with an initial velocity $v=v_0\hat{i}\left(v_0>0\right)$ in an electric field $E=-E_0\hat{i}$ (E_0 = constant > 0). It's de Broglie wavelength at time t is given by

(1) $\frac{\lambda_0}{\left(1+\frac{eE_0t}{mv_0}\right)}$

(2) $\lambda_0\left(1+\frac{eE_0t}{mv_0}\right)$

(3) λ_0

(4) $\lambda_0 t$

110. A proton and an α particle are accelerated through the same potential difference. The ratio of de Broglie wavelength of proton to the de Broglie wavelength of alpha particle will be

(1) 1 : 2

(2) 1 : 1

(3) 2 : 1

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

111. Electrons with de Broglie wavelength λ fall on the target in an X – rays tube. The cut off wavelength of the emitted X – ray is

(1) $\lambda_0 = \frac{2mc\lambda^2}{h}$

(2) $\lambda_0 = \frac{2h}{mc}$

(3) $\lambda_0 = \frac{2m^2c^2\lambda^2}{h^2}$

(4) $\lambda_0 = \lambda$

112. The wavelength of the first spectral line in the Balmer series of hydrogen atom is $6561A^o$. The wavelength of the second spectral line in the Balmer series of singly – ionised helium atom is

(1) $1215\,A^o$

(2) $1640\,A^o$

(3) $2430\,A^o$

(4) $4687\,A^o$

113. In an experiment, two oil drops of same oil are falling with terminal velocities in the ratio 1:4. The ratio of their de- Broglie wavelengths is

(1) 2:1

(2) 4:1

(3) 32:1

(4) 8:1

114. For a certain element the wavelength of K_α line is 0.33A^0. If the value of constant 'a' for the line is 5 x 10^7, the atomic number of the element is

(1) 51

(2) 61

(3) 41

(4) 31

115. When photons of energy $h\upsilon$ fall on an aluminium plate (of work function E_0), photoelectrons of maximum kinetic energy K are ejected. If the frequency of the radiation is doubled, the maximum kinetic energy of the ejected photoelectrons will be.....

(1) K + E_0

(2) 2K

(3) K

(4) K + $h\upsilon$

116. A hydrogen atom undergoes a transition from the state n = 5 to n = 2 state. If the angular momentum is conserved and if the Bohr model is used to describe the atom, what must be the angular momentum of the photon that is emitted?

(1) $6.67 \times 10^{-34}\,Js$

(2) $2.22 \times 10^{-34}\,Js$

(3) $6.34 \times 10^{-34}\,Js$

(4) $3.17 \times 10^{-34}\,Js$

117. The electric potential between a proton and an electron is given by $V = V_0$ In $\left(\frac{r}{r_0}\right)$, where r_0 is a constant. Assuming Bohr's model to be applicable, write variation of r_n with n ; n being the principal quantum number

(1) $r_n \propto n$

(2) $r_n \propto 1/n$

(3) $r_n \propto n^2$

(4) $r_n \propto 1/n^2$

118. A particle moves in a closed orbit around the origin, due to a force which is directed towards the origin. The de Broglie wavelength of the particle varies cyclically between two values λ_1 and λ_2 with $\lambda_1 > \lambda_2$. Which of the following statements are true?

a) the particle could be moving in a circular orbit with origin as centre.

b) The particle could be moving in an elliptic orbit with origin as its focus.

c) When the de Broglie wave length is λ_1, the particle is nearer the origin than when its value is λ_2

d) When the de Broglie wavelength is λ_2, the particle is nearer the origin than when its value is λ_1

(1) b and c

(2) b and d

(3) a and c

(4) a and d

119. Light of wave length λ is incident on a surface to emit electrons with certain KE. When the wave length is made three times, the corresponding stopping potential becomes one sixth of the initial value. The threshold wave length is

(1) 4λ

(2) 5λ

(3) 3λ

(4) 1.5λ

120. In a nuclear reactor, moderators slow down the neutrons which come out in a fission process. The moderator used have light nuclei. Heavy nuclei will not serve the purpose because

(1) They will break up

(2) Elastic collision of neutrons with heavy nuclei will not slow them down

(3) The net weight of the reactor would be unbearably high.

(4) Substances with heavy nuclei do not occur in liquid or gaseous state at room temperature.

121. At a given instant, there are 25% undecayed radioactive nuclei in a sample. After 10s, the number of undecayed nuclei reduces to 12.5 %. Calculate the time in which the number of undecayed nuclei will further reduce to 6.25% of the reduced number

(1) 10 s

(2) 20 s

(3) 40 s

(4) 80 s

122. A nuclear reactor delivers a power of 10W. Find fuel consumed by the reactor per hour, if its efficiency is 20%.

(Given $c = 3 \times 10^8\ m/s$)

(1) $2 \times 10^{-6}\ g/h$

(2) $9 \times 10^{-12}\ g/h$

(3) $8 \times 10^{-9}\ g/h$

(4) $2 \times 10^{-9}\ g/h$

123. Hole is

(1) an anti particle of electron.

(2) a vacancy created when an electron leaves a covalent bond.

(3) absence of free electrons.

(4) an artificially created particle.

124. Fusion processes, like combining two deuterons to form a He nucleus are impossible at ordinary temperatures and pressure. The reasons for this can be traced to the fact.

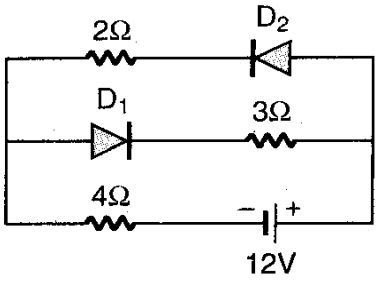
(1)nuclear forces have short range and nuclei are positively charged

(2) nuclear forces are due to exchange of π-mesions

(3) the original nuclei must be completely ionized before fusion can take place.

(4) the original nuclei must first break up before combining with each other.

125. The circuit has two oppositely connected ideal diodes in parallel. What is the current flowing in the circuit?



(1) 1.71 A
(2) 2.0 A
(3) 2.31 A
(4) 1.33 A

126. The depletion region in a p – n diode contains

(1) no charged bodies
(2) impurity ions and minority carriers
(3) impurity ions and majority carriers
(4) impurity ions and no free charges

127. For a transistor, the current amplification factor $\alpha = 0.8$. The transistor is connected in common emitter configuration. The change in collector current when the base current changes by 6 mA is

(1) 6 mA
(2) 4.8 mA
(3) 24 mA
(4) 8 mA

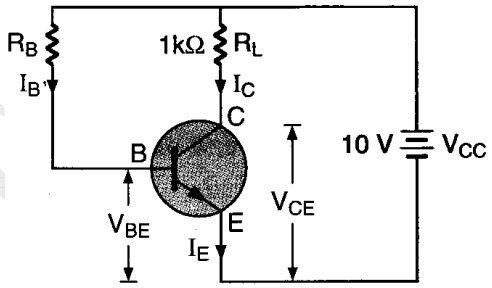
128. In a transistor, the current gain in the common base configuration is α and the current gain in the common emitter configuration is β. Then the value of $[\alpha\beta/(\alpha-\beta)]$ is

(1) 1
(2) 0
(3) - 1
(4) ∞

129. The conductivity of a semiconductor increases with increase in temperature because

(1) number density of free current carriers increases
(2) relaxation time increase
(3) both number density of carriers and relaxation time increase.
(4) number density of current carriers increases, relaxation time decreases but effect of decrease in relaxation time is much less than increase in number density.

130. In the circuit shown in the current gain, $\beta = 100$ for the transistor. What would be the bias resistance R_B so that $V_{CE} = 5V$? (Neglect V_{BE}).



(1) $2\times10^3\ \Omega$
(2) $2\times10^5\ \Omega$
(3) $1\times10^6\ \Omega$
(4) $500\,\Omega$

131. The number of gates in LSI is about

(1) ≤ 100
(2) ≤ 500
(3) ≤ 1000
(4) ≤ 50

132. What happens during regulation action of a zener diode?

(1) The current in and voltage across the Zenor remains fixed.
(2) The current through the series resistance (R_s) changes.
(3) The zener resistance is constant.
(4) The voltage across series resistance (R_s) is fixed.

133. A radio signal has a frequency of $10\,MHz$. The least length of antenna required for the transmission of signal is
(1) 7.5 m
(2) 5 m
(3) 5.5 m
(4) 3.5 m

134. A basic communication system consists of
a) transmitter
b) information source
c) user of information
d) channel
e) receiver
Choose the correct sequence in which these are arranged in a basic communication system.
(1) b d a c e
(2) b e a d c
(3) a b c d e
(4) b a d e c

135. A message signal of frequency ω_m is superposed on a carrier wave of frequency ω_c to get an amplitude modulated wave (AM). The frequency of the AM wave will be
(1) $\frac{\omega_c + \omega_m}{2}$
(2) $\frac{\omega_c - \omega_m}{2}$
(3) ω_m
(4) ω_c

136. Which of the following is not the mineral of zinc?
(1) Calamine
(2) Zinc blend
(3) Siderite
(4) Zincite

137. Correct match among the following is
(1) Electromagnetic separation – Cassiterite from Wolframite
(2) Froth flotation – Sulphide ores
(3) Leaching – Alumina from bauxite
(4) All

138. $4M + 8CN^- + 2H_2O + O_2 \rightarrow 4M(CN)_2 + 4OH^-$ in the above reaction 'M' is
(1) Ag
(2) Zn
(3) A*l*
(4) Fe

139. Extraction of aluminium from bauxite is carried out by
(1) Hall – Heroult process
(2) Blister process
(3) Mond's process
(4) Bessimerisation

140. Incorrect match is
(1) Zone refining – Germanium
(2) Mond's process – Nickel
(3) Van Arkel method - Zirconium
(4) Poling – Zinc

141. Which of the following is used for galvanizing iron?
(1) Copper
(2) Zinc
(3) Nickel
(4) Lead

142. Incorrect statement among the following is:
(1) Permanganate titrations are carried out in presence of HCl.
(2) In faintly alkaline medium $KMnO_4$ oxidises iodide to iodate
(3) Chromate and permanganate ions are isostructural
(4) In MnO_4^- ion π bonding a takes place by overlap of pure p – orbital of oxygen with d – orbital of manganese

143. Common metal present in the alloys of Brass and Bronze is
(1) Zinc
(2) Tin
(3) Copper
(4) Iron

144. Which of the following is a Piezoelectric material ?
(1) Silicon
(2) Quartz
(3) Mica
(4) Beryl

145. Which of the following is with highest SRP?
(1) Zn^{2+} / Zn
(2) Cu^{2+} / Cu
(3) Cr^{2+} / Cr
(4) Mn^{2+} / Mn

146. The acidic oxide among the following is
(1) Cr_2O_3
(2) Mn_2O_7
(3) FeO
(4) ZnO

147. Magnetic moment of M^{n+} is 5.92 BM. Which of the following is M^{n+} ?
(1) Fe^{2+}
(2) Cr^{3+}
(3) Zn^{2+}
(4) Mn^{2+}

148. Which of the following is coloured?
(1) $Sc^{3+}_{(aq)}$
(2) $Ti^{4+}_{(aq)}$
(3) $Zn^{2+}_{(aq)}$
(4) Fe^{+3}(aq)

149. Eu^{2+} acts as _____and Ce^{4+} acts as ____ in aqueous solution.
(1) Oxidant, Reductant
(2) Reductant, Oxidant
(3) Oxidant, Oxidant
(4) Reductant, Reductant

150. The correct statement among the following is/are
(1) Atomic radii of Zr and Hf are nearly same due to lanthanoid contraction
(2) Europium is the largest lanthanoid
(3) IP_1 and IP_2 values of lanthanoids are comparable with those of calcium
(4) All are correct

151. The actinoid element with $5f^0\,6d^2\,7s^2$ electronic configuration is
(1) Th
(2) U
(3) Cm
(4) Lw

152. Yellow coloured Werner's cobalt complex gives 3 moles of white coloured $AgCl$ ppt. with $AgNO_3$ solution. The formula of the complex is
(1) $CoCl_3.3NH_3$
(2) $CoCl_3.5NH_3$
(3) $CoCl_3.4NH_3$
(4) $CoCl_3.6NH_3$

153. The correct IUPAC name of $\left[Cr(NH_3)_3(H_2O)_3\right]Cl_3$ is
(1) Triammine triaqua chromate (III) chloride
(2) Triammine triaqua chromium (III) chloride
(3) Tetra ammine triaqua chromium (III) chloride
(4) Hexa ammine aqua chromate (III) chloride

154. Which of the following complex compound exhibit facial and meridonial isomerism?
(1) $\left[Co(NH_3)_4Cl_2\right]Cl$
(2) $\left[PtCl_2(en)_2\right]Cl_2$
(3) $\left[Co(NH_3)_3(NO_2)_3\right]$
(4) $\left[Cr(H_2O)_6\right]Cl_3$

155. Hybridisation of 'Ni' in $[NiCl_4]^{2-}$, $[Ni(CN)_4]^{2-}$ and $[Ni(CO)_4]$ is

(1) sp^3, dsp^2, sp^3

(2) sp^3, sp^3, dsp^2

(3) sp^3, dsp^2, sp^2

(4) sp^3, sp^3d, dsp^2

156. Which of the following has highest magnetic moment?

(1) $[Fe(CN)_6]^{3-}$

(2) $[Mn(CN)_6]^{3-}$

(3) $[FeF_6]^{3-}$

(4) $[MnCl_6]^{3-}$

157. For the same metal, same ligands and metal-ligand distances the relation between Δ_0 and Δ_t is

(1) $\Delta_t = \frac{4}{9}\Delta_0$

(2) $\Delta_0 = \frac{4}{9}\Delta_t$

(3) $\Delta_0 = 4.9\Delta_t$

(4) $\Delta_t = 9.4\Delta_0$

158. The overall complex dissociation equilibrium constant for $[Cu(NH_3)_4]^{2+}$ if its stability equilibrium constant (β_4) is 2×10^{13} is

(1) 5×10^{14}

(2) 0.5×10^{14}

(3) 5×10^{-13}

(4) 5×10^{-14}

159. KBr is 80% dissociated in aqueous solution of 0.5 m concentration (Given K_f for water $= 1.86\,K\,kg\,mol^{-1}$). The solution freezes at

(1) 271.326 K

(2) 278 K

(3) 260.5 K

(4) 268.5 K

160. Concentrated aqueous solution of sulphuric acid 98 % H_2SO_4 by mass and has a density of $1.80\,g\,mL^{-1}$. Volume of acid required to make 1 litre of 0.1 M H_2SO_4 solution is

(1) 11.10 mL

(2) 16.65 mL

(3) 22.20 mL

(4) 5.55 mL

161. Which of the following aqueous solutions has the highest boiling point?

(1) 0.1 M KNO_3

(2) 0.1 M Na_3PO_4

(3) 0.1 M $BaCl_2$

(4) 0.1 M K_2SO_4

162. P_A and P_B are the vapour pressure of pure liquid components A and B respectively of an ideal binary solution. If X_A represents the mole fraction of component A, the total pressure of the solution will

(1) $P_A + X_A(P_B - P_A)$

(2) $P_A + X_A(P_A - P_B)$

(3) $P_B + X_A(P_B - P_A)$

(4) $P_B + X_A(P_A - P_B)$

163. Which of the following has highest e.c.e?

(1) Al

(2) Na

(3) Ca

(4) Mg

164. The equivalent conductance of M/32 solution of a weak monobasic acid is $8.0\ mho\ cm^2\ eq^{-1}$ and at infinite dilution is $400\ mho\ cm^2\ eq^{-1}$. The dissociation constant of this acid is

(1) 1.25×10^{-5}

(2) 1.25×10^{-6}

(3) 6.25×10^{-4}

(4) 1.25×10^{-4}

165. Standard electrode potential for Sn^{4+}/Sn^{2+} couple is + 0.15 V and that for the Cr^{3+}/Cr couple is $-0.74V$. These two couples in their standard state are connected to make a cell. The cell potential will be
(1) + 1.19 V
(2) + 0.89 V
(3) + 0.18 V
(4) + 1.83 V

166. The electrode potentials for $Cu^{2+}_{(aq)} + e^- \rightarrow Cu^+_{(aq)}$ and $Cu^+_{(aq)} + e^- \rightarrow Cu_{(s)}$ are + 0.15 V and + 0.50 V respectively. The value of $E^o_{Cu^{2+}/Cu}$ will be
(1) 0.500 V
(2) 0.325 V
(3) 0.650 V
(4) 0.150 V

167. A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of $pH = 10$ and by passing hydrogen gas around the platinum wire at one atm pressure. The oxidation potential of electrode would be
(1) 1.81 V
(2) 0.059 V
(3) 0.59 V
(4) 0.118 V

168. Select the rate law that corresponds to the data shown for the reaction $A + B \rightarrow C$

Exp.	[A]	[B]	Rate
(i)	0.012	0.035	0.10
(ii)	0.024	0.070	0.80
(iii)	0.024	0.035	0.10
(iv)	0.012	0.070	0.80

(1)Rate $= k[B]^3$
(2) Rate $= k[B]^4$
(3) Rate $k = [A][B]^3$
(4) Rate $k = [A]^2[B]^2$

169. For a given reaction rate $= K[A]^1[B]^{2/3}$; the unit of rate constant K can be given as
(1) $mol^{-2/3} litre^{2/3} time$
(2) $mol^{2/3} litre^{-2/3} time^{-1}$
(3) $mol^{-2/3} litre^{2/3} time^{-1}$
(4) None of these

170. Which of the following represents the expression for $\frac{3}{4}th$ life of first order reaction?
(1) $\frac{k}{2.303} log\, 4/3$
(2) $\frac{2.303}{k} log\, 3/4$
(3) $\frac{2.303}{k} log\, 4$
(4) $\frac{2.303}{k} log\, 3$

171. The half – life of $_6C^{14}$ is 5730 year. What fraction of it's original C^{14} would left after 22920 year of storage?
(1) 0.50
(2) 0.25
(3) 0.125
(4) 0.0625

172. The activation energy of the reaction, $A + B \rightarrow C + D +$ 38 kcal is 20 kcal. What would be the activation energy of the reaction, $C + D \rightarrow A + B$
(1) 20 kcal
(2) – 20 kcal
(3) 18 kcal
(4) 58 kcal

173. The density of argon (face centered cubic cell) is $1.83\,g/cm^3$ at 20^0C. What is the length of an edge a unit cell? (Atomic weight : Ar = 40)
(1) 0.499 nm
(2) 0.669 nm
(3) 0.525 nm
(4) 0.551 nm

174. Which of the following statement for crystals having Schottky defect is not correct?

(1) Schottky defect arises due to the absence of a cation and anion from the position which it is expected to occupy.

(2) Schottky defect is more common in ionic compounds with high co – ordination numbers.

(3) The density of the crystals having Schottky defect is large than that of the perfect crystal.

(4) The crystal having Schottky defect is electrical neutral as a whole.

175. Which of the following primitive cells show the given parameters?

$a \neq b \neq c$, $\alpha = \beta = \gamma = 90^0$

(1) Cubic

(2) Tetragonal

(3) Orthorhombic

(4) Hexagonal

176. In a compound, atoms of element 'Y' forms ccp lattice and those of element 'X' occupy 2/3rd of tetrahedral voids. The formula of the compound will be:

(1) X_4Y_3

(2) X_3Y_2

(3) X_3Y_4

(4) XY_3

177. A solid compound XY has $NaCl$ **type structure. If the radius of the cation is 100 pm and unit cell edge length is 683pm, then the radius of the anion** $\left(Y^-\right)$ **will be**

(1) 275.1 pm

(2) 322.5 pm

(3) 241.5 pm

(4) 126.7 pm

178. The coagulation of 200 mL of a positive colloid took place when 0.73 g HC*l* was added to it without changing the volume much. The flocculation value of HC*l* for the colloid is

(1) 0.365

(2) 36.5

(3) 100

(4) 150

179. At the high pressure, Langmuir adsorption isotherm takes the form

(1) $\frac{x}{m} = \frac{ap}{1+bp}$

(2) $\frac{x}{m} = \frac{a}{b}$

(3) $\frac{x}{m} = ap$

(4) $\frac{m}{x} = \frac{b}{a} + \frac{1}{ap}$

180. Addition of dil. Solution of $AgNO_3(aq.)$**, to excess of dil.** $KI(aq)$ **gives**

(1) AgI solution

(2) +ve sol of AgI

(3) –ve sol of AgI

(4) Neutral sol of AgI

REVISED NEET PART TEST -4 SYLLABUS (22-01-19)

SUBJECT	TOPIC
BOTANY	Cell: The unit of life, Bio molecules, Cell cycle and cell division, Anatomy of flowering plants, Biotechnology principles & process, Biotechnology and its applications, Microbes in Human Welfare, Strategies for Enhancement in Food production, Ecosystem & Soil.
ZOOLOGY	Animal tissues, Cockroach , Organisms and Populations (excluding soil), Ecosystem (14.1 to 14.5), Biodiversity and Conservation, Environmental Issues
PHYSICS	Static electricity, Current electricity, Moving charges and Magnetism, Magnetism and matter, Electromagnetic induction, AC circuits, EM waves & Mechanical properties of solids and fluids
CHEMISTRY	IA to VIIA , zero group elements, Polymers , Chemistry in every day life and Environmental chemistry, Biomolecules

SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA

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

SR ELITE & AIIMS SUPER 60 NEET PART TEST – 3 KEY Date : 12-01-2019

BOTANY

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

ZOOLOGY

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

PHYSICS

91) **4**	92) **2**	93) **3**	94) **1**	95) **2**	96) **4**	97) **3**	98) **1**	99) **1**	100) **1**
101) **3**	102) **2**	103) **3**	104) **3**	105) **3**	106) **3**	107) **4**	108) **2**	109) **1**	110) **4**
111) **1**	112) **1**	113) **3**	114) **2**	115) **4**	116) **4**	117) **1**	118) **2**	119) **2**	120) **2**
121) **3**	122) **4**	123) **2**	124) **1**	125) **2**	126) **4**	127) **3**	128) **3**	129) **4**	130) **2**
131) **3**	132) **2**	133) **1**	134) **4**	135) **4**					

CHEMISTRY

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

SOLUTIONS
PHYSICS

91. Velocity of red is more in glass.

92. $\bar{\upsilon}_{oM} = \bar{\upsilon}_0 - \bar{\upsilon}_M = 2\upsilon\hat{i}$, $\upsilon_{IM} = -2\upsilon\hat{i}$

$\bar{\upsilon}_I - \bar{\upsilon}_M = -2\upsilon\hat{i} \Rightarrow \upsilon_I - \left(-\upsilon\hat{i}\right) = -2\upsilon\hat{i} \Rightarrow \upsilon_I = -3\upsilon\hat{i}$

93. Conceptual

94. The question needs correction. The boundary should be XY – plane so that the line above the boundary is Z – axis.

As $\cos\theta_1 = \frac{A_z}{A} = \frac{10}{20} = \frac{1}{2}$, $\theta_1 = 60^o$

As $\mu_1 \sin\theta_1 = \mu_2 \sin\theta_2$, $\sin\theta_2 = \frac{\mu_1 \sin\theta_1}{\mu_2} = \frac{\sqrt{2}\sin 60^o}{\sqrt{3}} = \frac{\sqrt{2}\left(\sqrt{3}/2\right)}{\sqrt{3}} = \frac{1}{\sqrt{2}}$,

i.e, $\theta_2 = 45^o$

95. Shift, $d = t\left(1 - \frac{1}{\mu}\right) = 3\left(1 - \frac{1}{1.5}\right) = 1cm\left(upward\right)$

96. As $\mu = \frac{\sin\left[\left(A + \delta_m\right)/2\right]}{\sin\left(A/2\right)}$ and $\mu = \sqrt{2}$, $\frac{\sin\left(\frac{60^o + \delta_m}{2}\right)}{\sin 30^o} = \sqrt{2}$

On simplification, $\delta_m = 30^o$ $\frac{1}{F} = \frac{2}{f_L} + \frac{1}{f_m} = \frac{2}{15}$

97. $M = \frac{\beta}{\alpha} = \frac{f_0}{f_e} = \frac{60\,cm}{5\,cm} = 12$, $\beta = 12\alpha = 12 \times 2^o = 24^o$

98. As intensity of transmitted light, $I = I_0 \cos^2\theta$ and the average value of $\cos^2\theta = \frac{1}{2}$, $I = \frac{I_0}{2}$

Intensity of light which is not transmitted = $I_0 - \frac{I_0}{2} = \frac{I_0}{2}$

99. Size >> wavelength order

100. $I_0 = I + I + 2\sqrt{I \times I}\cos 0^o = 4I$ When path diff. $p = \frac{\lambda}{6}$, $\phi = \left(\frac{2\pi}{\lambda}\right)\left(\frac{\lambda}{6}\right) = \frac{\pi}{3}$

$I' = 4I\cos^2\frac{\pi}{6} = I_0\left(\frac{3}{4}\right)$ Hence, $\frac{I'}{I_0} = \frac{3}{4}$

101. $\left(\mu - 1\right)t = n\lambda \Rightarrow \left(1.5 - 1\right)2 \times 10^{-6} = n \times 5 \times 10^{-7} \Rightarrow n = 2$

$\Delta x = 2\beta$ (upward)

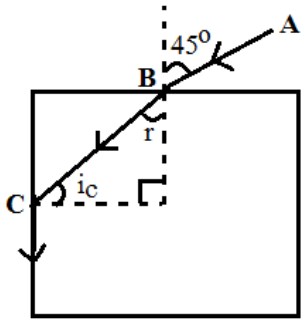
102. Distance of first dark fringe from

Central maximum $= \frac{\lambda D}{a} = \frac{\lambda f}{a} = \frac{4890 \times 10^{-10} \times 40 \times 10^{-2}}{0.5 \times 10^{-2}} \simeq 40\,\mu m$

103. As $d\theta = \frac{x}{d} = \frac{1.22\lambda}{D}$, $x = \frac{1.22\lambda d}{D} = \frac{1.22\left(500 \times 10^{-9}\,m\right)\left(400 \times 10^{3}\,m\right)}{\left(5 \times 10^{-3}\,m\right)} = 48.8\,m \approx 50\,m$

104. Conceptual

105. $\sin i = \sqrt{\mu^2 - 1} \Rightarrow \frac{1}{2} = \mu^2 - 1 \quad (or)\ \mu^2 = \frac{3}{2} \Rightarrow \mu = \sqrt{\frac{3}{2}}$



106. As $\theta = \frac{\beta}{D} = \frac{(\lambda D / d)}{D} = \frac{\lambda}{d}$, $\qquad d = \frac{\lambda}{\theta} = \frac{6 \times 10^{-4}\, mm}{(11/180)} = 0.03\, mm$

107. If I_0 and $4I_0$ be the intensities due to individual slits, $I_m = \frac{(2+1)^2}{(2-1)^2} I_0 = 9I_0$

$I_R = I_0 + 4I_0 + 2\sqrt{I_0}\sqrt{4I_0}\cos\phi = 5I_0 + 4I_0\cos\phi$

$I_R = I_0 + 4I_0(1+\cos\phi) = I_0 + 8I_0\cos^2\phi/2 = I_0\left[1 + 8\cos^2\phi/2\right] = \frac{I_m}{9}\left(1 + 8\cos^2\phi/2\right)$

108. Number of photons emitted/s (N) $\propto$ intensity of incident light $\propto \frac{1}{d^2}$

When d becomes d/2, N becomes 4 N.

109. $\lambda_0 = \frac{h}{mv_0}$

In electric field, velocity of electron at any time t is $v = v_0 i + (eE_0 t / m) i$

$\lambda = \frac{h}{m\left[v_0 + (eE_0 t / m)\right]} = \frac{h}{mv_0(1 + eE_0 t / mv_0)} = \frac{\lambda_0}{(1 + eE_0 t / mv_0)}$

110. As $\lambda = \frac{h}{\sqrt{2mqV}}$, $\frac{\lambda_p}{\lambda_\alpha} = \sqrt{\frac{m_\alpha q_\alpha}{m_p q_p}} = \sqrt{\frac{4m_p(2e)}{m_p e}} = 2\sqrt{2} = 2\sqrt{2} : 1$

111. As $K = \frac{hc}{\lambda_0} = \frac{h^2}{2m\lambda^2}$, $\qquad$ (as $\lambda = \frac{h}{p} = \frac{h}{\sqrt{2mK}}$, $K = \frac{h^2}{2m\lambda^2}$) $\qquad \lambda_0 = \frac{2mc\lambda^2}{h}$

112. For first spectral line in the Balmer series f hydrogen atom, $\frac{1}{6561} = R\left(\frac{1}{4} - \frac{1}{9}\right) = \frac{5R}{36}$

For second spectral line in the Balmer series of singly ionised helium atom,

$\frac{1}{\lambda} = 4R\left(\frac{1}{4} - \frac{1}{16}\right) = \frac{3R \times 4}{16} = \frac{3R}{4}$

Thus $\frac{1}{6561} \times \frac{\lambda}{1} = \frac{5R}{36} \times \frac{4}{3R} = \frac{5}{27}$ or $\lambda = \frac{5}{27}(6561 A^o) = 1215 A^o$

113. $v_t \propto r^2 \qquad \Rightarrow v_1 : v_2 = r_1^2 : r_2^2 = 1 : 4 \qquad$ so, $r_1 : r_2 = 1 : 2$

$\lambda = \frac{h}{mv} \Rightarrow \lambda_1 : \lambda_2 = \frac{m_2 v_2}{m_1 v_1} = \frac{r_2^5}{r_1^5} = \left(\frac{2}{1}\right)^5 = \frac{32}{1}$

114. $\sqrt{\upsilon} = a(z-b)$ $\sqrt{\frac{C}{\lambda}} = a(z-b)$ $\sqrt{\frac{3\times10^{8}}{0.33\times10^{-10}}} = 5\times10^{7}(z-1)$ on simplification, z = 61

115. $h\upsilon = W + k$ $2h\upsilon = W + k'$ $2h\upsilon - h\upsilon = k' - k$ $\Rightarrow k' = h\upsilon + k$

116. $L = n\frac{h}{2\pi}$ $\Delta L = (2-5)\frac{h}{2\pi} = \frac{3\left(6.63\times10^{-34}\,Js\right)}{2\times3.14} = -3.17\times10^{-34}\,Js$

117. Potential energy, $U = eV = eV_0\,In(r/r_0)$

Force, $F = \frac{dU}{dr} = \frac{d}{dr}\left[eV_0\,In(r/r_0)\right] = eV_0(r/r_0)(1/r_0) = \frac{eV_0}{r}$

As F provides the necessary centripetal force $\left(mv^2/r\right)$, $\frac{mv^2}{r} = \frac{eV_0}{r}$ or $v = \sqrt{\frac{eV_0}{m}}$

Further, $mvr = (nh/2\pi)$ or $r = \frac{nh}{2\pi mv} = \frac{nh}{2\pi m}\sqrt{\frac{m}{eV_0}}$, i.e., $r_n \propto n$

118. Conceptual

119. $\frac{hc}{\lambda} = \frac{hc}{\lambda_0} + k$ $\frac{hc}{3\lambda} = \frac{hc}{\lambda_0} + \frac{k}{6}$ $\Rightarrow \frac{2hc}{\lambda_0} = \frac{6hc}{\lambda_0} + k$ on simplification, $\lambda_0 = 5\lambda$

120. Conceptual

121. $T_{1/2} = 10\,s$

$\frac{N}{N_0} = 6.25\% = \frac{6.25}{100} = \frac{1}{16} = \frac{1}{2^n}$ $\Rightarrow n = 4$, $t = 4T_{1/2} = 4\times10\,s = 40s$

122. As efficiency, $\eta = \frac{output\ power}{input\ power}$, Input power $= \frac{10W}{(20/100)} = 50W = 50J/s$

As $E = (\Delta m)c^2$, $\Delta m = \frac{E}{c^2} = \frac{50J/s}{\left(3\times10^{8}\,m/s\right)^2} = \frac{50}{9}\times10^{-16}\,kg/s = 2\times10^{-9}\,g/h$

123. Conceptual

124. Conceptual

125. Diode D_1 is reverse – biased and as such no current flows through it and consequently resistance of 3Ω is ineffective. Only diode D_2 conducts as it is forward – biased.

Thus, $I = \frac{V}{R} = \frac{12V}{2\Omega + 4\Omega} = 2.0\,A$

126. Conceptual

127. As $\alpha = 0.8$, $\beta = \frac{\alpha}{1-\alpha} = \frac{0.8}{1-0.8} = 4$

Further, as $\beta = \frac{\Delta I_C}{\Delta I_B}$, $\Delta I_C = \beta\Delta I_B = 4\times6\,mA = 24\,mA$

128. $I_E = I_c + I_b$

$$\frac{\Delta I_E}{\Delta I_C}=\frac{\Delta I_C}{\Delta I_c}+\frac{\Delta I_b}{\Delta I_C} \Rightarrow \frac{1}{\alpha}=\frac{1}{\beta}+1 \Rightarrow \frac{1}{\beta}-\frac{1}{\alpha}=-1 \Rightarrow \frac{\alpha-\beta}{\beta\alpha}=-1 \quad (or)\ \frac{\alpha\beta}{\alpha-\beta}=-1$$

129. Conceptual

130. $\beta=\frac{I_C}{I_B}$ or $I_B=\frac{I_C}{\beta}=\frac{I_C}{100}$ Also, $V_{CE}=V_{CC}-I_C R_L$ or $5V=10V-I_C\times 1000$

or $I_C=\frac{5V}{1000\,\Omega}=5\times 10^{-3}\,A$; $I_B=\frac{5\times 10^{-3}\,A}{100}=5\times 10^{-5}\,A$

Thus, $R_B=\frac{V_{CC}-V_{BE}}{I_B}=\frac{10V}{5\times 10^{-5}}=2\times 10^5\,\Omega$ (neglecting V_{BE})

131. Conceptual

132. Conceptual

133. Min length of antenna $=\frac{\lambda}{4}=\frac{1}{4}\left(\frac{C}{\upsilon}\right)=\frac{1}{4}\frac{3\times 10^8}{10\times 10^6}=7.5\,m$

134. Conceptual

135. Conceptual

CHEMISTRY

159. $\alpha=\frac{i-1}{2-1}$ or $0.8=\frac{i-1}{2-1}\Rightarrow i=1.8$

Now $\Delta T_f=K_f\times Molality\times i=1.86\times 0.5\times 1.8=1.674$ (Molarity = Molality)

Solution freezes = 273 – 1.674 = 271.326 K

160. Mass of H_2SO_4 in 100 mL solution = 98 g $=\frac{98}{98}=1 mole$

Volume of solution $=\frac{100}{1.84}mL$ $\therefore M_{H_2SO_4}=\frac{mole}{V(in\,mL)}\times 1000=\frac{1\times 1000\times 1.8}{100}=18.0$

Now $M_1V_1=M_2V_2 \Rightarrow 18.0\times V_1=0.1\times 1000$ $\therefore V_1=5.55\,mL$

161. $\Delta T_b=iK_bm$

Maximum elevation will be there where value of I is maximum and it is the case in option 2.

The value of 'i' for the KNO_3, Na_3PO_4, $BaCl_2$ and K_2SO_4 are respectively 2, 4, 3 and 3.

162. $P=P_AX_A+P_BX_B=P_AX_A+P_B(1-X_A) \Rightarrow P_AX_A+P_B=P_BX_A \Rightarrow P_B+X_A(P_A-P_B)$

163. Mole of $Ni(NO_3)_2=\frac{2\times 500}{1000}=1 mole$ Charge $=i\times t=96.5\times 18\times 60$ coulomb

$Ni^{2+}+2e\rightarrow Ni$ $\because$ $2\times 96500\,C$ deposits of $Ni(NO_3)_2=1 mole$

$\therefore$ $96.5\times 18\times 60\,C=\frac{96.5\times 18\times 60}{2\times 96500}=0.54$ mole

$\therefore$ Mole left of $Ni(NO_3)_2=1-0.54=0.46$ mole

164. $\alpha=\frac{\wedge_v}{\wedge_\infty}=\frac{8.0}{400}=2\times 10^{-2}$ $\therefore K_a=\frac{C\alpha^2}{(1-\alpha)}\approx C\alpha^2$ $(\because C=M/32)$

$$= \frac{1}{32} \times \left(2 \times 10^{-22}\right) = 1.25 \times 10^{-5}$$

165. $E^0_{cell} = E^0_{cathode} - E^0_{anode} = 0.15 - (-0.74) = 0.15 + 0.74 = 0.89\,V$

166. $Cu^{2+} + e \rightarrow Cu^{+};\ \ E^0 = +0.15V \qquad \therefore \Delta G^0_1 = -nFE^0 = -1 \times F \times 0.15 = -0.15\,F$

$Cu^{2+} + e \rightarrow Cu^{+};\ \ E^0 = +0.15V \qquad \therefore \Delta G^0_2 = -1 \times F \times 0.15 = -0.15\,F$

Now, $Cu^{2+} + 2e \rightarrow Cu;\ E^0 = ? \qquad \therefore \Delta G^0 = -2FE^0$

$\because \Delta G^0 = \Delta G_1{}^0 - \Delta G_2{}^0 \ \Rightarrow -2FE^0 = -0.15F - (-0.50)F = -0.65\,F$ or $E^0 = 0.325\,V$

167. $\frac{1}{2}H_2(g) \rightarrow H^+ + e^- \qquad E_{o.P.} = E^o_{O.P} - \frac{0.059}{n} log \frac{\left[H^+\right]}{\left(P_{H_2}\right)}$

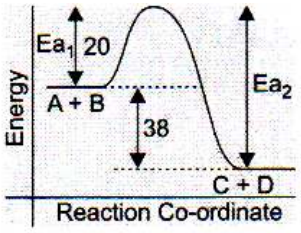
$E_{o.P.} = 0 - \frac{0.059}{n} log \frac{10^{-10}}{(I)^{1/2}} \ \left(pH = 10, \left[H^+\right] = 10^{-10}\,M\right) \qquad E_{O.P} = 0.59V$

169. Unit of $K = (mol)^{1-n}(litre)^{n-1}, time^{-1}$ where n is order of reaction $n = 1 + \frac{2}{3} = \frac{5}{3}$

170. $t_{3/4} = \frac{1}{K} In \frac{100}{\frac{1}{4} \times 100}$

171. Four half – livers (Total time = n × half life so, n = 4), hence 0.0625.

172. $E_{a2} = 58$



173. $D = \frac{ZM}{N_A a^3} = \frac{4 \times 40}{6.02 \times 10^{23} a^3} = 1.83 \qquad \Rightarrow a = 0.525\,nm$

174. Due to missing of ions. Density decreases in Schottky defect.

175. Conceptual

176. Conceptual

177. For $NaCl$, $\frac{r^+}{r} = 0.414$

Given radius of cation = 100 pm $\qquad \frac{100}{r^-} = 0.414 \ \Rightarrow \frac{100}{0.414} = r^- \ \Rightarrow r^- = 241.5\,pm$

178. Conceptual

179. Langmuir adsorption isotherm, is $\frac{x}{m} = \frac{ap}{1 + bp}$

At high pressure, $1 + bp = bp$ or $\frac{x}{m} = \frac{ap}{bp} = \frac{a}{b}$

180. Sol particles of AgI adsorbs I^- (present in excess) from solution.