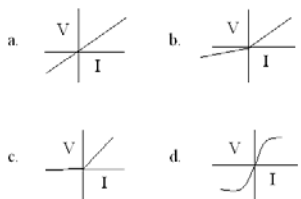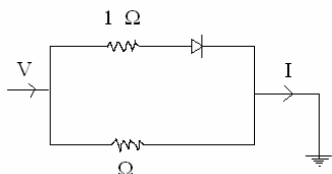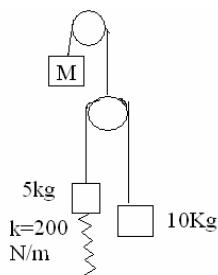1. The circuit is shown as follows with a true diode and circuit is finally earthed. The relation ship between the V and I will be **(Answer D)**

2. The pulley system is in equilibrium as shown in figure. Neglect mass of Pulley, what would be the mass of "M"

   a. 10 kg   b. 5 kg
   b. **20 kg**   d. 2.5 Kg

3. If an beam of electron with velocity 4×10^8 m/s enters along positive X axis in the magnet field 0.003 T aligned on positive Z axis. The change in path of electron will be
a. Curved along negative Z axis
b. Along positive Z axis
c. Along negative Y axis
d. Along Positive Y axis

4. Considering the earth as perfect black body. It is given that $\lambda = 2900/T$ where T is 290K. The maximum radiation emitted by the earth will fall in which range of Electromagnetic Spectrum
a. UV   b. Visible
c. X-ray   **d. IR**

5. A wire of length 'l' and cross section area 'A' has resistance 'R'. Another wire of length '$2l$' and Area of cross section 'A/2' will have resistance equal to
a. R   b. 2R
c. 4R   d. 8R

6. When 1 gram of ^{238}U is converted into Pb, eight α particles are emitted. The mass of Pb will be
a. 0 gm   b. Little less than 1
c. 1 gm   **d. 206/208**

7. A man along with a cylinder filled with Helium gas and a balloon was sitting in a boat. He fills some of gas from cylinder to the balloon as a result balloon swells. [Hint: Do not neglect the density of air]What is effect on boat in water
a. Boat will rise in water
b. Boat will sink little in water
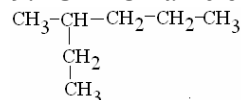c. No effect on boat
d. Data are not sufficient to draw conclusion

8. Among the following which has highest boiling point

a. CH_3OH b. CH_3CH_2OH

c.
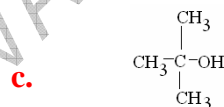
d. $CH_3CH_2CH_2CH_2OH$

9. IUPAC name of given structure will be

a. 2-methyl pentane
b. 4 –methyl pentane
c. 3 methyl hexane
d. 4-methyl hexane

10. If current applied is 5 A then the amount of Cu deposited on cathode from $CuSO_4$ in 3 min 13 sec will be [Given: mol wt of Cu= , S=   ,O=16   and Faraday constant =]
a.   b.   c.   d.

11. If in a balloon air is filled, it was observed that it denies Boyles rule P α 1/V because as air is filled both the Pressure and

volume inside the balloon increases. The explanation for this is
a. Air is not an real gas
b. Boyles law is applicable at low temperatures only
c. It is applicable at high temperatures only
d. Boyles law is applicable at all temperatures

12. If an substrate changes from X to Y and finally to Z by an first order reaction. The rate constant of X→Y is 0.2 sec^{-1} and Y→Z is 200 sec^{-1}. The overall rate of reaction from X→Z will be
a. 0.2 sec^{-1}   b. 100 sec^{-1}
c. 200sec^{-1} d. 400 sec^{-1}

13. Considering the isothermal condition, what would be change in the atmospheric pressure at height 0 Km, 8 Km and 16 Km.
a. No change   **b. 1, 0.5, 0**
c. 1, 2,4   d. 1,0.8, 0.16

14. Venus is visible only during the morning or evening because
a. It rotate very fast
b. It has very elliptical path
c. It is eclipsed by earth
d. It revolving path is smaller as compare to earth

15. We are able to know about internal details of earth due to
a. Picture from satellites
b. Surface features
c. Acoustic waves from earth quake
d. from deep wells

16. Consider the equation for eclipse is as follows, the distance between point (2,0) will be

$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

17. Equations
X cos α -2y sin α=17

2x sin α + y cos α=100
will have real solution only when α is
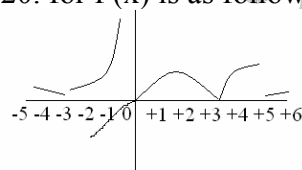a. 0   b. All case
c. 45   d 90

18.   Z= x +i Y
IZI=IXI + IYI

19. In transitive sets number of (a,b) (b,c) are (a,c) and also in R, then Transitive set for (3,4,7,9) will be
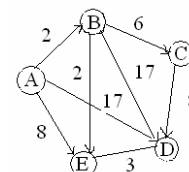a. R$_1$=(3,4)(7,9)(9,4)

20. for f (x) is as follows

The relationship is not obeyed at f(x)
a. -3, 0, +3,+6

21. The direct flight cost between place A and D is 17. What would be the minimum flight cost between A and D by any route?

a. 7   b. 9   c. 14   d. 17

22. Solution of equation will be

$$\lim_{x \to 0} \left(\frac{\sin x\text{-}x}{1+\cos x} +1 \right)$$

23. Peripheral devices are attached to computer to increase its basic functioning. Among the following which is not an peripheral device
a. USB flash drive   **b. CPU**
c. Modem   d. Printer

24. Floating number in computer has
a. Indefinite range and indefinite precision
b. Definite range and indefinite precision
c. Definite range and definite precision
d. Indefinite range and definite precision

23. A is an array A[1], A[2]....A[10]
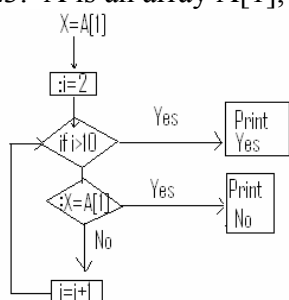
Program will print "Yes" if the array A is
a.   Is sorted in increasing order
b.   Is sorted in decreasing order
c.   Has first element repeated
d.   Has a element less then 10

26. First cell to be differentiated in developing embryo is
a . Epithelial cells   b. Rods
c. RBC   d. Nerve cells

27. In plant if the sequence 5'-GATGGCACGAT-3' is transcribed, the corresponding m-RNA will be
a. 5'-CUACCGUGCUA-3'
b. 5'-GAUGGCACGAU- 3'
c. 5- AUGUCCAUC-3'
d. 5'-ATGTCCATC-3'

28. which of the following vaccine does not provide lifetime protection
a. Typhoid   **b. Tetanus**
c. Polio   d. Small pox

29. The special roots termed as pneumatophores are visible at
a. Mangroves   b. Oceans
c. Epiphytes   d. Salt stress

30. Efficiency of ATP synthesis is 40 % and enthalpy of reaction ADP+iP→ATP is 8 K cal. If an individual consumes 2000 K cal, then the net ATP production from it would be
a. 40   **B. 100**
C. 250   D. 1000

31. Pearl oysters are obtained from the genus
a. Oysteria   **b. Pinctada**
c. mytillus   d. Pila

32. Temperature sensitive mutation are important in molecular biology because it helps in studing
a. genes for heat stress
b. genes for cold stress
c. genes necessary for survival of cell
d. genes required for development

33. In ecosystem the concept of entropy is used to explain
a. Photosynthesis efficiency
b. Energy flow in trophic level
c. Population growth
d. Competition

34. Rate of reaction for first order reaction for an radioisotope is 6.93×10^{-2} sec^{-1}. What is half life of radioisotope
a. 10 sec   b. 100 sec
c. 0 sec   d. 1000 sec

35. Chlorinated hydrocarbons effects ecosystem by
a. Biomagnifications   b. Bioconcentration
c. Bioaccumulation   d. Bioremediation

36. Morphologically similar species when interbreed produce viable fertile offspring. They are considered as single species according to
a. biological species concept
b. evolutionary species concept
c. Genetic species concept
d. Morphospecies concept

37. Natural selection against extreme phenotype is termed as
a. Directional selection
b. Diversifying selection
c. Disruptive selection
d. Stabilizing selection

38. At any OTU following dendrogram was obtained
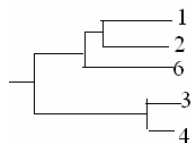
Here species 1, 2 and 6 represents
a. Evolutionary relationship
b. phylogenetic relationship
c. Overall similarity
d. genetic similarity

39. Extensive phyletic diversification of animals was observed in
a. Devonian   b. Silurian
c. Cambrian   d. Mesozoic

40. Which one of the following statement is not true for edge effect of two ecosystems
a. Moving corridors are always harmful
b. It has its distinct physical environment differing from both side
c. It has different species composition as compare to both side
d. It has high biodiversity

41. In habitat A pike cichlid fishes preferentially feeds on large adult guppies, so guppies mature later and is of small size while in habitat B killer fish feeds on small, juvenile guppies so here guppies mature early and are large size. What will be effect if experimentally guppies for habitat A are transferred to habitat B.
a. No change would be seen
b. Mature early but large size adults
c. mature late but small size adults
d. mature late but large size adults

42. if in a metabolic reaction at temperature 27^0C increase in enthalpy is 1000 J and decrease in entropy is 10 J. calculate the change in free energy
a. 4000   b. 1270
c. 2000   d. 730

43. In a population frequency of A_1 is 0.75 and A_2 is 0.25. After one generation the phenotype frequency will be
a. 0.5625; 0.375; 0.0625
b. 0.5625; 0.0625;0.375
c. 0.750; 0.250;0.350
d. 0.5625; 0.1525;0.0625

44. The curve shown below shows a relationship between
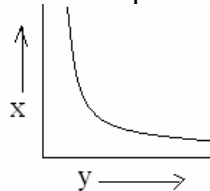
a. Time (X) and Population density (Y)
b. Body size (X) and generation time (Y)
c. Area(X) and number of species (Y)
d. Fish length(X) and fish body weight(Y)

45. Phenotype A has selective advantage over B , B has over C and C has over A. The condition is like "paper-scissor-rock". Under such condition in nature
a. All phenotype would be selected
b. Only A and C would be selected
c. A and B together selected
d. only B would be selected

46. Among the following which organelle is involved in apoptosis
a. Lysosome
b. ER
c. Golgi
d. Mitochondria

47. Tiger is not found in wild at
a. Punjab   b. Rajasthan
c. UP   d. Arunchal Pradesh

48. Taxol, an anti-cancerous drug effects
a. Inhibiting polymerization of tubulin
b. Inhibiting depolymerization of tubulin
c. Polymerization of actin
d. Favoring depolymerizaton of tubulin

49. Distance between gene A and B is 10 cM. If the F1 genotype $\frac{A \quad B}{a \quad b}$ was test crossed then what is probability of obtaining $\frac{A \quad B}{a \quad b}$ genotypes

a. 90   **b. 45**
c. 10   d. 5

50. Aspirin delays senescence in cut parts of plant and keeps flower fresh for longer time. The effect of aspirin is
a. by decreasing the synthesis of ethylene.
b. by increasing the synthesis of absicicic acid
c. by increasing the synthesis of cytokinins
d. by increasing the synthesis of gibberlic acid

51. Gibberlic acid stimulates seed germination in monocots by activation of degradative enzymes by acting on
a. endosperm   **b. Aleurone layer**
c. Embryo   d. Cotyledons

52. Hemidesmosomes are structure found between
a. Two adjacent plant cells
b. two adjacent animal cells
c. Between cell and extracellular matrix
d. Within a bacteria

53. Lymphatic system are mainly involved in
a. Innate immunity
b. Acquired Immunity
c. Phagocytosis
d. Recycling lymph

54. A zygote formed by a fusion of one normal gamete and another gamete where one of the chromosomes did not segregated at Anaphase-II will lead into chromosomal aberrations known as
a. Haploidy   b. Diploidy
c. Polyploidy   **d. Aneuploidy**

55. The Fluid mosaic model of Plasma membrane given by Singer and Nicolson is applicable to
a. only prokaryotic membrane
b. Only eukaryotic membrane
c. Both prokaryotic and Eukaryotic membranes
d. Only to organelle membranes

56. During which phase of infection cycle, the DNA polymerase of T_4 –Phage is expressed maximally
a. Immediate early   **b. Early**
c. Late   d. Middle

57. In a chemical reaction catalyzed by enzyme following the Michales-Menten equation what will be the concentration of substrate when the velocity of reaction is 90% of the maximum velocity
a. 18 Km   **b. 9Km**
c. 5 Km   d. 1Km

58. Which of the following is involved in intermolecular hydrogen bonding with water
a. Urea   b. CH_4
c. CCl_4 d. $CHCl_3$

59. If the length of one helix in DNA is 34 A^0. The type of DNA is
a. A   b. B
c. C   d. D

60. Which statement is NOT correct regarding the genetic code
a. One Amino acid can have more then one codon
b. In eukaryotes the start codon is AUG
c. Genetic codes are not strictly universal
d. Third base of anticodon in not necessary for specificity

61. In prokaryotes there is single multifunctional fatty acyl synthase sufficient for complete fatty acid synthesis where as in eukaryotes there are many different enzymes

involved in fatty acid synthesis. The probable explanation for this difference is
a. fatty acid synthesis is more stringent in eukaryotes
b. Synthesis of fatty acid is by different mechanism in eukaryotes as compare to prokaryotes
c. For better regulation of fatty acid synthesis in eukaryotes
d. Fatty acids of eukaryotes are different from the prokaryotes

62. Vitamin B complex is an essential for humans because
a. It is obtained only from plant sources
b. It is obtained only from animal sources
c. It act as cofactor for various metabolic enzymes
d. It is directly utilized in various metabolic reactions

63. In submerged roots of mangrove plants the recycling of NAD^+ is carried out by
a. Cellular oxidation
b. Glycolysis
c. Electron transport chain
d. Fermentative metabolism

64. Electron acceptor in anaerobic conditions in prokaryotes is
a. Glucose, fructose, maltose
b. Fatty acids
c. SO_4^{2-}, NO_3^{2-}, CO_2
d. Antioxidants such as Vitamin K

65. The biggest disadvantage of sexual reproduction against the asexual reproduction is
a. Only half of genetic material is passed to offspring from each parent
b. Lot of energy and time is consumed in locating mate
c. Atleast two individuals are required for sexual reproduction
d. After fertilization in many cases zygote fails to develop

66. In test cross F1 progeny is crossed with
a. Either of the parent
b. Recessive parent
c. Dominant parent
d. Heterozygous parent

67. Polytene chromosome is generated due to
a. Failure of DNA replication
b. Repeated DNA replication without segregation chromosomes
c. Pairing of homologous chromosomes
d. Due to extensive transcription process

68. An bacterial operon contains three structural genes A,B and C in the same order. If polar mutation occurs in gene B, then the effect in protein would be observed in
a. In all proteins A, B, and C
b. Only in B and C
c. Only in B
d. Complete loss of all proteins

69. Among the following, which is Sex linked disorder
a. Night blindness
b. color blindness
c. Cretinism
d. Myxodema

70. Among the following which statement is not correct for X-linked recessive disorder
a. Females with such disorders are unknown
b. Males carrying the diseased allele are always diseased
c. Females are diseased only when their mother is carrier and father is diseased
d. Males always passes trait to all of his sons

71. c-Value measures
a. haploid content of genome
b. diploid genome content
c. Polyhploid genome content
d. Anueploid genome content

72. The most ancient mode of energy generating metabolic reactions are
a. Photosynthesis
b. Oxidation of Nitrate
c. Reduction of sulphate
d. Reduction of nitrate

73. Chemolithotroph obtain their carbon from CO_2 and energy from
a. Sunlight
b. Water
c. Inorganic compounds
d. Organic compounds

74. Carrying capacity of a forest is 20 tones which increases 10 % of its biomass annually. For sustainable forestry how much trees can be harvested for timber so that it has minimum effect on forest and can be harvested annually
a. 20 tones   b. 10 tones
c. 1 tones   d. 0.5 tones

75. The characteristic of a population with low value of intrinsic growth (r = 0.2) is
a. Later age at maturity and small clutch size
b. Early age at maturity and small clutch size
c. Late age at maturity and large clutch size
d. Early age at maturity and large clutch size

76. The characteristic survivorship curve III is shown by
a. fruit flies   **b. Pelagic fishes**
c. Birds   d. Humans

77. Which statement is correct regarding arteries and veins
a. Arteries has single valve while veins has two valves
b. there is no difference
c. Arteries carry deoxygenate blood and has thicker walls
d. veins contain deoxygenated blood and has thinner walls

78. Which statement is true regarding spore and seed
a. Spore always generate diploid organisms
b. Spore always give rise to sporophyte generation while gamete fuses with another haploid cells to give rise to zygote
c. Spore and gametes are identical
d. Spore are immotile and gametes are always motile

79. Which is not considered as major threat to loss of species diversity
a. Habitat destruction
b. Overexploitation
c. Alien invasion
d. Pollution

80. The technique used for observing 3-D structures is
a. Scanning electron microscopy
b. Transmission electron microscopy
c. Confocal microscopy
d. UV microscopy

81. Pyrimidine dimmers formed due to UV rays can be repaired without removing any nucleotide by the repair mechanism known as
a. Mismatch repair mechanism
b. Photoactivation
c. Base excision repair mechanism
d. SOS repair mechanism

82. Pentadactyly is a dominant trait, yet many individuals having single dominant alleles does not show any sign of polydacylity. This is known as
a. Incomplete penetrance
b. Variable expressivity
c. Co dominance
d. Incomplete dominance

83. Which of the following graph explains the "All or none" response against stimulus **(Answer D)**
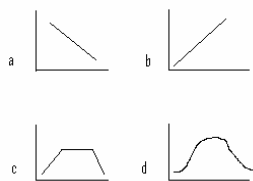
84. Among the following which is not an correct explanation for high biodiversity at tropical rain forests
a. Long evolutionary time
b. More surface area
c. High productivity
d. Minimum competition

85. Ribose-5-Phosphate is precursor for ribose sugar in DNA and RNA and is obtained from
a. Pentose phosphate pathway
b. Kreb cycle
c. Glycolysis
d. Aminoacids

86. First fossils were discovered
a. Prior to both Lamarck and Darwin
b. Prior to Lamarck but after Darwin
c. After Lamarck but prior to Darwin
d. After Lamarck and Darwin

87. Prebiotic environment was different from present enviorment and was devoid of
a. CO_2 b. atmosphere
c. O_2   d. N_2

88. Type of biome in California and coastal regions of Mediterranean sea is
a. Taiga   b. Savanah
c. Chaparrals
d. Tropical deciduous forests

89. Biodiesal is obtained from
a. Jatropa curcus
b. Calotropis
c. Prosopis
d. Catharanthus

90. Homeotic genes are responsible for
a. Development
b. Homeostasis
c. Cell cycle   d. Gene regulation

91. An object of 1.5 m height is placed 8.5 m away from the human eye and image is formed on retina which is 1.7 cm away from the lens. The size of image will be
a. 0.3 μm   b. 3 mm
c. 3 cm   d. 3 m

92. The sign of cross between Spartina X townsendaii represents
a. Cultivars
b. Intergeneric hybridization
c. Interspecific hybridization
d. Grafts

93. The equation $1 - \Sigma Pi^2$ represents
a. Shannon weaver index
b. Simposon index
c. Bronaulli index
d. Hills equation

94. Gram positive bacteria are further classified at generic and species level by analysis of
a. DNA   b. Cell wall
c. Proteins   d. Cell membranes

95. In *E. coli* the complementation test is done by
a. Transformation
b. Merozygotes
c. heterokaryons
d. Making them dipoid

96. Absisisic acid can be degraded by
a. Oxidation and reduction
b. reduction and conjugation
c. Oxidatation and conjugation
d. light and oxidation

97. Honey bee keep variations among the workers by
a. Matting with males many times
b. Parthenogeneis
b. Specialization of functional role
d. Extensive recombination during oogenesis

98. Haematopoetic stem cells are found in
a. Bone marrow   b. Skin
c. Lympoid organs   d. Spleen

99. Among the following which is not an density independent factor effecting population
a. Competition   b. Food
c. Temperature   d. Nutrients

100. Under which condition of natural selection no allele would be lost
a. any one homozygote is favored
b. Both homozygote are favored
c. Heterozygote are favored
d. Heterozygote is not favored