

**ANSWER ALL THE QUESTIONS**  
**SECTION –A**

1. Which IPL cricket team signed with UNICEF in a bid to support the girl child in India?
  - a. Delhi Daredevils
  - b. Chennai Super kings
  - c. Deccan Chargers
  - d. Rajasthan Royals
  
2. Which is the southernmost point of Republic of India?
  - a. Cape Comorin
  - b. Indira Point
  - c. Vivekananda rock
  - d. None of these
  
3. UN Conference on Biodiversity 2012 will be held on October at which place?
  - a. Hyderabad (Andhra Pradesh)
  - b. Hazaribagh (Jharkhand)
  - c. Jaipur (Rajasthan)
  - d. Coimbatore (Tamil Nadu)
  
4. Which State/Union Territory government recently increased OBC quota in higher institution to 27% from existing 21%?
  - a. Chandigarh
  - b. Delhi
  - c. Puducherry
  - d. Daman & Diu
  
5. How many types of polio have been recognized?
  - a. 2 Types
  - b. 3 Types
  - c. 5 Types
  - d. 4 Types
  
6. Which of the following metals forms an amalgam with other metals?
  - a. Tin
  - b. Lead
  - c. Mercury
  - d. Zinc
  
7. Jarawa of Andamans are
  - a. A variety of Jawar
  - b. An endemic bird
  - c. Aboriginal tribe
  - d. None of these
  
8. Which of the gas is not known as green house gas?
  - a. Hydrogen
  - b. Carbon dioxide
  - c. Nitrous oxide
  - d. Methane

9. The property of a substance to absorb moisture from the air on exposure is called
  - a. Osmosis
  - b. Efflorescence
  - c. Desiccation
  - d. Deliquescence
  
10. Potassium Permanganate is used for purifying drinking water, because
  - a. It is an oxidising agent
  - b. It is a reducing agent
  - c. It dissolves the impurities of water
  - d. It is a sterilising agent
  
11. Which of the following is an element?
  - a. Diamond
  - b. Sapphire
  - c. Emerald
  - d. Ruby
  
12. One of the following is not a function of bones.
  - a. Production of blood corpuscles
  - b. Secretion of hormones for calcium regulation in blood and bones
  - c. Protection of vital organs
  - d. Place for muscle attachment
  
13. Plants that grow in saline water are called
  - a. Halophytes
  - b. Mesophytes
  - c. Thallophytes
  - d. Hydrophytes
  
14. Myopia is connected with
  - a. Eyes
  - b. Lungs
  - c. Ears
  - d. None of these
  
15. Ramapithecus and Cro-Magnon man are considered
  - a. Ancestors of lion
  - b. Ancestors of monkey
  - c. Ancestors of modern man
  - d. None of the above
  
16. Mumps is a disease caused by
  - a. Bacterium
  - b. Fungus
  - c. Virus
  - d. None of these
  
17. The members of the Rajya Sabha are elected by
  - a. Elected members of the legislative assembly
  - b. Lok Sabha
  - c. The people
  - d. The President

18. The preamble to our constitution includes all the following except
  - a. Justice
  - b. Adult franchise
  - c. Equality of status
  - d. Fraternity
  
19. Under an agreement with which of the following countries did Subhas Chandra Bose organize the Indian soldiers, taken as prisoners by the Axis Powers, into the Azad Hind Fauj?
  - a. Japan
  - b. China
  - c. Italy
  - d. Germany
  
20. The Asian Games were held in Delhi for the first time in...?
  - a. 1951
  - b. 1971
  - c. 1982
  - d. 1963
  
21. The term 'epicentre' is associated with
  - a. Earthquakes
  - b. Tornadoes
  - c. Cyclones
  - d. Earth's interior
  
22. By selling an article for Rs. 40, there is loss of 40%. By selling it for Rs. 80 there is
  - a. Gain of 20%
  - b. Loss of 10%
  - c. Loss of 20%
  - d. Gain of 10%
  
23. In banking ATM stands for
  - a. Any Time Money
  - b. Automatic Teller Machine
  - c. Automated Totalling Machine
  - d. Automated Transaction of Money
  
24. The highest gallantry award in India is
  - a. Ashok Chakra
  - b. Paramvir Chakra
  - c. Mahavir Chakra
  - d. Param Vishista Chakra
  
25. The speed of light with the rise in the temperature of the medium
  - a. Increases
  - b. Decreases
  - c. Remains unaltered
  - d. Drops sharply

26. Make hay while the sun shines
- To make sweet dish using solar energy
  - To take advantage of a good situation which may not last long
  - To prepare for the next event
  - To run very fast to reach the goal before sunset
27. To be on cloud nine
- To become very happy
  - To go to very high point in a hill
  - To be on the top position in an organization
  - To become weightless like a cloud
28. To bear brunt of
- to burn own finger
  - to face full fury of
  - to bear others burden
  - to take somebody's responsibility
29. To play second fiddle
- To take a subordinate position
  - To fiddle the cards second time
  - To play a musical instrument
  - To take second chance
30. To feel the pinch
- To feel very hungry
  - To feel very thirsty
  - Begin to suffer from lack of money
  - Begin to enjoy

**II. In each of the four words given under following four choices, only one word is correctly spelt. Identify the correct word**

- 31.
- ALLOTED
  - ALLOTTED
  - ALOTTED
  - ALOTED
- 32.
- TUTION
  - TUITION
  - TUSION
  - TUTISION
- 33.
- NEECE
  - NIECE
  - NEICE
  - NEEICE

34.

- a. BELIEVE
- b. BELEIVE
- c. BELEEVE
- d. BELEVE

35.

- a. ARITHMATIC
- b. ARETHMATIC
- c. ARITHMETIC
- d. ARITHEMATIC

**III. Pick out the most appropriate meaning of the following underlined phrases in each sentence out of four options –**

36. When police found the child, he was at loss

- a. Completely lost
- b. Puzzled
- c. Nervous
- d. Weeping

37. He won the first prize in race by dint of hard work

- a. By force of
- b. By doing
- c. Because of
- d. Without

38. The shopkeeper told that this type of shirt is in vogue

- a. Out of stock
- b. In a particular showroom
- c. Not liked now-a-days
- d. In fashion

39. He invited all his kith and kin in the ceremony

- a. Close friends
- b. Blood relations
- c. Children
- d. Brothers

40. Reeta is fair and square in her dealings

- a. Sincere
- b. Honest
- c. Clear
- d. Dishonest

**IV. Out of the four alternatives, choose the one which best expresses the meaning of the given word**

41. Splurge

- a. To fall down
- b. To climb up
- c. To spend lavishly
- d. To talk without thinking

42. Vengeance  
a. Love  
b. Affection  
c. Hatred  
d. Violent revenge

43. Inception  
a. Plinth  
b. End  
c. Beginning  
d. Middle

44. Abysmal  
a. Immeasurably deep or great  
b. Plenty  
c. Chaotic  
d. Not good

45. Tenacious  
a. Jealous  
b. Holding fast  
c. Envious  
d. Tension full

**V. Choose the most suitable word from the alternatives and complete the passage-**

Positive people are strongly ---(46)--- in the original nature or qualities or religion of the self such as peace, purity, love, wisdom and happiness. Nothing can ---(47)--- them from their position of peace, tranquility and equanimity by virtue of which they remit strong vibrations of spiritual energy, solace, bliss and contentment. The power of positivity is not ---(48)--- which is God gifted or which can be attained by a chosen few only. ---(49)--- it is the innate nature or quality of the self in every human being which can be brought to the fore ---(50)--- proper and regular cultivation and practice of our rich and ancient spiritual knowledge, universal values and divine contemplation or meditation on one's inner self and on the supreme soul.

46.  
a. hold  
b. fixed  
c. rooted  
d. stood

47.  
a. wash  
b. throw  
c. shift  
d. uproot

48.  
a. everything  
b. anything  
c. something  
d. bad

- 49.
- Moreover
  - However
  - Whatsoever
  - Rather
- 50.
- by
  - through
  - at
  - in
51. The sum of all even natural numbers less than 75 is
- 1046
  - 1406
  - 1200
  - 1022
52. The Nuclear power plant recently in news for safety issues is
- Narora
  - Kudankulam
  - Tapovan
  - Bellary
53. If  $1/(3.718)$  is 0.2689, the value of  $1/(0.0003718)$  is
- 2689
  - 268.9
  - 2.689
  - 26.89
54. The square root of 6084 is
- 78
  - 72
  - 68
  - 62
55. King Krishna Devaraya ruled the kingdom of
- Alleppy
  - Travancore
  - Vijayanagaram
  - Kahyakumari
56. The sum of squares of three consecutive odd numbers is 2531. The numbers are
- 27, 31, 33
  - 31, 33, 39
  - 27, 29, 31
  - None of above

57. The value of  $(27)^{2/3}$  is
- 9
  - 7
  - 11
  - 13
58. 56% expressed in fraction is
- $14/27$
  - $13/27$
  - $14/25$
  - $14/31$
59. The fourth proportional to 5, 8, 15 is
- 18
  - 24
  - 19
  - 20
60. A, B and C start a business each investing Rs. 20,000. After 5 months A withdrew Rs. 5,000, B withdrew Rs, 4,000 and C invests Rs. 6,000 more,. At the end of the year, a total profit of Rs. 69,900. The share of C is
- 20,500
  - 21,200
  - 28,200
  - 29,500
61. Tehri Hydroelectric Project is located in which of the following states
- Uttar Pradesh
  - Punjab
  - Gujarat
  - Uttarakhand
62. A is twice as good a workman as B and together they finish a piece of work in 18 days. A alone will finish the work in
- 29 days
  - 27 days
  - 25 days
  - 18 days
63. Raja Ravi Verma is known to be associated with
- Landscape painting
  - Sculpture
  - Clay Modeling
  - Painting Portraits

64. A dog takes 4 leaps for every 5 leaps of a hare but 3 leaps of a dog are equal to 4 leaps of the hare. The ratio of their speeds is
- 16:13
  - 16:15
  - 14:13
  - 12:9
65. Kalpana Chawla was
- Chemist
  - Economist
  - Astronaut
  - Scuba Diver
66. About whom it is said 'The Man who knew infinity'
- Vikram Sarabhai
  - Ramanujan
  - C.V. Raman
  - Aryabhata
67. Nobel Award in Chemistry for 2011 was awarded to
- Saul Perlmutter
  - Daniel Schechtman
  - Thomas Sargent
  - Christopher A. Sims
68. The annual installment that will discharge a debt of Rs. 1092 due in 3 years at 12% simple interest is
- 225
  - 325
  - 350
  - 275
69. Nimbus are a type of
- Clouds
  - Rain
  - Wind
  - Lightning
70. If  $\log 2 = 0.30103$ , the number of digits in  $2^{64}$  is
- 18
  - 19
  - 20
  - 21

71. A cone, a hemisphere and a cylinder stand on equal bases and have the same height. The ratio of their volumes will be
- 1:3:4
  - 1:2:3
  - 2:4:5
  - 1:3:4
72. The next in the series 0, 1, 1, 2, 3, 5 is
- 7
  - 9
  - 8
  - 11
73. A watch which gains uniformly is 5 minutes slow at 8 o'clock in the morning on Sunday and it is 5 min 48 sec fast at 8 p.m. on following Sunday. It was correct at
- 6.20 a.m. Tuesday
  - 7.20 p.m. Wednesday
  - 7.20 a.m. Wednesday
  - 6.20 p.m. Tuesday
74. The value of  $30!/28!$  is
- 880
  - 890
  - 860
  - 870
75. How many words can be formed by using all the letters of 'DAUGHTER' so that the vowels always come together?
- 4230
  - 4320
  - 2430
  - 2340
76. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?
- 252
  - 105
  - 2140
  - None of these
77. Two cards are drawn at random from a pack of 52 cards. The probability that either both are black or both are queens is
- $51/221$
  - $51/223$
  - $55/221$
  - $49/221$

78. A man and his wife appear in an interview for two vacancies in the same post. The probability of husband's selection is  $\frac{1}{7}$  and that of wife is  $\frac{1}{5}$ . The probability that only one of them is selected is
- a.  $\frac{2}{7}$
  - b.  $\frac{4}{5}$
  - c.  $\frac{8}{15}$
  - d.  $\frac{4}{7}$
79. The present worth of Rs. 930 due 3 years hence at 8% per annum is
- a. 650
  - b. 850
  - c. 900
  - d. 750
80. Non-recurring Non-terminating decimals are known as
- a. Irrational Numbers
  - b. Rational Number
  - c. Whole numbers
  - d. Complex numbers

**SECTION –B**  
**ATTEMPT TWO SECTIONS AS PER INSTRUCTIONS GIVEN ON QUESTION**  
**BOOKLET/ ANSWER SHEET.**  
**EACH SECTION HAS SIXTY QUESTIONS**

**1. FORESTRY**

1. Practical application of scientific, technical and economic principles of forestry is called
  - a. Silviculture
  - b. Forest Management
  - c. Forest Policy
  - d. None of these
  
2. The planned number of years between the formation of a crop and its final felling is known as
  - a. Seeding felling
  - b. Felling series
  - c. Rotation
  - d. None of these
  
3. In '**Crown Thinning**', the removal of trees is affected from
  - a. Forest in the dominant class
  - b. Forest in the suppressed
  - c. Both a & b
  - d. None of these
  
4. '**Radiation Frost**' is a characteristics of
  - a. Plain Areas
  - b. Hilly Areas
  - c. Both a & b
  - d. None of these
  
5. Abney's level is used for the measurement of
  - a. Volume
  - b. Height
  - c. Height and Volume
  - d. None of these
  
6. Sal grows in soil with a pH range of
  - a. 4.5- 5.5
  - b. 6.5- 7.5
  - c. 8.0- 9.0
  - d. > 9.0
  
7. Sandal is obtained from
  - a. Tree Bark
  - b. Roots
  - c. Heartwood
  - d. Softwood
  
8. Crown length is the vertical measurement of the crown of a tree from the tip of a tree to
  - a. Midpoint of crown
  - b. Point where lowest branch emerges
  - c. Point of forking of the tree
  - d. Point of midway of lowest green branch of green crown and lowest green branch on bole
  
9. Clear Felling System cannot be used for species which are
  - a. Light Demander
  - b. Fast Growing
  - c. Exotic
  - d. Shade Demander
  
10. Smithies' safe guarding formula is used for calculation of
  - a. Growing Stock
  - b. Yield
  - c. Both of these
  - d. None of these

11. The growth of trees with annual rings can be determined by
- Stem analysis
  - Increment borings
  - stump analysis
  - All of these
12. Ratio of Volume of a tree to the product of basal area and height is known as
- Crown ratio
  - Form Factor
  - Form quotient
  - None of these
13. The overlap of two ecosystem is called
- Ecotype
  - Ecotone
  - Ecosphere
  - Ecosere
14. Allogenic succession is a term associated with
- Primary succession
  - Secondary succession
  - Both of these
  - None of these
15. Rate of energy storage at consumer level is known as
- Primary productivity
  - Secondary productivity
  - Net productivity
  - None of these
16. Capturing rain where it fall or capturing the run off of seasonal flood water from local streams is
- River stabilization
  - Run off energy
  - Water harvesting
  - Channelization
17. The characteristic that affects the velocity of overland flow and runoff, infiltration rate and soil transportation is
- Climate
  - Land use
  - Drainage
  - Slope
18. The totality of genes, species and ecosystems in a region can be defined as ----- of the region
- Species diversity
  - Genetic diversity
  - Biodiversity
  - Ecosystem diversity
19. Sandwich board is a type of
- Composite wood
  - Improved wood
  - Plywood
  - All of these
20. Cell lignifications is the
- 4<sup>th</sup> stage in cell life history
  - Advance stage in cell life history
  - Last stage in cell life history
  - All of these
21. Myrobalans are
- Bark Tans
  - Fruit Tans
  - Leaf Tans
  - None of these
22. Lemongrass oil is obtained from
- Vetiveria zizanoidies*
  - Cinnamomum camphora*
  - Cymbopogon flexosus*
  - Ganltheria fragrantissima*
23. Nursery pests include
- Cock chafers
  - Cut worms
  - Both of these
  - None of these

24. Proportion of different component (sand, silt and clay) in soil is known as
- Soil texture
  - Soil density
  - Particle density
  - None of these
25. pH > 8.5 is a characteristic feature of
- alkaline
  - Sodic
  - Acidic
  - None of these
26. Creosote is a type of
- Oil preservative
  - Water soluble preservative
  - Organic solvent preservative
  - None of these
27. Major differences in plywood and laminated wood is
- Arrangement of Veneers
  - Dressing time
  - Yield
  - Durability
28. Tracheids are absent in
- Angiosperms
  - Gymnosperms
  - Both of these
  - None of these
29. The viability of seed can be determined by
- Chemical test
  - Germination test
  - X-ray test
  - All of these
30. Schneider's formula is used for calculation of
- Age of tree
  - Increment percent
  - Bark thickness
  - All of these
31. A tree whose stem has been cut off in order to obtain a flush of shoots above the height to which browsing animals cannot reach is known as
- Coppice
  - Pollard
  - Both a & b
  - None of the above
32. The initial choice of species for afforestation in watershed should be
- Indigenous spp
  - Exotic spp
  - Hybrid spp
  - Monoculture
33. Vivipary is found in which of the following
- Rhizophora spp.*
  - Pines*
  - Cassia spp.*
  - Acer spp.*
34. To which group of plants does the spruce tree belong?
- Angiosperms
  - Gymnosperms
  - Pteridophytes
  - Bryophytes
35. Root coiling in nurseries generally occurs in
- Polythene bags
  - Root trainers
  - Raised mother beds
  - Mist chamber
36. Which one of the following is a strong coppicer:
- Pinus roxburghii*
  - Dalbergia sissoo*
  - Cedrus deodara*
  - Abies pindrow*

37. Neem (*Azadirachta indica*) belongs to the family
- Verbenaceae
  - Meliaceae
  - Myrtaceae
  - Ranunculaceae
38. Ecological niche is defined as
- Place where a species is found
  - What it does there
  - How it adapts there
  - All of these
39. Seed is developed from the following part of the plant
- Flower
  - Ovary
  - Ovule
  - Pollen grain
40. Attempt to extinguish an advancing forest fire by deliberately burning the forest from the opposite direction
- Slash burning
  - Controlled burning
  - Counter fire
  - Cross fire
41. The species that require abundant light for their optimum growth and development are
- Light bearer
  - Light tolerant
  - Light demander
  - None of these
42. An outgrowth from the base of trees connecting it with the roots is called
- Taper
  - Forking
  - Buttress
  - Pole
43. Diameter at breast height is measured at a height of
- 1.50 m
  - 1.37 m
  - 1.30 m
  - 1.40 m
44. High forest is a forest regenerated from
- Cuttings
  - Coppice
  - Seeds
  - Suckers
45. Powerhouse of cell is generally referred to
- Plastids
  - Mitochondria
  - Nucleus
  - Ribosomes
46. A young plant up to 1 m height is termed as
- Seedling
  - Sapling
  - Tree
  - Pole
47. Generally the moisture content of seed to be stored should be
- 20 %
  - 10-12%
  - 15-20%
  - 20-25%
48. Coppicing characteristics mainly exploited for
- Fuel wood
  - Fodder
  - Short-rotation
  - All of above

49. Total number of plants in 0.75 ha area at a spacing of 2.5 x 2.5 m<sup>2</sup> will be
- 625
  - 975
  - 1200
  - 1600
50. Which one is a seasonal defect
- Spiral grain
  - Mineral streak
  - Rot
  - Bowing
51. Occurrence of forest fire is more common in
- Dry deciduous forest
  - Dry temperate forest
  - Moist temperate forest
  - Shola forest
52. 'Flame of Forest' refers to
- A lady with flame in her hands found in the forest
  - A forest full of tree which burst with red flower during autumn
  - A fire always found in some jungles
  - The title of a book
53. In *Taxus baccata*, taxol is extracted from
- Root and stem
  - Fruits and seed
  - Leaves and bark
  - All of these
54. Champion and Seth has broadly classified forest types into ---- groups
- 14
  - 12
  - 16
  - 18
55. The interval between seeding felling and final felling on a particular area is called
- Regeneration period
  - Regeneration interval
  - Both A&B
  - None of these
56. Tetrazolium test is conducted to test the
- Viability of seed
  - Fresh weight of seed
  - Dormancy of seed
  - Moisture content of seed
57. Progeny tested tree is known as
- Plus Tree
  - Elite Tree
  - Select Tree
  - Dominant Tree
58. The source of Khus oil is
- Vetiveria zizanoides*
  - Andropogon nardus*
  - Ocimum sanctum*
  - None of these
59. A substance, which neither dissolves nor softens in water but more or less soluble in organic matter is called
- Gums
  - Resin
  - Oil
  - None of these
60. Environment friendly control of weeds is known as
- Chemical control
  - Biological control
  - Pest control
  - None of these

## 2. AGRICULTURE

1. Whiptail of cauliflower is caused due to deficiency of
  - a. Mn
  - b. B
  - c. Mo
  - d. K
  
2. Causal organism of Ufra disease of rice is
  - a. *Ditylenchus angustus*
  - b. *Ditylenchus destructor*
  - c. *Heterodora avenae*
  - d. *Tylenchulus semipenetrans*
  
3. Consider following statements about MLOs
  - i. Brijal little leaf is caused by MLOs
  - ii. MLOs are susceptible to tetracycline
  - iii. Application of ABA result in MLO destruction and plant recovery
  - a. Only i and ii are true
  - b. Only ii and iii are true
  - c. Only i and iii are true
  - d. All are true
  
4. Cuscuta is a
  - a. Total root parasite
  - b. Total stem parasite
  - c. Partial stem parasite
  - d. Partial root parasite
  
5. One gene affecting more than one character is known as
  - a. Pleiotropic Gene
  - b. Active Gene
  - c. Ploidy Gene
  - d. Duplicate Gene
  
6. Disomic haploids are represented as
  - a.  $n+1$
  - b.  $2n-1$
  - c.  $2n-2$
  - d.  $n-3$
  
7. Operon concept was proposed by
  - a. Donald
  - b. Hughes and Babcock
  - c. Jacob and Manod
  - d. Jensen
  
8. The function of ribosomes is
  - a. Protein synthesis
  - b. Fat Synthesis
  - c. Photosynthesis
  - d. Photorespiration

9. Which of the following is not correctly matched
- |    | Structure     | Function                                       |
|----|---------------|--|
| a. | Chromosome    | Ultimate controller of cell, carrier of genes  |
| b. | Mitochondria  | Site of Creb's cycle                           |
| c. | Golgi Complex | Site of protein synthesis                      |
| d. | Lysosomes     | Site of hydrolytic enzyme digestion, autolysis |

10. Which one of the following is not correctly matched

List I (Mechanism)	List II (Crops)
a. Cleistogamy	1 Barley
b. Chasmogamy	2 Rice
c. Protogyne	3 Bajra
d. Protoandry	4 Wheat

11. Match list I with list II and select the correct answer using code given below

List I (Crops)	List II (Centre of Origin)
i Wheat	1 South America
ii Potato	2 Mediterranean
iii Chickpea	3 Indo-Burma
iv Rice	4 Mediterranean

Code:

	i	ii	iii	iv
a.	3	4	1	2
b.	2	1	4	3
c.	2	4	1	3
d.	3	1	4	2

12. Which test is used for viability test

- Respiration test
- Electrical conductance test
- Potassium permanganate test
- All of the above

13. Tag colour of foundation seed is

- Red
- White
- Yellow
- Azure Blue

14. Minimum isolation distance (m) for foundation seed production of Cabbage is

- 300
- 500
- 1000
- 1600

15. Seedlessness in grape is due to
- Aneuploidy
  - Stenospermocarpy
  - Triploidy
  - Incompatibility
16. Lal ambri, Sunheri are the varieties of
- Berry
  - Apple
  - Cherry
  - Drupe
17. Consider following points
- Yellow spot in Citrus is due to Copper deficiency
  - Exanthema is due to molybdenum deficiency in Citrus
- Both i and ii are true
  - Both i and ii are false
  - i is true but ii is false
  - ii is true but i is false
18. Which one of the following is a commercial method of rose propagation
- Layering
  - Grafting
  - Cutting
  - Budding
19. Application of which chemical acts as an aid for mechanical harvesting
- GA3
  - NAA
  - ABA
  - Ethephon
20. Aonla is native to
- China
  - India
  - Pakistan
  - Sri Lanka
21. Which nutrient reduces the disease incidence by increasing phenolics synthesis in plants
- N
  - P
  - K
  - Ca
22. Total assest/Total Liabilities is
- Current ratio
  - Working ratio
  - Net capital ratio
  - None of the above

23. The line passing through least cost points is called as
- Expansion path
  - Isocline
  - Ridge line
  - None of the above
24. Father of cooperative movement in India was
- Smith
  - Dewitt
  - Marshall
  - Nicholson
25. The demand for common salt is
- Perfectly elastic
  - Highly Elastic
  - Inelastic
  - None of the above
26. Which of the following is not correctly matched
- | Programme                          | Year |
|------------------------------------|------|
| a. Community Development Programme | 1952 |
| b. National Extension Service      | 1953 |
| c. National Demonstration          | 1965 |
| d. Operation Research Project      | 1981 |
27. NAFED is related to
- Animal Husbandry
  - Agricultural Implements
  - Agricultural Marketting
  - Soil Conservation
28. Consider following definition about the economic holding
- 10 acers for irrigated land
  - 27 acers for partially irrigated land
  - 35 acers for non irrigated agriculture
- Only i and ii are true
  - Only i and iii are true
  - Only iii and i are true
  - None is true
29. Which of the following is not a feature of marginal /subsistence farming
- Farm Holding are tiny
  - Resource structure is helplessly poor
  - Production is only for family needs
  - Price elasticity of production is too large
30. Fraction of the water volume applied to a farm or a field that is "consumed" by a crop, relative to the amount applied.
- Evapotranspiration
  - Consumptive use
  - Conveyance efficiency
  - Field application efficiency

31. What is the critical limit below which there is no salinity hazard in irrigation water
- 0.75 dS/m
  - 1.0 dS/m
  - 1.5 dS/m
  - 2.0 dS/m
32. Which of the following species is not used as hedge row species in the alley cropping system.
- Leucaena leucocephala*
  - Sesbania grandiflora*
  - Populus deltoides*
  - Pongamia pinnata*
33. Planting of trees on and around agricultural boundaries, and on marginal, private lands, in combination with agricultural crops is known as
- Farm forestry
  - Community Forestry
  - Extension forestry
  - Agroforestry
34. Contour bunding is suitable for land having slope less than
- 6%
  - 10%
  - 20%
  - 30%
35. Consider the following
- Bacteria
  - Wheat Straw
  - Clover Straw
  - Soil Humus
- What is the ascending order of C:N ratio in the above materials
- i-ii-iii-iv
  - iv-iii-i-ii
  - iv-i-iii-ii
  - i-iv-iii-ii
36. The N deficiency symptom visible on foliage of cereal crops is
- General yellowing of older leaves
  - Reddish brown or purple discoloration on older leaves
  - Marginal scorching of older leaves
  - Interveinal chlorosis of young leaves
37. Which of the following pairs are not correctly matched
- Inceptisols-found in humid regions
  - Histosols-high in organic matter
  - Spodosols- sub soil accumulation of sesquioxide
  - Oxisols-very high base status

38. Which one of the following is a primary mineral
- Olivine
  - Geothite
  - Gibbsite
  - Dolomite
39. Refractometer is used to determine
- TSS
  - Protein
  - Vitamins
  - Organic Matter
40. C-4 cereal is
- Sugarcane
  - Rice
  - Wheat
  - Maize
41. Transpiration takes place through
- Stomata
  - Lenticels
  - Cuticles
  - All of the above
42. Which of the following herbicide is most appropriate as early post emergence for weed control in wet seeded rice
- Butachlor
  - Anilofos
  - Pendimethalin
  - Sulfosulfuron
43. Scientific name of emmer wheat is
- Triticum aestivum*
  - Triticum durum*
  - Triticum dicoccum*
  - Triticum vulgare*
44. The group of organism which converts ammonia into nitrites and nitrites into nitrate respectively is
- Streptomyces, Bacillus*
  - Nitrosomonas, Nitrobacter*
  - Micromonospora, Nocardia*
  - Rhizobium, Azotobacter*
45. Which of the following crop can survive 4-6 pH condition
- Tea
  - Rice
  - Wheat
  - None of these

46. Which of the following pair are not correctly matched
- | Crop         | Important Moisture Sensitive Stage |
|--------------|------------------------------------|
| a. Rice      | Panicle Initiation, flowering      |
| b. Sugarcane | Germination                        |
| c. Cotton    | Flowering, boll formation          |
| d. Chillies  | Flowering                          |
47. The recommended number of sugarcane setts for planting per hectare
- 20-25 thousand
  - 35-40 thousand
  - 55-60 thousand
  - 75-80 thousand
48. 1000 seed weight (g) of bajra is about
- 5 no. of seeds
  - 10 no. of seeds
  - 45 no. of seeds
  - 75 no. of seeds
49. Which one is not essential in plants
- Calcium
  - Aluminium
  - Boron
  - Copper
50. Strip cropping is best represented by
- Wheat+Mustard in 9:1 ratio
  - Poplar at boundries
  - Agrisilvicultural system
  - Wind breaks and shelter belts
51. Dapog method of crop raising is associated with
- Intercultural operation
  - Seedbed preparation
  - Intercultivation
  - Nursery raising
52. Which one of the following oil cakes in addition to its manorial value acts also as a nitrification inhibitor
- Mustard
  - Groundnut
  - Neem
  - Sesamum
53. Which of the following part of tobacco plant synthesizes nicotine
- Root
  - Branch
  - Stem
  - Leaf

54. The rice variety containing dee-geo-woo-gen is
- Indrasan
  - Tilak
  - IR-8
  - Basmati
55. The scientific name of Brown plant hopper is
- Leptocorisa varicornis*
  - Tryporyza incertulus*
  - Nilaparvata lugens*
  - Nephotettix nigropictus*
56. In the communication process information flows through following elements-  
i. Awareness ii. Interest iii. Action iv. Satisfaction  
The correct sequence of these four stages is
- i,ii,iv,iii
  - ii,i,iii,iv
  - i,ii,iii,iv
  - ii,i,iv,iii
57. The seed which cannot germinate in the absence of light is called as
- Positively photoblastic seed
  - Negatively Photoblastic seed
  - Photoperiodic seed
  - Photophobic seeds
58. The ripening hormone is
- Auxin*
  - Ethylene*
  - Gibberellin*
  - Cytokinin*
59. National Bureau of agriculturally important insects is located at
- Bengaluru
  - Allahabad
  - Varanasi
  - Lakhnow
60. Which one of the following is not a parasitoid
- Trichogramma pretiosum*
  - Goniozus nephantidis*
  - Chelonus blackburnii*
  - Plutella xylostella*

### 3. LIFE SCIENCES

1. The forces that maintain the three-dimensional structure of a protein is mainly
  - a. Non-covalent
  - b. Covalent
  - c. Coordinate
  - d. Covalent and non-covalent
  
2. The Z-DNA helix-
  - a. Has fewer base pairs per turn than the B-DNA
  - b. Is favoured by an alternating GC sequence
  - c. Tends to be found at the 3' end of genes
  - d. Is the most common conformation of DNA
  
3. Catalytic antibodies function as enzyme on the principle of -
  - a. Enzymatic conversion of antibodies
  - b. Stabilizing transition state analogue of substrates
  - c. Antigen-antibody affinity
  - d. Monoclonal antibodies with chemical capability
  
4. Deoxyribose in a nucleotide is a-
  - a. Primary alcohol
  - b. Secondary alcohol
  - c. Tertiary alcohol
  - d. Phenol
  
5. Membranes of the following two organelles is contiguous-
  - a. ER and Golgi
  - b. ER and Nucleus
  - c. Golgi and Plasma membrane
  - d. Golgi and Lysosomes
  
6. Which of the following method is most suitable to separate chloroplasts from nuclei in a homogenized plant tissue-
  - a. Polyacrylamide gel electrophoresis
  - b. Differential centrifugation using sucrose gradients
  - c. Equilibrium density gradient centrifugation on CsCl gradients
  - d. Gel filtration
  
7. C-bands are deeply stained chromosomal regions which represents the –
  - a. Euchromatin
  - b. Constitutive heterochromatin
  - c. Cytosine dominant region of chromosome
  - d. Metaphase chromosome
  
8. Which of the following statement is not true for a chloroplast?
  - a. It contains DNA as their genetic material
  - b. It produces ATP
  - c. It has an electron transport chain
  - d. It contains a transcription apparatus but no translational apparatus

9. In meiosis, replication of DNA occurs at-
- Meiosis I
  - Meiosis II
  - Between meiosis I and meiosis II
  - In both meiosis I and meiosis II
10. Okazaki fragments
- Require the activity of only a DNA polymerase for synthesis
  - Require only RNA polymerase activity for synthesis
  - Are made when DNA is exposed to UV radiation
  - Are composed of both DNA and RNA
11. Changes in RNA polymerase III promoters result in changes in the sequence of the gene product. This is because-
- RNA polymerase III initiates transcription at various positions
  - The promoter elements are located within the coding region of the gene
  - Promoters are located for upstream of the gene transcribed
  - Polymerase is unable to bind to the promoter
12. Molecular weight of an unknown protein can be found out by-
- Electrophoresis
  - Ion-exchange chromatography
  - Affinity chromatography
  - None of the above
13. Transcription termination of mRNA genes in Eukaryotes occurs-
- At polyadenylation sites by the action of a terminator factor
  - By the formation of a strong hairpin structure in the vicinity of polyadenylation site
  - Termination factor bound to the termination site in the vicinity of polyadenylation site
  - At pause sites following the polyadenylation sites
14. Retroviruses are capable of causing cancer because they
- Produce a very high number of progeny viruses per infected cell
  - Often contain point mutations in their *pol* gene
  - Transduce mutant versions of cellular genes that normally regulate cell growth
  - Infect cells more efficiently than other viruses
15. G-proteins are involved in relaying signals through G-protein linked receptors. Which of the following form of G-protein is considered to be in active state?
- G-protein- ADP
  - G-protein- ATP
  - G-protein- GDP
  - G-protein- GTP

16. Retroviruses have RNA genome, however they replicate through double stranded DNA formation. This process involves-
- A polymerase coded by the virus itself
  - A polymerase coded by the host
  - Host DNA polymerase
  - Unknown mechanism
17. Synaptic signaling involves-
- Endocrine signals
  - Membrane bound signal molecules
  - Autocrine signals
  - Neurotransmitters
18. Which of the following biochemical reactions are most commonly utilized by living cells to propagate intracellular signals-
- Acylation
  - Phosphorylation
  - Methylation
  - Decarboxylation
19. Which one of the following is found only in plants-
- Tight junctions
  - Gap junctions
  - Desmosomes
  - Plasmodesmata
20. In anchoring junctions, cadherins are linked to-
- Actin filaments in the cell's cytoskeleton
  - Cell walls of adjacent cells in plants
  - Connexons of its own and adjacent cells
  - Extracellular matrices of adjacent cells
21. During non-cyclic photophosphorylation, plants and cyanobacteria produce-
- ATP
  - NADPH
  - NADPH and ATP
  - NADH and ATP
22. Total energy requirement for fixing one CO<sub>2</sub> by combined C<sub>4</sub> and C<sub>3</sub> cycle is-
- 5 ATP+ 4 NADPH
  - 3 ATP+ 4 NADPH
  - 5 ATP+ 2 NADPH
  - 8 ATP+ 2 NADPH
23. All of the following statements about NAD<sup>+</sup> are true except
- NAD<sup>+</sup> is reduced to NADH during both glycolysis and the Krebs' cycle
  - NAD<sup>+</sup> has more chemical energy than NADH
  - NAD<sup>+</sup> is reduced by the action of enzymes called dehydrogenases
  - NAD<sup>+</sup> can receive electrons for use in oxidative phosphorylation
24. The accumulation of one of the following causes seed dormancy-
- Cytokinin
  - Auxin
  - Abscisic acid
  - Gibberellin

25. Phototropism  
P. Involves receptor phototropin  
Q. Is induced by blue light  
R. Is auxin-mediated phenomenon  
S. Is phytochrome-mediated response  
*Which of the following is correct?*
- P and S
  - P, R and S
  - P,Q and R
  - Q, R and S
26. Ion absorption by plant roots
- Can be explained by the nutrient-carrier hypothesis
  - Is basically ions passively soaking in root cells along with soil water
  - Explains the movement of ions from dilute soil solution into a more concentrated solution
  - More than one correct
27. Which statement about the function of the casparian strip is correct-
- It prevents excess transpiration from leaves
  - It regulates ions movement into the root vascular cylinder
  - It prevents disease causing organisms from invading the plant
  - It is the pathway for nutrient transfer from xylem to phloem
28. One of the most notable difference between gamete formation in animals and gamete formation in plants is that-
- Plants produce gamete in somatic tissue, while animals produce gamete in germ tissue
  - Plants produce gametes by mitosis, while animals produce gametes by meiosis
  - Plants produce only one of each gamete, while animals produce many gametes
  - Plants produce gametes that are diploid, while animals produce gametes that are haploid
29. Virus-free plants have been propagated commercially through
- Cell culture
  - Pollen culture
  - Apical meristem culture
  - Embryo culture
30. Stem cells in plants are located in
- Meristem
  - Fruits
  - Ovary
  - Leaves
31. Senescence is caused by
- Changes in hormonal signaling over the lifespan
  - Changes in gene expression that affect the systems responsible for maintenance, repair, and defense responses
  - Environmental impacts on living organisms that induce damage to tissues and cells by oxygen radicals
  - All the above

32. The colour of flowers of an annual species of plants is controlled by a single locus with two alleles R and r, and the genotypes RR, Rr and rr and red, pink and white respectively. A large number of seeds from individuals with pink flowers were collected and planted on an island, where, because of absence of pollinators, only self-pollination is possible. What will be the most likely outcome after 25 years?
- About 50% plants with red flowers, 50% with white flowers
  - Almost 100% plants with pink flowers
  - Red, pink and white flowered plants in a ratio of 1:2:1
  - Red, pink and white flowered plants in equal proportion
33. QTL analysis is used to
- Identify RNA polymerase binding sites
  - Map genes in bacterial viruses
  - Determine which genes are expressed at a developmental stage
  - Identify chromosome region associated with a complex trait in a genetic cross
34. Which of the following chromosomal changes is usually the most damaging when in the homozygous condition?
- Deletion
  - Duplication
  - Translocation
  - Inversion
35. Diagnosis of chromosome aneuploidy of unborn children is normally done by a combination of amniocentesis, cellculture, and-
- Enzyme assay
  - RFLP analysis
  - Pedigree analysis
  - Karyotyping
36. Genetic diversity is required for natural selection to act, but natural selection can reduce or eliminate diversity. What process can restore genetic diversity to a population?
- Genetic drift
  - Mutation
  - Sexual selection
  - Stabilizing selection
37. Vessels and companion cells are the characteristic features of -
- Gymnosperms
  - Angiosperms
  - Pteridophytes
  - Fungi
38. Development of embryo from gametophyte without the intervention of the gamete is known as -
- Apospory
  - Apogamy
  - Apomixis
  - Aposporogamy

39. The cell walls of gram-positive and gram-negative bacteria -
- Are the sites of spore formation
  - Both contain peptidoglycan
  - Are connected to the cell nucleus by the endoplasmic reticulum
  - Are composed exclusively of proteins
40. In the Angiosperms, the
- Gametophyte is prominent, and the sporophyte is dependant upon the gametophyte
  - Sporophyte is prominent, with the sporophyte and gametophyte living separately
  - Sporophyte is prominent, and the gametophyte is dependant upon the sporophyte
  - Gametophyte is prominent, and the sporophyte stage has disappeared
41. Which of the following statement is **incorrect**
- Ecosystem is an open system
  - Ecosystem is self-sustaining and dynamic structure
  - Sun is the ultimate source of energy for any ecosystem
  - In an artificial ecosystem flow of energy is unidirectional
42. Net primary productivity is -
- The difference between primary productivity and community respiration
  - The rate production of biomass by heterotrophs
  - The mass of living plants per unit area in a community
  - The total rate of fixation of energy by photosynthesis
43. Which of the following statement is **incorrect?**
- Genetic diversity helps prevent a species from becoming extinct
  - Geographical isolation is a common mechanism contributing to speciation
  - Biologists estimate that 99% of all the species that have ever existed are now extinct
  - The earth summit of 1992 at Rio de Janeiro was held to prevent ozone depletion at stratosphere
44. Which of the following is not recycled in an ecosystem?
- Water
  - Carbon
  - Energy
  - Nitrogen
45. The phenomenon of Genetic drift is most likely to occur in populations that are
- Small and inbred
  - Undergoing gene flow
  - Allopatric
  - Large and panmictic

46. Which one of the following is an evidence to show that the birds evolved from reptiles
- Scales of birds and reptiles are shed and replaced
  - Bones of some reptiles are pneumatic like birds
  - Presence of pygostyle in reptiles
  - Presence of synapsid skull and the oviparous nature
47. The first vertebrates appeared in which of the following period of the Palaeozoic era-
- Ordovician
  - Silurian
  - Devonian
  - Mississippian
48. An increase in the inbreeding coefficient,  $F$ , is likely to result in
- Reduced likelihood of heterozygotes being present in a population
  - Higher proportion of genes that show linkage
  - Higher proportion of genes with introns
  - Lower level of difference between proteins in two daughter cells
49. Which of the following evolutionary process is random?
- Gene flow
  - Mutation
  - Natural selection
  - Speciation
50. The concept of molecular clock implies that
- Many proteins show a constant rate of change with time
  - Organisms evolve at a constant rate
  - One can date evolutionary event with molecules alone
  - All molecules change at the same rate in evolution
51. Which of the following statement is most appropriate for recombinant antibody production in transgenic plants?
- A very high level expression is always obtained
  - Light promote more antibody production
  - Such antibodies are free from other antigen of animal origin
  - Functional antibody cannot be produced in plants
52. According to the Clonal selection theory
- An antibody changes its shape according to the antigen it meets
  - An individual animal contains only one type of B cell
  - The animal contains many types of B cells, each producing one kind of antibody
  - Each B cell produces many types of antibodies
53. Which of the following is **least** likely to lead to autoimmunity?
- Loss of suppressor T cells
  - Release of sequestered self antigen
  - Genetic predisposition
  - Increased clearance of immune complexes

54. A steroid hormone alters the activity of its target cells by
- Digesting holes in the cell's lysosomes
  - Entering the cell and altering gene expression
  - Digesting holes in the cell's plasma membrane
  - Passing its message to an intracellular messenger
55. The secondary structure of protein **cannot** be determined by one of the following techniques
- NMR spectroscopy
  - X-ray crystallography
  - Fluorescence spectroscopy
  - Circular dichroism
56. Which of the following **could not** possibly give rise to a restriction fragment length polymorphism (RFLP)?
- A missense mutation within the protein coding region of a gene
  - A silent mutation within the protein coding region of a gene
  - A single base change within the intron sequence of a gene
  - An error in RNA splicing that mistakenly removes an exon during RNA processing
57. At the end of the ELISA test,
- Radioactivity is produced
  - A clumping reaction is seen
  - Cells undergo lysis
  - A colour change takes place
58. The immunofluorescence test can be used to identify
- Protein molecules and polysaccharide molecules
  - Lipid molecules and nucleic acid molecules
  - Antibody molecules and antigen molecules
  - Cytoplasmic molecules and cell wall molecules
59. Increase number of chromosome occurs in-
- Turner's syndrome
  - Fragile-X syndrome
  - Klinefelter's syndrome
  - Retinoblastoma
60. An analysis of chromosomal DNA, using the Southern blot technique, involves the following five major steps-
1. Autoradiography
  2. Blotting
  3. Cleavage
  4. Electrophoresis
  5. Hybridization
- Which of the following sequence of steps best illustrates the technique?
- 1,2,3,4,5
  - 1,3,2,4,5
  - 3,5,2,4,1
  - 3,4,2,5,1

#### 4. CHEMISTRY

- IUPAC name of the compound  $\text{CH}_2(\text{CN})\text{CH}_2(\text{CN})\text{CH}_2(\text{CN})$  is
  - Propane-1,2,3-tricarbonitrile
  - Propane-1,2,3-cyanide
  - 1,2,3-tricyanopropane
  - 1,2,3-trinitrile propane
- Nitroalkane and alkylnitrite are examples of the
  - Functional isomerism
  - Position isomerism
  - Metamerism
  - Tautomerism
- Which term best describes a carbocation?
  - nucleophile
  - electrophile
  - free radical
  - hydrophobic
- Which of the following will not show the aromatic character?
  - Cyclopentadienide ion
  - Pyridine
  - Cyclopentadiene
  - Pyrrole
- Which of the following statements is true for pericyclic reactions?
  - These are not affected by solvent polarity, radical inhibitors or catalysts
  - Bond making and bond breaking take place simultaneously
  - These do not involve ionic or free radical intermediates
  - All of the above.
- Match the reactions of list A and metal used in List B

List A	List B
I Wurtz reaction	(p) Cu
II Wurtz-Fittig reaction	(q) Zn
III Frankland reaction	(r) Fe
IV Ullmann reaction	(s) Na

  - I (s), II (s), III (q), IV (p).
  - I (s), II (r), III (q), IV (p).
  - I (r), II (s), III (q), IV (p).
  - I (r), II (r), III (s), IV (q).
- The Wegner-Meerwin Rearrangement belongs to
  - C-C Rearrangement
  - C-N Rearrangement
  - C-O Rearrangement
  - None of the above
- Which of the following reactions takes place through free radical mechanism?
  - Acylation of aromatic compounds
  - Allylic bromination by NBS
  - Halogenation of alkanes
  - All of the above

9. Which of the following reagents is used in oxidation test to distinguish 1°, 2°, 3° alcohols?
- Sodium dichromate
  - Potassium permanganate
  - Lithium aluminium hydride
  - Sodium boro hydride
10. Burgess reagent is
- a mild and selective dehydrating agent
  - a strong oxidizing agent
  - a reducing agent
  - a strong and selective dehydrating agent
11. Glucose can be distinguished from fructose by which of the following tests?
- Selivanoff's test
  - Furfural test
  - Pinoff's test
  - All of the above
12. The reason for double helical structure of DNA is operation of
- Hydrogen bond
  - Electrostatic attraction
  - vander waal's forces
  - Dipole –dipole interaction
13. Lecithins are examples of
- Phospholipids
  - Vitamins
  - Proteins
  - Nucleic acids
14. Oragnoaluminium reagents are known for which type of the following selective organic transformations?
- Epoxide-allylic alcohol rearrangements
  - Aldol synthesis
  - Beckmann rearrangement
  - All of the above
15. Which one of the following is hydroxyl protecting group?
- Methyl ether
  - Methoxymethyl ether
  - Benzyl ether
  - All of the above
16. Which of the following compounds will be formed when phthalic anhydride is condensed with phenol in presence of conc. Sulfuric acid?
- Cyclohexanol
  - Saccharine
  - Phenolphthalein
  - Aspirin

17. Which type of technique is FT-IR spectroscopy?
- A dispersive technique
  - An emission technique
  - An absorbance technique
  - A reflectance technique
18. Nujol mull technique is used to record which of the following spectrum of an organic compound?
- IR spectrum
  - UV spectrum
  - Raman spectrum
  - NMR spectrum
19. In the mass spectra of an organic compound the molecular ion peak is indicative of its
- Equivalent weight
  - Molecular weight
  - Both of the above
  - None of the above
20. Which of the following is a fossil fuel for power stations?
- Hydrogen
  - Uranium
  - Wood
  - Oil
21. Supramolecular chemistry has been defined as the
- Chemistry beyond the molecules
  - Chemistry beyond the atoms
  - Chemistry of large molecules
  - All of the above
22. 'Green Chemistry' is journal of the
- Royal Society of Chemistry
  - American Chemical Society
  - Indian Chemical Society
  - Korean Chemical society
23. The prefix 'nano' comes from a
- French word meaning billion
  - Greek word meaning dwarf
  - Spanish word meaning particle
  - Latin word meaning invisible
24. Sixty carbon atoms in a fullerene molecule are arranged in a structure similar to
- Basketball
  - Volleyball
  - Football
  - Cricket ball

25. As we proceed from L to R in a period
- Basicity of oxides and hydroxides decreases
  - Basicity of oxides and hydroxides increases
  - Acidity oxides and hydroxides decreases
  - Basicity of only oxides increases
26. When ammonia is heated with HCl, H-N-H bond angle
- Decreases
  - Increases
  - Remains same
  - Depends upon temperature
27. The correct order of relative strengths of the following bases is
- $\text{KOH} > \text{NaOH} > \text{Ca}(\text{OH})_2 > \text{NH}_4\text{OH}$
  - $\text{KOH} > \text{Ca}(\text{OH})_2 > \text{NaOH} > \text{NH}_4\text{OH}$
  - $\text{NaOH} > \text{KOH} > \text{Ca}(\text{OH})_2 > \text{NH}_4\text{OH}$
  - $\text{NaOH} > \text{Ca}(\text{OH})_2 > \text{NH}_4\text{OH} > \text{KOH}$
28. Halides of alkaline earth metals form hydrates of formula  $\text{MX}_2 \cdot n\text{H}_2\text{O}$ . This shows the halides of group 2 elements
- Are hygroscopic in nature
  - Act as dehydrating agents
  - Can absorb moisture from air
  - All of the above
29. EMF of a cell is given by
- $E_{\text{cell}} = E_{\text{ox}} + E_{\text{red}}$
  - $E_{\text{cell}} = E_{\text{ox}} - E_{\text{red}}$
  - $E_{\text{cell}} = E_{\text{ox}} \times E_{\text{red}}$
  - $E_{\text{cell}} = E_{\text{ox}} / E_{\text{red}}$
30. The electrode potential and the EMF of the cell depends upon
- Nature of the electrode
  - Temperature
  - Concentration of the ion in the solution
  - All of the above
31. Which of the following statements is true?
- Porphyryns are all tetrapyrrolic compounds in which rings are linked by methine carbons in a close conjugated system.
  - In porphines none of the  $\beta$  or  $\beta'$  - carbons within the rings are reduced.
  - In chlorines two adjacent carbons ( $\beta$  or  $\beta'$ ) are reduced.
  - All of the above.
32. Which of the lanthanide salts are used in volumetric analysis?
- Cerium
  - Thorium
  - Praseodymium
  - None of the Above

33. Hydrogen bomb is based on the principle of
- Nuclear fission
  - Nuclear fusion
  - Natural radioactivity
  - Artificial radioactivity
34. The amount of  ${}^6\text{C}^{14}$  isotope in a piece of wood is found to be  $1/5^{\text{th}}$  of that present in a fresh piece of wood. What is the age of the wood? (Half life of  ${}^{14}\text{C}$  is 5577 years).
- 12953 years
  - 1295 years
  - 129 years
  - 12956 years
35. Which of the following statements is true?
- Angular momentum of an electron is an integral multiple of  $h / 2 \pi$
  - It is impossible to measure simultaneously the exact position and exact momentum of a body as small as an electron
  - An electron, like light, behaves both as a particle and as a wave.
  - All of the above.
36. Total number of vibrational modes for hydrogen sulphide is
- 4
  - 3
  - 6
  - 5
37. The correct order of chemical shift ( $\delta$  value in ppm) in methyl halides is
- $\text{CH}_3 \text{I} < \text{CH}_3 \text{Br} < \text{CH}_3 \text{Cl} < \text{CH}_3 \text{F}$
  - $\text{CH}_3 \text{I} > \text{CH}_3 \text{Br} > \text{CH}_3 \text{Cl} > \text{CH}_3 \text{F}$
  - $\text{CH}_3 \text{I} = \text{CH}_3 \text{Br} < \text{CH}_3 \text{Cl} < \text{CH}_3 \text{F}$
  - $\text{CH}_3 \text{I} = \text{CH}_3 \text{Br} > \text{CH}_3 \text{Cl} > \text{CH}_3 \text{F}$
38. The amount of work done by 2 mol of an ideal gas at 298K in reversible isothermal expansion from 10 litre to 20 litre.
- +3434.9 J
  - 3434.9 J
  - +343.49 J
  - 343.49 J
39. Which of the following statements is false?
- A closed system is one which can exchange energy but not matter with its surroundings.
  - Ice in contact with water constitutes a homogenous system.
  - Enthalpy, entropy, free energy are state variables.
  - For a cyclic process  $dE=0$  and  $dH=0$ .
40. The frequency of the radiation having wave number  $10\text{m}^{-1}$  is
- $10 \text{ s}^{-1}$
  - $3 \times 10^7 \text{ s}^{-1}$
  - $3 \times 10^{11} \text{ s}^{-1}$
  - $3 \times 10^9 \text{ s}^{-1}$
41. Any p orbital can accommodate up to
- 4 electrons
  - 2 electrons with parallel spin
  - 6 electrons
  - 2 electrons with opposite spin

42. The number of degree of freedom in an aqueous solution of sugar is  
 a. 1                      b. 2                      c. 3                      d. 0
43. For the extraction of a solute from an aqueous solution by an organic solvent, it is preferable to  
 a. make an extraction using total volume of solvent  
 b. make the solvent layer as the top layer  
 c. make the aqueous as top layer  
 d. make serial extraction using small portions of solvent.
44. Active mass is defined as  
 a. number of gram equivalents per unit volume  
 b. number of g mol / litre  
 c. amount of substance in g / unit volume  
 d. number of gram mol in 100 litre
45. The state of equilibrium refers to  
 a. state of rest  
 b. dynamic state  
 c. stationary state  
 d. state of inertness
46. Which of the following polymers is widely used for making bullet proof materials?  
 a. PVC  
 b. Polyethylene  
 c. Polyamides  
 d. Polycarbonates
47. On the basis of electrical conductivity, solids are divided into  
 a. Metals  
 b. Insulators  
 c. Semiconductors  
 d. All of the above
48. Match the list.
- |    | <u>Solid</u>                |       |       | <u>Magnetic properties</u> |
|----|-----------------------------|-------|-------|----------------------------|
|    | A) $\text{Fe}_3 \text{O}_4$ |       |       | (i) Ferrimagnetic          |
|    | B) $\text{Fe}_2 \text{O}_3$ |       |       | (ii) Antiferromagnetic     |
|    | C) Fe                       |       |       | (iii) Ferromagnetic        |
|    | D) $\text{V}_2\text{O}_5$   |       |       | (iv) Diamagnetic           |
|    | A                           | B     | C     | D                          |
| a. | (i)                         | (ii)  | (iv)  | (iii)                      |
| b. | (i)                         | (iii) | (ii)  | (iv)                       |
| c. | (i)                         | (ii)  | (iii) | (iv)                       |
| d. | (iv)                        | (iii) | (ii)  | (i)                        |
49. Which of the following substances gives a positively charged sol?  
 a. Gold  
 b. Arsenious sulphide  
 c. Starch  
 d. Ferric hydroxide

50. Cod liver oil is
- fat dispersed in water
  - water dispersed in fat
  - water dispersed in oil
  - fat dispersed in fat
51. Which of the following reaction is used to introduce an alkyl / acyl group to an aromatic molecule?
- Friedal craft reaction
  - Carbyl amine reaction
  - Hofman reaction
  - Wurtz reaction
52. The influence of temperature on the rate of a reaction is determined by
- Nernst's equation
  - Gibbs – Helmohtz equation
  - Arrhenius equation
  - vant Hoff equation
53. In general with lowering of 10°C rise in temperature, the rate of reaction becomes approximately
- Ten times
  - Double
  - Half
  - 1/10
54. Which of the following types of metals make the most efficient catalysts?
- Transition metals
  - Alkali metals
  - Alkaline earth metals
  - All of the above
55. The biocatalysts are
- Enzymes
  - Minerals
  - Plants
  - All proteins
56. Nicotine, a tobacco alkaloid, belongs to which of the following groups?
- Pyrrolidine-pyridine group
  - Quinoline group
  - Isoquinoline group
  - Pyrrolidine group
57. Commercial polymers are selected on the basis of which of the following parameters?
- Density
  - Melt viscosity
  - Zeta potential
  - Solubility
58.  $\text{Mn}(\text{CO})_4\text{NO}$  is
- Paramagnetic
  - Diamagnetic
  - Ferromagnetic
  - None of the above.
59. Which class or classes of drugs react with carboxylic acids to form salts?
- Alcohols
  - Sulfonamides
  - Amines
  - a & c
60. The Nobel Prize in Chemistry for 2011 has been awarded to Dan Shechtman for the discovery of
- Pseudocrystals
  - Quasicrystals
  - Molecular crystals
  - None of the above

## 5. PHYSICS

1. The number of non-vanishing terms in the Fourier series of  $\cos^3\theta$  in the interval  $(-\pi, \pi)$  is
  - a. One
  - b. Two
  - c. Three
  - d. Infinity
  
2. One second is defined to be equal to
  - a. 1650763.73 periods of krypton clock
  - b. 652189.63 periods of krypton clock
  - c. 1650763.73 periods of cesium clock
  - d. 9192631770 periods of cesium clock
  
3. Rectangular array of elements or numbers are called-
  - a. Matrices
  - b. Tensors
  - c. Rows
  - d. Columns
  
4. Number of degrees of freedom of a system is:
  - a. The number of independent ways in which a system can move violating any constraints imposed on the system.
  - b. The number of degrees of dependent ways
  - c. The number of independent ways in which a system can move without violating any constraints imposed on the system
  - d. Both a and b.
  
5. Constraint in the case of a rigid body is:
  - a. Dynamic constraint
  - b. Scleronomous constraint
  - c. Rheonomous constraint
  - d. Static constraint
  
6. Equation expressing a relationship among rate of change of one variable with respect to another and their derivatives are known as-
  - a. Differential equations
  - b. Integral equations
  - c. Fourier equations
  - d. None of these
  
7. The period of oscillation for compound pendulum is:
  - a.  $2\pi\sqrt{(gl/(k^2 + l^2))}$
  - b.  $2\pi\sqrt{((k^2+l^2)/gl)}$
  - c.  $2\pi\sqrt{mgl/(k^2 + l^2)}$
  - d. None of these
  
8. If a co-ordinate is cyclic, Hamiltonian would reduce the number of variables in new formulation by:
  - a. Four
  - b. One
  - c. Two
  - d. Three

9. Rutherford's differential scattering cross-section
- Has the dimensions of area
  - Has the dimensions of solid angle
  - Is proportional to the square of the kinetic energy of the incident particle
  - Is inversely proportional to the  $\text{cosec}^4(\Phi/2)$ , where  $\Phi$  is the scattering angle
10. The relative displacement of the charges is called \_\_\_\_\_:
- Polarization
  - Reflection
  - Transmission
  - None of these
11. Example of a bounded motion is:
- Scattering of alpha particles
  - Double stars
  - Both (A) and (B)
  - None of these
12. An example of stable equilibrium is
- A hanging spring-mass system in the stationary position
  - A pendulum in the rest position
  - An egg standing on one end
  - None of these
13. Aberration of light from stars is caused due to
- The travelling of light in the atmosphere
  - The elliptical orbit of the earth around the sun
  - The finite speed of light and the speed of earth in its orbit around the sun
  - The scattering of light by the air particles
14. Magnetic vector potential due to magnetic dipole is proportional to:
- $r$
  - $r^{-1}$
  - $r^{-2}$
  - $r^{-3}$
15. The intangible medium to carry the electromagnetic waves, pervading all the space, empty or otherwise is:
- Elasticity
  - Ether
  - Cosmic
  - Solid
16. "The magnitude of the magnetic field at a point due to small element of the current conductor is directly proportional to the current, to the length of the current element, to sine of the angle between the direction of the current and the line joining the current element to that point and is inversely proportional to the square of the distance of that point from the current element" is known as-
- Biot's law
  - Savart's law
  - Lorentz's law
  - Biot-Savart's law

17. Commutative group is called
- Abelian group
  - Monoid
  - Semi group
  - None of these
18. The path of the particle for a motion in a uniform electric field is:
- Parallel
  - Perpendicular
  - Parabola
  - Circular
19. Electrostatic potential is the:
- Potential energy per time.
  - Potential energy per unit charge.
  - Potential difference per time
  - Potential difference per unit charge
20. An optical device which is used for producing and analyzing plane polarized light is called-
- Fresnel Biprism
  - Nicol prism
  - Grating
  - None of these
21. Photographs of rapidly moving distant objects will
- Not show Lorentz contraction
  - Show Lorentz contraction
  - Not show any change
  - None of these
22. For a Gaussian wave function, the uncertainty product is:
- Minimum
  - Maximum
  - Nil
  - Negative
23. The radio wave has a maximum electric field intensity  $10^{-4} \text{ Vm}^{-1}$  on arrival at a receiving antenna. The maximum magnetic flux density of such a wave is-
- Zero
  - $3 \times 10^4 \text{ T}$
  - $5.8 \times 10^{-9} \text{ T}$
  - $3.3 \times 10^{-13} \text{ T}$
24. If the charged particle enters the magnetic field at any angle  $\theta$ , then due to perpendicular velocity  $v_{\perp}$  component, path of the particle is-
- Straight line
  - Parabola
  - Circular
  - Rectangular

25. Zeeman effect is an example of
- Magneto-optical phenomenon
  - Electro-mechanical phenomenon
  - Thermo-electrical phenomenon
  - Electro-magnetic phenomenon
26. Davission and germer experiments relates to:
- Interference
  - Polarisation
  - Electron diffraction
  - Phosphorene
27. The total outward flux of magnetic induction  $B$  through any closed surface  $S$  is equal to zero. This is Maxwell's \_\_\_ law.
- First
  - Third
  - Fourth
  - Second
28. "A black body radiation chamber is filled up by not only with radiation, but also with simple Harmonic oscillator of molecular of molecular dimensions, which vibrate with all possible frequencies" is called-
- Avogadro's hypothesis
  - Planck's hypothesis
  - Maxwell's hypothesis
  - None of these
29. In a refrigerator the heat exhausted to the outer atmosphere is
- Less than that absorbed from the contents of the refrigerator
  - Same as that absorbed from the contents
  - More than that absorbed from the contents
  - Any of the above depending upon the working substance
30. Which of the following is not a Fermion?
- Muons
  - Electron
  - Neutrons
  - Photon
31. The wavelength associated with a moving particle
- Depends upon the charge associated with it.
  - Does not depend upon the charge associated with it
  - Depends upon the medium in which the particle travels
  - Is not defined by any of the above
32. Which of the following is wrong property of Pauli operators?
- The Pauli operators are added together by the standard rule of matrix addition
  - The Pauli operators are multiplied together by the standard rule matrix multiplication
  - The Pauli operators whatever they may not be operated on the two component wave function
  - None of these

33. The physical process during which there is neither gain nor loss of heat from the system is called:
- Adiabatic operation
  - Isothermal operation
  - Isentropic
  - Endothermic
34. Find the probability that a particle trapped in a box  $L$  wide can be found between  $0.45 L$  and  $0.55 L$  for the ground state.
- 19.8%
  - 17%
  - 15%
  - 46%
35. "The Schroedinger wave equation leads to the satisfaction of classical (Newton's) laws of motion on the average". Is the statement of-
- Ehrenfest's theorem
  - Nernst heat theorem
  - Carnot theorem
  - None of these
36. Paraffin wax contracts on solidification. The melting point of wax will
- Increase with pressure
  - Decrease with pressure
  - Not change with pressure
  - Decrease linearly with pressure
37. Formation of dew is comparatively easier on the object
- Which are lying near the earth
  - Which are good radiator
  - Which are bad conductor
  - All of the above
38. Which of the following statement about the energy in a quantum is true?
- Varies directly with frequency
  - Varies inversely with frequency
  - Same for all frequencies
  - None of the above
39. The sole effect of a hypothetical thermodynamic process  $E_1$  is to convert an amount  $Q$  of heat entirely into work. A second hypothetical process  $E_2$  converts an amount  $W$  of work entirely into heat. It can be said that the second law of thermodynamics is violated by
- $E_1$  but not  $E_2$
  - $E_2$  but not  $E_1$
  - Both  $E_1$  and  $E_2$
  - Neither process
40. The dimensional formula of co-efficient of thermal conductivity is
- $M L T^{-1}$
  - $M L^{-1} T^{-1}$
  - $M^{-1} L^1 T^{-1}$
  - $M^{-1} L^{-1} T^{-1}$

41. An iceberg melts at the bottom and not at the top because
- Ice at the base has its melting point increased due to high pressure
  - Ice at the base has its melting point lowered due to low pressure
  - Ice at the base has its melting point lowered due to high pressure
  - Ice at the base has its melting point increased due to low pressure
42. The total energy per particle of a collection of free fermions is 3 eV. The Fermi energy of the system is
- 1.8 eV
  - 3 eV
  - 4 eV
  - 5 eV
43. The surface whose emissivity (as well as absorptivity) is the same at all wavelengths is known as
- Black surface
  - Grey surface
  - Good surface
  - Bright surface
44. The property of a gas which depends on its mean free path is
- Viscosity
  - Thermal conductivity
  - Diffusion
  - All the above
45. The dimension of phase space of ten rigid diatomic molecules is
- 5
  - 10
  - 50
  - 100
46. The simple unit of polymers is called
- Wigner unit
  - Macro unit
  - Repeat unit
  - None of these
47. The rate of cooling depends on
- Nature of the radiating surface
  - Area of the radiating surface
  - Difference of temperature between the body and its surrounding
  - All the above
48. The upper limit of the mercury thermometer can be extended by filling the space above mercury with
- Hydrogen
  - Carbon dioxide
  - Sulphur dioxide
  - Nitrogen

49. A junction field effect transistor behaves as a
- Voltage controlled current source
  - Voltage controlled voltage source
  - Current controlled voltage source
  - Current controlled current source
50. Teflon, Styron and neoprene are all
- Copolymers
  - Condensation polymers
  - Homopolymers
  - Monomers
51. The packing fraction of a simple cubic lattice is approximately
- 0.74
  - 0.68
  - 0.52
  - 0.34
52. In which of the following detector P\_N junction diode is used
- Scintillation counter
  - GM counter
  - Surface barrier detector
  - Proportional counter
53. In simple metals the phonon contribution to the electrical resistivity at temperature T is
- Directly proportional to T above Debye temperature and  $T^3$  below it
  - Inversely proportional to T for all temperatures
  - Independent of T for all temperatures
  - Directly proportional to T above Debye temperature and to  $T^5$  below it
54. A 3 x 3 matrix has eigenvalues 0,  $2 + i$ ,  $2 - i$ . Which of the following statements is correct?
- The matrix is Hermitian
  - The matrix is unitary
  - The inverse of the matrix exists
  - The determinant of the matrix is zero
55. One of the organic crystal used in scintillators is
- Anthracene
  - Xylene
  - Urea
  - Benzene
56. What is the second nearest-neighbour distance in a face centred cubic lattice whose conventional unit cell parameter is  $\alpha$  ?
- $\alpha / \sqrt{2}$
  - $\alpha / 2$
  - $\alpha$
  - $\sqrt{2} / \alpha$

57. Superconductors are generally
- Ferromagnetic and antiferromagnetic metals
  - Monovalent metals
  - Amorphous thin films of Be and Bi
  - Thin films of barium titanate
58. The effective mass of an electron in a semiconductor
- Can never be positive
  - Can never be negative
  - Can be positive or negative
  - Depends on its spin
59. When applied to solar radiation, Planck's law reduces to Wien's law in the-
- Infrared region
  - Visible region
  - Ultraviolet region
  - Microwave region
60. The origin of Vander Waals interaction in molecular crystals is
- Nuclear
  - Magnetic
  - Ionic
  - Fluctuating dipolar

## 6. MATHEMATICS

1. If  $\Delta$  is symmetric difference operator and A, B, C are the sets, then  $(A\Delta B) \Delta (B\Delta C)$   
=

- a.  $(A\Delta C)$                       b.  $(B\Delta C)$                       c.  $(A\Delta B)$                       d. none of these

2.  $\sup\{a + b : a \in A \text{ and } b \in B\} =$

- a.  $\sup\{A+B\}$       b.  $\sup(A)+\sup(B)$       c.  $\sup\{A-B\}$                       d.  $\sup(A)-\sup(B)$

3. Which of the following sequences is described, as far as it goes, by an explicit formula

( $n \geq 0$ ) of the form  $g_n = \binom{n}{k}$ ?

- a. 0000111122222      b. 001112223333      c. 000111222333      d. 0000011112222

4. The sum  $\sum_{k=1}^n (1 + 2 + 3 + 4 + \dots + k)$  is a polynomial in n of degree

- a. 1                      b. 2                      c. 3                      d. 4

5. Which of the following is not an assumption of mean value theorem?

- a.  $f$  be a real-valued function  
b.  $f$  be a continuous function on  $[a, b]$   
c.  $f$  be a differentiable function on  $(a, b)$   
d.  $f(a)=f(b)$

6. Find the nth term of the sequence 1, -8, 27, -64, . . . .

- a.  $a_n = n^3$       b.  $a_n = (-i)^n n^3$       c.  $a_n = (-i)^{n+1} n^3$       d.  $a_n = (-i)^n n^2$

7. One of the solutions of

$$\sum_{k=0}^4 \binom{4}{k} (x)^{4-k} (3)^k = 1 \quad \text{is}$$

- a. -2                      b. 3                      c. -6                      d. 1

8. Let  $A = \begin{bmatrix} 4 & -2 & 1 \\ 2 & 0 & 1 \\ 2 & -2 & 3 \end{bmatrix}$ ,  $v_1 = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$ ,  $v_2 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$ ,  $v_3 = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$ ,  $v_4 = \begin{bmatrix} 1 \\ 1 \\ 4 \end{bmatrix}$

Which of the following statements is correct?

- a.  $v_1$  and  $v_2$  are eigenvectors of A      b.  $v_1$  and  $v_3$  are eigenvectors of A  
c.  $v_2$  and  $v_3$  are eigenvectors of A      d.  $v_3$  and  $v_4$  are eigenvectors of A

9.  $\begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix}$  is an eigenvector of  $\begin{bmatrix} 4 & -2 & 1 \\ 2 & 0 & 1 \\ 2 & -2 & 3 \end{bmatrix}$ . What is the corresponding eigenvalue?
- a. 1            b. 2            c. 3            d. 4

10. What are the eigenvalues of  $\begin{bmatrix} 4 & 7 & 1 \\ 0 & -3 & 8 \\ 0 & 0 & 2 \end{bmatrix}$
- a. 1,4,7            b. 0,4            c. -3,2,4            d. -3,0,1

11. A particular  $3 \times 3$  matrix  $A$  has an eigenvalue of  $-1$ . The matrix  $A+I$  reduces to

$$\begin{bmatrix} 1 & 0 & -2 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Corresponding to the eigenvalue  $-1$ , all the eigenvectors of  $A$  are non-zero vectors of the form:

- a.  $\begin{bmatrix} 2t \\ 0 \\ t \end{bmatrix}, t \in R$     b.  $\begin{bmatrix} 2t \\ s \\ t \end{bmatrix}, t, s \in R$     c.  $\begin{bmatrix} t \\ 0 \\ -2t \end{bmatrix}, t \in R$     d.  $\begin{bmatrix} t \\ s \\ 2t \end{bmatrix}, t, s \in R$

12. General solution of the differential equation  $ty' + 2y = t^2 + 2$  ( $t > 0$ ) is

- a.  $y = \frac{c}{t^2} + \frac{t^2}{4} + 1$     b.  $y = \frac{c}{t^4} + \frac{t^2}{5} + 1$     c.  $y = t^3 + \frac{t^2}{5} + C$     d.
- $y = \frac{C}{t^3} + \frac{t^2}{5} + 1$

13. Which of the following statements is not true?

- a. Similar matrices  $A$  and  $B$  have exactly the same determinant.  
 b. Similar matrices  $A$  and  $B$  have exactly the same eigenvalues.  
 c. Similar matrices  $A$  and  $B$  have the same characteristic polynomial.  
 d. Similar matrices  $A$  and  $B$  have exactly the same eigenvectors.

14. If  $A$  and  $B$  represent the same linear operator  $T: U \rightarrow U$ , then they have the same eigenvectors.

- a. True            b. False.            c. Information incomplete            d. None of these

15. Given that  $\lambda_i$  and  $\lambda_j$  are distinct eigen values of the real symmetric matrix  $A$  and that  $v_1$  and  $v_2$  are the respective eigenvectors associates with these values, then  $v_1$  and  $v_2$  are orthogonal.

- a. True            b. False.            c. Information incomplete            d. None of these

16. Does  $f(c) = (c + 2)^3 - 2$  have an inflection point? If so, where is it located?

- a. Yes, at  $(-2, -2)$ .    b. Yes, at  $(2, -2)$ .    c. Yes, at  $(8, -2)$ .    d. No.

17. The inverse Laplace of the function  $\frac{4s + 2}{s^2 + 2s + 5}$  is

a.  $e^{-t}\cos 2t + 2e^{-t}\sin 2t$

b.  $e^{-t}\cos 2t - 4e^{-t}\sin 2t$

c.  $4e^{-t}\cos 2t + e^{-t}\sin 2t$

d.  $4e^{-t}\cos 2t - e^{-t}\sin 2t$

18. Solution of the integral-differential equation  $y''(t) + 3y'(t) + 2y(t) = g(t)$ ,  $y(0) = y'(0) = 0$ , where  $g(t)$  is the function which is equal to one for  $1 \leq t \leq 2$  and zero otherwise.

(a)  $(e^{-(t-1)} - e^{-2(t-1)})u(t-1) - (e^{-(t-2)} - e^{-2(t-2)})u(t-2)$

(b)  $\left(\frac{1}{2} - e^{-t} + \frac{1}{2}e^{-2t}\right)u(t-1) - \left(\frac{1}{2} - e^{-t} + \frac{1}{2}e^{-2t}\right)u(t-2)$

(c)  $(e^{-t} - e^{-2t})u(t-1) - (e^{-t} - e^{-2t})u(t-2)$

(d) None

19. A homomorphic image of a finite cyclic group is

- a. finite cycle    b. infinite cycle    c. non-cyclic    d. none of these

20. Let  $I$  be an ideal in a commutative ring  $R$  with unit 1. If  $I$  contains any element

$u \in R^*$ , then

- a.  $I \geq R$     b.  $I = R$     c.  $I \leq R$     d. none of these

21. What is the output of the following code?

```
#include<stdio.h>
#define a 10
main()
{ printf("%d.",a);
  foo();
  printf("%d",a);
}
void foo()
{
  #undef a
  #define a 50
}
```

- a) 10..10  
b) 10..50  
c) Error  
d) 0

22. What is the result of  $16 \gg 2$  in C?

- a) 4
- b) 8
- c) 3
- d) 0

23. What is the output of the program code?

```
#include <stdio.h>
void main()
{
int I=3,*j,**k;
j=&I;
k=&j;
printf("%d%d%d",*j,**k,*(*k));
}
```

- a) 444
- b) 000
- c) 333
- d) 433

24. Array passed as an argument to a function is interpreted as

- a) Address of the array
- b) Values of the first elements of the array
- c) Address of the first element of the array
- d) Number of element of the array

25. What is the output of the following C Code

```
void main()
{
int a=10,b=20;
char x=1,y=0;
if(a,b,x,y)
{
printf("EXAM");
}
}
```

- a) XAM is printed
- b) exam is printed
- c) Compiler Error
- d) Nothing is printed

26. What is the output of the following code?

```
#include<stdio.h>
void main()
{
    int s=0;
    while(s++<10)
    {
        if(s<4 && s<9)
            continue;
        printf("\n%d\t",s);
    }
}
```

- a) 1 2 3 4 5 6 7 8 9
- b) 1 2 3 10
- c) 4 5 6 7 8 9 10
- d) 4 5 6 7 8 9

27. What is the correct way to declare a pointer in “C

- a) int ptr x;
- b) int \*x;
- c) \*int x;
- d) int &x;

28. What is the output of the below program code?

```
#include <stdio.h>
void main()
{
    int I=3,*j,**k;
    j=&I;
    k=&j;
    printf("%d%d%d",*j,**k,*(*k));
}
```

- a) 444
- b) 000
- c) 333
- d) 433

29 What is the output of the following C Code ?

```
#include<stdio.h>
void main(){
    int a=5,b=10;
    if(++a||++b)
        printf("%d %d",a,b);
    else
        printf("John Terry");
}
```

Choose all that apply:

- a) 5 10
- b) 6 10
- c) 6 11
- d) 5 11

30. Function arguments can be

- a) A structure member
- b) A Pointer variable
- c) A complete structure
- d) All of the above

31. What will be output when you will execute following “C” code?

```
#include<stdio.h>
void main(){
    int a=10;
    if(printf("%d",a>=10)-10)
        for(;;)
            break;
    else;
}
```

- a) It will print nothing
- b) 0
- c) 1
- d) Compilation error: Misplaced else

32. What will be the value of the variable a when the following C code is executed

```
Int a=strcmp(“abc”,”xyz”);
```

- a) 0
- b) 1
- c) 2
- d) True

33. Consider the following definitions

```
Int a[10]; int *p;
```

Which of the following statement is incorrect?

- a) p=a+2;
- b) \*p=a[5];
- c) a=p;
- d) p=&a[3];

34. Which of the following preprocessor directives is used to create macros

- a) #include
- b) #ifdef
- c) #define
- d) #undef

35. What is the output of the following code?

```
#include<stdio.h>
void swap(int&, int&);
void main()
{
int a = 10,b=20;
swap (a++,b++);
printf("\n%d\t%d\t",a, b);
}
void swap(int& x, int& y)
{
x+=2;
y+=3;
}
```

- a) 14, 24
- b) 11, 21
- c) 10, 20
- d) Error

36. What will be output when you will execute following c code?

```
#include<stdio.h>
void main(){
int x=1,y=2;
if(--x && --y)
printf("x=%d y=%d",x,y);
else
printf("%d %d",x,y);
}
```

- a) 1 2
- b) X=1 y=2
- c) 0 2
- d) X=0 y=1

37. If you want to exchange two rows in a two dimensional array, the fastest way is to ;

- a) Exchange the elements of the two rows.
- b) Exchange the addresses of each element in the two rows.
- c) Store the addresses of the rows in an array of pointers and exchange the pointers.
- d) None of these.

38. Recursive functions are executed in

- a) Last in First Out order
- b) First in Last Out order
- c) Parallel fashion
- d) Any of the above

39. What is the output of this program?

```
main( )
{
char thought[2][30]={ "Don`t walk in front of me..","I am not follow" };
printf("%c%c",*(thought[0]+9),*(*(thought+0)+5));
}
```

- a) k k
- b) Don`t walk in front of me
- c) I may not follow
- d) K

40. Which is the not a correct statement?

- a) Linked list is used to store similar data.
- b) A singly linked list can be traversed in reverse direction.
- c) A circular Linked List have the same beginning and end.
- d) A doubly linked list contains the pointers in both the directions

41. Which of the following is true for a normal distribution?

- a. Mean > Mode > Median
- b. Mean, median and mode coincide
- c. The distribution is positively skewed
- d. None of the above

42. For a resolvable BIBD with parameters  $v, b, r, k, \lambda$

- a.  $b < v + r$
- b.  $b > v + r$
- c.  $b = v + r - 1$
- d.  $b \geq v + r - 1$

43. Contingency tables are best analyzed by which of the following statistic?

- a. F
- b. t
- c. z
- d.  $\chi^2$

44. The weakest scale of measurement is the

- a. Nominal
- b. Ratio
- c. Interval
- d. Ordinal

45. The number of normal equations required to fit an equation of second degree to a given data asset are

- a. 2
- b. 3
- c. 4
- d. 5

46.  $X$  is uniformly distributed with mean 1 and variance  $4/3$ , then  $P(X < 0)$  is
- $1/2$
  - $1/3$
  - $1/4$
  - $3/4$
47. The probability of drawing 1 white and 2 black balls from a bag containing 4 white and 5 black balls is
- $5/22$
  - $5/21$
  - $5/19$
  - None of these
48. In 100 sets of 10 tosses of a perfect coin, in approximately how many cases should we expect to get 7 heads and 3 tails?
- 12
  - 18
  - 4
  - 2
49. If  $X$  is a positive random variable having density function  $f(x)$ , and  $f(x) \leq c$  for all  $x$ , then, for  $a < 0$
- $P\{X > a\} \leq 1 - ac$
  - $P\{X > a\} \geq 1 - ac$
  - $P\{X > a\} = 1 - ac$
  - None of the above
50. If  $A$  is a generalized inverse of  $B$  and  $AB = H$  then
- $H$  is singular
  - $H$  is idempotent
  - $H$  is null
  - None of the above
51. The mean of a Poisson distribution with parameter  $\lambda$  is
- $\lambda^2$
  - $(\lambda)^{1/2}$
  - $\lambda$
  - None of the above
52. The probability of not accepting a false null hypothesis is known as
- Level of significance
  - Acceptance region
  - Power of a test
  - Critical region

53. The minimum number of replications required so that an observed difference of 120% of the mean will be taken as significant at 5% level, the C.V. of the plot values being 12% is
- 9
  - 10
  - 14
  - 12
54. A linear combination  $\sum c_i t_i$  of  $k$  treatment means  $t_i$  is called a contrast of treatment means of
- $\sum c_i = 0$
  - $\sum c_i > 0$
  - $\sum c_i < 0$
  - $\sum c_i = 1$
55. The deliberate introduction of non-orthogonality in a design in order to get better estimates and tests on important comparisons is known as
- Randomization
  - Local Control
  - Replication
  - Confounding
56. Necessary condition for existence of a Balanced Incomplete Block Design with  $v$  treatments and  $b$  blocks of size  $k$  each treatment replicated  $r$  times and each pair of treatment occurs together in  $\lambda$  blocks is
- $vr = bk$
  - $\lambda(v-1) = r(k-1)$
  - $b \geq v$
  - All of the above
57. Two  $p$ -dimensional variables  $U_1$  and  $U_2$  are such that  $U = U_1 + U_2 \sim N_p$ , then
- Any one of  $U_1$  and  $U_2$  is  $N_p$
  - None of them is  $N_p$
  - Both,  $U_1$  and  $U_2$  are  $N_p$
  - None of the above
58. The second moment is minimum when taken about
- Median
  - Mean
  - Mode
  - First Quartile
59. The geometric mean between two linear regression coefficients give the
- Coefficient of Determination
  - Beta coefficients
  - F-probability
  - Coefficient of Correlation
60. The null hypothesis is rejected when
- The tabulated value of the test statistic  $<$  the calculated value
  - The  $p$ -value of the test statistic  $<$  probability of committing type I error
  - Both A and B
  - None of A and B

## 7. WOOD SCIENCE & TECHNOLOGY

1. Which of the following would provide immunity from fungal infection to plants that are recognized by fungal pathogens on the basis of their stomatal pores?
  - a) By increasing the number of trichomes on the surfaces of the plants
  - b) By removing all of the stomata from the plant
  - c) By reinforcing the cell wall in the guard cells of stomatal pores
  - d) By changing the spacing of stomatal pores in the plants
2. A pendulum consists of a bob suspended by a massless thread of length  $l$ . It is displaced to a position where the thread makes an angle  $\theta$  with the vertical and released from rest. If  $g$  denotes the acceleration due to gravity, the speed of the bob is given by
  - a)  $2lg$
  - b)  $\sqrt{[2lg(1-\cos\theta)]}$
  - c)  $[2lg(1-\cos\theta)]$
  - d)  $\sqrt{2lg}$
3. A wire with resistance per unit length  $\rho$  is bent into a circular loop of radius  $r$ . The resistance between two diametrically opposite points of the loop is
  - a)  $\pi\rho/2$
  - b)  $\pi r\rho$
  - c)  $r\rho$
  - d)  $2\pi r\rho$
4. Atoms of a radioactive material decay with time as  $e^{-t/\tau}$ , where  $\tau$  is a constant, the half-life of the material equals
  - a)  $\tau$
  - b)  $2\tau$
  - c)  $\tau \ln 2$
  - d)  $2\tau \ln 2$
5. Microwave oven works on the principle of
  - a) Exciting the rotational degree of freedom of water molecules
  - b) Vibration of water molecules
  - c) Translation motion of water molecules
  - d) Electronic excitations of water molecules
6. Which of the following has the lowest thermal conductivity
  - a) Concrete
  - b) Marble
  - c) Glass
  - d) Wood
7. Which type of batteries use the redox reaction to generate electricity
  - a) Electromagnetic
  - b) Electroplating
  - c) Electrochemical
  - d) Electrolytic
8. Which of the following properties generally characterises an organic compound?
  - a) Solubility in polar solvents
  - b) Insolubility in polar solvents
  - c) High melting point
  - d) Low melting point
9. Which of the following has a charge of  $-1$  ?
  - a) Gamma rays
  - b) Alpha particles
  - c) Beta particles
  - d) Neutrons

10. Which of the following is a salt?  
 a) KCl            b) KOH            c) CH<sub>3</sub>OH            d) CH<sub>3</sub>COOH
11. Which of the following changes occur when a catalyst is added to a system at equilibrium  
 a) Increases the activation energy            b) Decreases the activation energy  
 c) decreases the heat of reaction            d) decreases the potential energy of the reactants
12. Covalent bonds have differences in electronegativities of the bonding ions below  
 a) 1.7            b) 1.8            c) 1.9            d) 2.0
13. Which three groups of the Periodic Table contain the most elements classified as semimetals  
 a) 18, 17 & 16            b) 16, 15 & 14            c) 14, 13 & 2            d) 2, 1 & 13
14. \_\_\_ is a wood staining fungus  
 a) *Poria contigua*            b) *Fusarium* spp.  
 c) *Phellinus megaloporus*            d) *Chaetomium globosum*
15. In the “face screw holding test” on Medium Density Fibreboard, screw withdrawal is measured  
 a) From the end of the board            b) From the edge of the board  
 c) Perpendicular to the plane of the board            d) All three of the above
16. Which of the following is a growth characteristic of wood  
 a) Cupping.            b) Wane            c) Knot            d) Check
17. Equilibrium Moisture Content of a given wood sample can be varied by \_\_\_  
 a) Seasoning it  
 b) Changing ambient relative humidity and temperature  
 c) Giving it a moisture retarding coating  
 d) Changing its physical dimensions
18. Lag screws are usually inserted into a wood with the help of a \_\_\_  
 a) Screw driver            b) hammer            c) Pneumatic gun            d) Wrench
19. Which of the following is not a type of warp?  
 a) Cup            b) Twist            c) Check            d) Crook
20. A fumigant used for obtaining different shades for timber  
 a) Ammonia vapour            b) Phosphine            c) Chlorine gas            d) Iodine gas
21. Which of the following is not a wood extractive  
 a) Fatty Acids            b) Resins            c) Terpenes            d) All three are wood extractives
22. The main type of stress experienced by the legs of a chair when a person occupies it is  
 a) Compression            b) Tension            c) Bending            d) Torsion

23. The shape and size of a wood specimen on which a bending stress is applied can be recovered till
- The strain produced is proportional to the applied stress
  - The specimen breaks under the applied stress
  - The Elastic limit of the wood
  - The wood reaches the plastic region under the applied stress
24. The movement in a wood product in service is indirectly proportional to its
- Maximum Moisture content
  - Minimum Moisture content
  - Total Shrinkage
  - Fibre saturation point
25. The common Araldite is an \_\_\_\_\_ Glue
- Animal
  - Epoxy
  - Casein
  - Urethane
26. The bark of a tree mainly helps in \_\_\_\_\_
- Cell Division
  - Protection
  - sap flow
  - Food storage
27. Which insect causes round holes that are surrounded by dark stains
- Ambrosia beetle
  - Carpenter ant
  - Termite
  - Lyctus beetle
28. Which of the following properties is connected with extractives in a wood
- Smell
  - Natural durability
  - Colour
  - All the three
29. If a colourless wood preservative is desired, which of the following chemicals would be most suitable
- CCA
  - PCP
  - Zinc naphthenate
  - ACA
30. The commonly used carrier in CCA preservative is \_\_\_\_\_
- Mineral spirit
  - Petroleum solvent
  - Water
  - Coal tar
31. *Toxicidendron vernicofluum* tree provides which polish
- Shellac
  - Tung oil
  - Danish oil
  - Lacquer
32. In softwoods, the penetrated preservatives are transported in the longitudinal direction by -
- Vessel segments
  - Fibre tracheids
  - Ray tracheids
  - Fibres
33. Mechanical properties of fibre reinforced composites depends on \_\_\_\_\_
- Fiber length, orientation, and volume fraction
  - Properties of constituents
  - Interface strength
  - All these
34. PVC belongs to which group of the following?
- Elastomer
  - Thermoplastic
  - Fibre reinforced plastic
  - Thermoset
35. Reducing the moisture content below the fibre saturation point of a given piece of wood sample can result in \_\_\_\_\_ of the sample
- Reduction in density
  - Reduction in strength
  - Shrinkage
  - Swelling



50. When sawing with a circular saw, the thickness of chip removed is minimum when  
 a) The chip thickness is constant always      b) the saw enters the work piece  
 c) the saw is at the centre of the work piece      d) the saw exits the work piece
51. Which of the following is a true linkage between machine and hand tools  
 a) Planer      b) Sander      c) Mortiser      d) Turning lathe
52. In a mortise and tenon joint, a good fit is regarded as that degree of tightness which just permits closing of the glued joint under \_\_\_\_ applied pressure  
 a) Zero      b) Very low      c) Reasonable      d) Very high
53. The reason for a chalky look of weathered painted wood surfaces is due to the \_\_\_\_ in the paint  
 a) Broken organic polymer      b) Modification of the pigment  
 c) Chemical modification of the polymer      d) Loosening of the pigment
54. \_\_\_\_ is used to prevent bleeding of stains into surface coating  
 a) Filler      b) Sealant      c) Sanding      d) Staining
55. Stretcher rail in a chair reduces the bending moment at the rear joint by  
 a) 70%      b) 60%      c) 50%      d) 40%
56. The cutting HP of a band saw is proportional to  
 a) The depth of cut      b) kerf width      c) feed speed      d) All of these
57. The minimum value of the lightness axis of CEILAB colour space represents  
 a) White      b) Black      c) Grey      d) Slategrey
58. An example of a wooden joint that helps in economically using up mill waste is  
 a) Mitre      b) Mortise and tenon      c) Finger joint      d) Bridle joint
59. The texture of woods with large even sized cells is  
 a) Coarse      b) Medium      c) Fine      d) Large
60. Scratch test measures the \_\_\_\_ of the coating film on a wood surface  
 a) Drying time      b) Adhesion      c) Thickness      d) Hardness

## **8. ENVIRONMENTAL SCIENCES**

- 1 Thunderstorms are considered in which scale of weather system –
  - a. Synoptic Scale
  - b. Microscale
  - c. Mesoscale
  - d. Global Scale
  
- 2 Trade winds are found
  - a. between equator and  $30^{\circ}$  latitude
  - b. between  $30^{\circ}$  and  $60^{\circ}$  latitude
  - c. between pole and  $60^{\circ}$  latitude
  - d. between pole and  $30^{\circ}$  latitude
  
- 3 Horse latitude is located
  - a. at  $30^{\circ}$
  - b. at  $60^{\circ}$
  - c. between  $30^{\circ}$  and  $60^{\circ}$
  - d. between equator and  $30^{\circ}$
  
- 4 Rapid mixing and dilution of pollutants in the atmosphere will occur when-
  - a. actual air temperature drops slowly than the adiabatic lapse rate
  - b. actual air temperature drops faster than the adiabatic lapse rate
  - c. actual air temperature drops at the rate of adiabatic lapse rate
  - d. an inversion layer covers the area.
  
5. The ambient air is stable when the ambient lapse rate is-
  - a. Subadiatic
  - b. Superadiabatic
  - c. Neutrally stable
  - d. Hyperadiabatic
  
- 6 Radiation Inversions occur due to –
  - a. Solar Radiations reaching on earth
  - b. Clouds covering the sky in a winter night
  - c. Clouds reflecting sunlight in a winter day
  - d. Cooling of earth's surface due to emission of radiation
  
- 7 The Scientific Committee on Problems of the Environment (SCOPE) was formed by –
  - a. International Council of Scientific Unions (ICSU)
  - b. Ministry of Environment and Forest Govt. of India
  - c. Council of Scientific and Industrial Research (CSIR), India
  - d. United Nations Environment Programme (UNEP)
  
- 8 The Head quarters of UNEP is located at -
  - a. Paris
  - b. Geneva
  - c. Riode de Jenerio
  - d. Nairobi

- 9 Nilgiri is spread among which group of states –  
a. Kerala, Andhra Pradesh and Karnataka  
b. Tamil Nadu, Kerala and Andhra Pradesh  
c. Tamil Nadu, Kerala and Karnataka  
d. Kerala, Andhra Pradesh and Karnataka
- 10 The first Indian Biosphere Reserve was –  
a. Sunderbans  
b. Nanda devi  
c. Nilgiri  
d. Kaziranga
- 11 Which elemental cycle has no atmospheric reservoir-  
a. Sulphur  
b. Nitrogen  
c. Phosphorus  
d. Carbon
- 12 The most commonly used method for desalination/desalting of water is -  
a. distillation  
b. reverse osmosis  
c. electro dialysis  
d. flash evaporation
- 13 Among the following which pollutant is generated in least amount during manufacturing of automobile batteries –  
a. Acids  
b. Lead  
c. Salts  
d. Organics
- 14 When methanol is used as a fuel for automobiles, emission of which pollutant increases significantly  
a.  $\text{NO}_x$   
b. CO  
c. Formaldehyde  
d. PAN
- 15 Hardness is commonly measured in terms of –  
a.  $\text{CaCO}_3$  equivalents  
b.  $\text{CaSO}_4$  equivalents  
c.  $\text{MgCO}_3$  equivalents  
d.  $\text{MgSO}_4$  equivalents
16. In titrimetric method for determination of total hardness which indicator is used –  
a. Methyl orange  
b. Ferroin  
c. Litmus  
d. Starch

- 17 For humans the major source of methyl mercury present in their body is –
- absorption through skin
  - respiratory air
  - drinking water
  - food and drinking water
- 18 Among the following toxic elements, the least permissible maximum concentration in irrigation waters is for –
- Fluoride
  - Arsenic
  - Cadmium
  - Lead
- 19 Stoichiometric calculations are based on-
- Atomic number
  - Atomic weight
  - Moles
  - Loss of mass
- 20 Which metal can be analysed using a flame photometer –
- Chromium
  - Mercury
  - Sodium
  - Lead
- 21 The United states Environmental protection Agency (USEPA) specifies a test called Toxicity characteristic leaching procedure (TCLP) to determine the –
- leaching characteristics of toxic wastes
  - toxicity hazard of wastes
  - loss of toxicity with leaching
  - toxicity of leachate of toxic wastes
- 22 The initial effect of CO poisoning is –
- headache
  - dizziness
  - loss of judgement
  - loss of consciousness
- 23 DDT accumulates in which tissue of the body
- Bones
  - Blood
  - Fat
  - Muscles
- 24 Ozone and PAN exert their biochemical effects by producing
- Carbonium ion
  - Free radicals
  - H<sup>+</sup> ions
  - Ozonides

- 25 Threshold limit value (TLV) for a pollutant is normally mentioned for an exposure of -
- 1 hr/day
  - 8 hr/day
  - 12 hr/day
  - 6 hr/day
- 26 Among the following chemical species of mercury which is the most toxic –
- $\text{Hg}_2^{+2}$
  - $\text{HgS}$
  - $\text{R Hg}^-$  (organomercurials)
  - $\text{R}_2\text{Hg}$  (Diorganomercurials)
- 27 Which Industry is the biggest user of mercury
- Fungicide
  - Pulp & paper
  - Electroplating
  - Chlor-alkali
- 28 Fragile bones may result due to toxicity of
- As
  - Hg
  - DDT
  - Cd
- 29 The major biochemical effect of Pb is its interference with
- nervous impulses
  - muscle contraction
  - heme synthesis
  - renal functions
- 30 The major oxidant found in polluted atmospheres is-
- Peroxyacetyl nitrate
  - Nitrogen dioxide
  - Nitrogen oxide
  - Ozone
- 31 “Brown air city” is the term used to denote cities which –
- are polluted by  $\text{NO}_2$  released from automobiles
  - exhibit high particulate matter concentration in air
  - are polluted by  $\text{SO}_2$  released from burning of fossil fuels
  - exhibit heat island conditions during summers.
- 32 Dobson is the unit of
- greenhouse potential of gases
  - concentration of trace gases in atmosphere
  - concentration of ozone in troposphere
  - relative toxicity of heavy metals

- 33 Methemoglobinemia is actually caused by which compound?  
a.  $\text{NO}_2$   
b.  $\text{NO}_3^-$   
c.  $\text{NH}_4^+$   
d.  $\text{NO}_2^-$
- 34 Nuclear winter can result due to  
a. Nuclear explosion during winter season  
b. Freezing of nuclear particles in an atom  
c. Mass nuclear explosion  
d. Atmospheric cooling near a fusion reactor
- 35 In West Bengal which ground water pollutant is posing a serious threat to public health –  
a. Nitrate  
b. Fluoride  
c. Arsenic  
d. Selenium
- 36 Mercaptans are not released by which in-  
a. Pulp & paper manufacturing  
b. Tanneries  
c. Refineries  
d. Coal Tar
- 37 Polynuclear hydrocarbons are generated by which industry  
a. Paints and pigments  
b. Carbon black manufacturing  
c. Pulp & Paper industry  
d. Tanneries
- 38 The method used to control evaporative losses of hydrocarbon from vehicles is –  
a. crank case sealing  
b. positive crank case ventilation  
c. condensing of crankcase vapour  
d. addition of chemical to reduce evaporation
- 39 The catalytic converter used in motor vehicles can't convert  
a.  $\text{NO}_x$  to  $\text{N}_2$   
b. Hydrocarbons to  $\text{CO}_2$   
c.  $\text{CO}$  to  $\text{CO}_2$   
d.  $\text{SO}_2$  to sulfur
- 40 Odour in a Pulp and Paper industry is mostly due to the presence of –  
a. Dioxins  
b. Mercaptans  
c. Sulphides  
d. Ammonia
- 41 Among the following, which type of scrubber is most suitable for controlling fine particulate emissions –  
a. Mechanical Scrubber  
b. Venturi Scrubber  
c. Spray tower  
d. Packed tower

- 42 For residential and rural area the prescribed limit for  $\text{SO}_2$  in  $\mu\text{g}/\text{m}^3$  is –
- 30
  - 120
  - 80
  - 50
- 43 Sodium tetrachloromercurate method mentioned in Indian standards is used for estimating which air pollutant-
- CO
  - $\text{SO}_2$
  - $\text{NO}_2$
  - $\text{NO}_x$
- 44 In automobile exhaust, lead is emitted mostly as
- tetra alkyl lead
  - metallic lead
  - lead sulphide
  - lead bromochloride
- 45 Which device has a dust collection efficiency greater than 99%
- Wet Electrostatic precipitator
  - Venturi scrubber
  - Cyclonic spray scrubber
  - Multicyclones
- 46 Untreated spent wash from a distillery has a BOD value near to –
- 80,000 mg/L
  - 60,000 mg/L
  - 50,000 mg/L
  - 40,000 mg/L
- 47 Colour of Distillery industry effluent is due to presence of –
- Lingo cellulose compounds
  - Caramel
  - Iron oxides
  - Dextrose
- 48 During composting maximum degradation and stabilization of organic matter occurs during which stage ?
- mesophiic
  - thermophilic
  - starting
  - cooling
- 49 Of the following units of radioactivity which one is based on the biological injury to human beings?
- Rad
  - Curie
  - Roentgen
  - Rem

- 50 During summers the coldest zone of a lake is –
- thermocline
  - epilimnon
  - hypolimnon
  - mesolimnon
- 51 Among the following which one is the best method for treating sewage sludge?
- Aerobic digestion
  - Anaerobic digestion
  - Incineration
  - Pisciculture
- 52 In West –Gaeke method of SO<sub>2</sub> estimation in ambient air, the scrubbing liquid contains
- HgCl<sub>2</sub> only
  - Formaldehyde and para-rosaniline
  - HgCl<sub>2</sub> and para-rosaniline
  - HgCl<sub>2</sub> and KCl
- 53 Solubility of gases in water can be calculated using
- Henry's Law
  - Raoult's Law
  - Avogadro's Law
  - Gaylusac's Law
54. The two formulas recommended by Central Pollution Control Board for deciding the minimum stack height are based on emission rates of
- CO<sub>2</sub> and soot
  - SO<sub>2</sub> and CO<sub>2</sub>
  - SO<sub>2</sub> and NO<sub>2</sub>
  - SO<sub>2</sub> and particulate matter
- 55 Which one among the following is not a method of air pollution control at source
- raw material changes
  - scrubbing of flue gases
  - Change in process
  - modification in equipments
56. Strategic Environmental Assessment (SEA) considers
- Defence projects
  - Developmental projects
  - Policies, plant and programmes
  - Impact on socio-economic environment
- 57 The Central and State Boards for prevention and control of pollution were first constituted under which law?
- The Environment (Protection) Act, 1986
  - The Air (Prevention and Control of Pollution) Act, 1981
  - The water (Prevention and Control of Pollution ) Act, 1974
  - The water (Prevention and Control of Pollution Cess Act, 1978

- 58 Except the Member-secretary, all other members of a State Pollution, all other members of a State Pollution Control Board hold office for a term of
- Six years
  - four years
  - three years
  - five years
- 59 Silent Valley hydroelectric project was abandoned due to strong public opposition. It is located in –
- Madhya Pradesh
  - Himachal Pradesh
  - Tamil Nadu
  - Kerala
- 60 Mosquito repellent coils /mats contain
- Paraquat
  - BHC
  - Toxaphene
  - Derivatives of Allethrin