

MIZORAM PUBLIC SERVICE COMMISSION

TECHNICAL COMPETITIVE EXAMINATIONS FOR LABORATORY ASSISTANT UNDER COMMERCE AND INDUSTRIES DEPARTMENT, GOVERNMENT OF MIZORAM, MARCH, 2019.

TECHNICAL PAPER - II

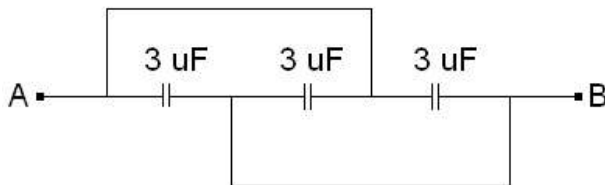
Time Allowed : 2 hours

FM : 150

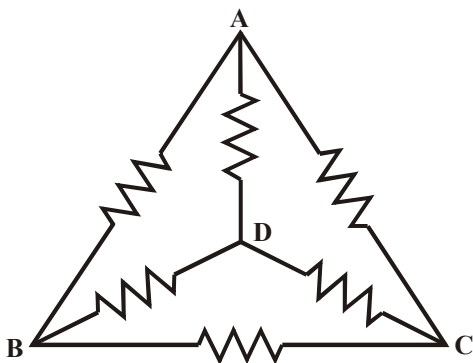
*All questions carry equal marks of two (2) each.
Attempt all questions.*

- Which of the following can produce a virtual image larger in size than the object?
 - Concave lens
 - Convex lens
 - Convexo concave lens
 - Plane mirror
- A convex lens of refractive index n_1 when placed in a certain medium of n_2 does not at all act as a lens. What is the relation between n_1 and n_2 ?
 - $n_1 > n_2$
 - $n_1 < n_2$
 - $n_1 = n_2$
 - $n_1 \cdot n_2 = 0$
- A lens of power +3.5 D is placed in contact with a lens of power - 2.5 D. The combination will behave like
 - Convergent lens of focal length = 100 cm
 - Divergent lens of focal length = 100 cm
 - Convergent lens of focal length = 200 cm
 - Divergent lens of focal length = 200 cm
- In optical fibers the refractive index of the fiber material should be
 - Higher than that of the coating material
 - Lower than that of the coating material
 - Equal to that of the coating material
 - No restriction on the refractive indices
- A person uses spectacle of power +2D. He is suffering from:
 - myopia
 - presbyopia
 - hypermetropia
 - astigmatism
- The magnifying power of a telescope is m . If the focal length of the eye piece is doubled, then its magnifying power will become
 - $2m$
 - $\frac{m}{2}$
 - $\sqrt{2}m$
 - $3m$
- If the aperture of a camera is halved, then for the given illumination of the object the exposure time should
 - be halved
 - remain unchanged
 - be doubled
 - be made four times
- Which of the following undergoes largest diffraction?
 - g-rays
 - UV light
 - IR light
 - radio waves

9. The refractive angle of a prism is A and its refractive index is $\cot\left(\frac{A}{2}\right)$. The angle of minimum deviation is:
- (a) $180^\circ - 3A$ (b) $180^\circ + 2A$
 (c) $90^\circ - A$ (d) $180^\circ - 2A$
10. What is the change in the electric field strength as one penetrates a uniformly charged non-conducting sphere?
- (a) It increased (b) It decreased
 (c) It remains constant (d) It is zero at all points
11. The effective capacitance between point A and B in the figure is



- (a) $9\mu F$ (b) $7.5\mu F$
 (c) $6.5\mu F$ (d) $6\mu F$
12. A voltmeter of resistance 20 KW reads 5 volt . To make it read 20 volt , the extra resistance required is
- (a) 40 KW in parallel (b) 60 KW in series
 (c) 60 KW in parallel (d) 40 KW in series
13. When current i is flowing through a conductor, the drift velocity is v . If $2i$ current is flowed through the same metal but having doubled the area of cross-section, drift velocity is
- (a) v (b) $\frac{v}{2}$
 (c) $\frac{v}{4}$ (d) $4v$
14. When potential difference is applied across an electrolyte, then Ohm's law is obeyed at
- (a) Zero potential (b) Very low potential
 (c) Negative potential (d) High potential
15. Nine resistances each of resistor R are connected as shown in the figure. The effective resistance between A and B is



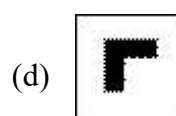
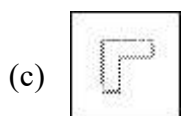
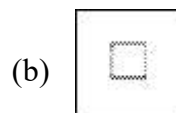
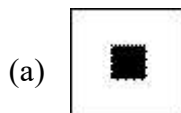
- (a) $\frac{7}{6}R$ (b) $\frac{5}{6}R$
 (c) $\frac{3}{5}R$ (d) $\frac{2}{9}R$

16. To convert a galvanometer into an ammeter, we connect
- (a) Small resistance parallel to the coil (b) Large resistance parallel to the coil
(c) Small resistance in series with the coil (d) Large resistance in series with the coil
17. The resistance of a voltmeter is always
- (a) Smaller than that of galvanometer from which it is obtained
(b) Larger than that of galvanometer from which it is obtained
(c) Equal to that of galvanometer from which it is obtained
(d) May be larger or smaller according to it is obtained
18. A Cathode ray tube is operated at 18.2 KV, what is the maximum speed of the electron emitted?
- (a) $8 \times 10^7 \text{ ms}^{-1}$ (b) $8 \times 10^8 \text{ ms}^{-1}$
(c) $8 \times 10^9 \text{ ms}^{-1}$ (d) $8 \times 10^{10} \text{ ms}^{-1}$
19. For photoelectric emission to take place
- (a) frequency of incident radiation should be less than threshold frequency
(b) frequency of incident radiation may have any value
(c) wavelength of incident radiation should be less than threshold wavelength
(d) wavelength of incident radiation may have any value
20. The de-Broglie wavelength associated with electron accelerated under a potential difference V volt is given by
- (a) $\frac{12.27}{\sqrt{V}} \text{ \AA}$ (b) $\frac{0.286}{\sqrt{V}} \text{ \AA}$
(c) $\frac{0.202}{\sqrt{V}} \text{ \AA}$ (d) $\frac{0.101}{\sqrt{V}} \text{ \AA}$
21. How much energy is released in the nuclear fission reaction of ${}_{92}\text{U}^{235}$?
- (a) 20 MeV (b) 100 MeV
(c) 200 MeV (d) 200 KeV
22. Hydrogen bomb is based on the process on:
- (a) Nuclear fission (b) Nuclear fusion
(c) Fission and fusion (d) Detonation process
23. NaCl crystal belongs to the crystal system
- (a) Tetragonal (b) Cubic
(c) Hexagonal (d) Orthorhombic
24. Bravais lattices are of
- (a) 10 types (b) 7 types
(c) 14 types (d) 20 types
25. As a result of Schottky defect
- (a) Density of the crystal decreases (b) Density of the crystal increases
(c) There is no effect on the density (b) Any of the above three can happen
26. Which one of the following statements is incorrect regarding an electrochemical cell?
- (a) The electrode on which oxidation takes place is called anode.
(b) Anode is a negative pole.
(c) The direction of current is same as that of flow of electron.
(d) The flow of current is partly due to the flow of electrons and partly due to the flow of ions.

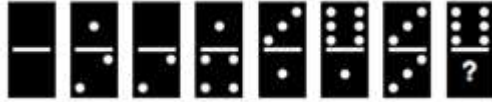
39. Glacial acetic acid is
- (a) Solidified acetic acid (b) Gaseous acetic acid
(c) 100% acetic acid free of water (d) Frozen acetic acid
40. Which of the following term means pain killing?
- (a) Analgesic (b) Antibiotic
(c) Antipyretic (d) Penicillin
41. Most commonly used tranquilizers are derivatives of
- (a) Acetic acid (b) Salicylic acid
(c) Sulphanilic acid (d) Barbituric acid
42. Detergents obtained from LAB are biodegradable. LAB stands for
- (a) Low anionic balance (b) Linear alkyl benzene
(c) Linear alkyl benzoate (d) Large alkyl benzene
43. Bakelite is the condensation polymer of
- (a) C_6H_5OH and caprolactam (b) Phthalic acid and HCHO
(c) Ethylene glycol and HCHO (d) C_6H_5OH and HCHO
44. Natural rubber is a polymer of
- (a) Isoprene (b) Ethylene
(c) Butadiene (d) Styrene
45. In mosses, the dominant part of the life cycle is
- (a) sporophyte (b) gametophyte
(c) both (a) & (b) (d) None of these
46. In seeded plants, megasporogenesis can proceed
- (a) by sexual route only (b) by asexual route only
(c) either by sexual or asexual route (d) None of these
47. Among the Ginkgo species of the order Ginkgoales, the only existing species is
- (a) *adiantoide* (b) *ginkgoites*
(c) *baiera* (d) *biloba*
48. Double fertilization is characterized by the formation of
- (a) a diploid embryo and a triploid endosperm (b) a triploid embryo and haploid endosperm
(c) a diploid embryo and a diploid endosperm (d) a haploid embryo and a haploid endosperm
49. The carnivorous pitcher plant found in India is
- (a) *Nepenthes klossii* (b) *Nepenthes khasiana*
(c) *Nepenthes lamii* (d) *Nepenthes longifolia*
50. In monocots, the largest members with the characteristic bilaterally symmetrical flowers are found in the family
- (a) poaceae (b) orchidaceae
(c) zingiberaceae (d) none of these

51. During the process of stomatal transpiration,
- (a) the evaporation of water from the saturated walls of cells lining the intercellular spaces occurs and followed by the diffusion of the water vapour
 - (b) first the diffusion of the water vapor occurs and then evaporation of water from the saturated walls of cells lining the intercellular spaces occurs
 - (c) only the diffusion of the water vapor occurs
 - (d) only the evaporation of water from the saturated walls of cells lining the intercellular spaces occurs
52. The intermediate compound formed from water (H_2O) and carbon dioxide (CO_2) during photosynthesis in plant is
- (a) Chloroform
 - (b) Ketone
 - (c) Formaldehyde
 - (d) Carbohydrate
53. In a monohybrid cross between a homozygous dominant phenotype and a homozygous recessive phenotype, the expected genotypic ratio of the F_2 generation is
- (a) 3:1
 - (b) 2:2
 - (c) 1:2:1
 - (d) 4:0
54. The gene mapped in Y chromosome for inducing maleness is
- (a) *YSR*
 - (b) *SR*
 - (c) *SRY*
 - (d) *YR*
55. Haemophilia is associated with
- (a) X– linked recessive disorder
 - (b) Y– linked recessive disorder
 - (c) X– linked dominant disorder
 - (d) Y– linked dominant disorder
56. Higher frequency of colour blindness occurs in
- (a) females
 - (b) males
 - (c) either (a) or (b)
 - (d) neither (a) or (b)
57. Sickle cell anaemia is caused by
- (a) polyploidy
 - (b) aneuploidy
 - (c) point mutation
 - (d) alleloploidy
58. Turner’s syndrome is associated with
- (a) XXY chromosomes
 - (b) XO chromosomes
 - (c) XYY chromosomes
 - (d) YO chromosomes
59. Trisomy at chromosome number 21 in humans are associated with
- (a) Kline Felter’s syndrome
 - (b) colour blindness
 - (c) Haemophilia
 - (d) Down’s syndrome
60. Restriction enzymes cleaves DNA and produces internal cuts at
- (a) random sites
 - (b) end sites
 - (c) specific sites
 - (d) none of these
61. For the treatment of cystic fibrosis using gene therapy the major target tissue is the lining of
- (a) heart
 - (b) brain
 - (c) lungs
 - (d) kidney
62. Blue-white screening for the presence of recombinant plasmids involves
- (a) insertional inactivation of a gene
 - (b) over-expression of a gene
 - (c) all of these
 - (d) none of these

63. The *cryIA* gene of *Bacillus thuringiensis* impart resistance against
(a) Diptera (b) Lepidoptera
(c) Coleoptera (d) All of these
64. The term 'Evergreen Revolution' for increasing agricultural production in India is associated with
(a) Norman Borlaug (b) M.S. Swaminathan
(c) Raj Krishna (d) R.K.V Rao
65. In the Indian sub-continent, the crops grown on irrigated lands which do not have to wait for monsoons, in the short duration mainly from March to June, are called
(a) Zaid crops (b) Kharif crops
(c) Rabi crops (d) None of these
66. -2 5 -4 3 -6 ?
(a) 0 (b) 1
(c) -3 (d) -4
67. If the cost of x metres of wire is d rupees, then what is the cost of y metres of wire at the same rate?
(a) Rs. $(xy)/d$ (b) Rs. xd
(c) Rs. yd (d) Rs. $(yd)/x$
68. What conclusion can be drawn on the basis of these two statements?
i. All mountains are hills.
ii. All Mount Everests are mountains.
(a) All hills are Mount Everests (b) No mountains are Mount Everests
(c) No hills are Mount Everests (d) All Mount Everests are hills
69. One Word Substitution: *Severely abusive writing in journals*
(a) Imaginary (b) Speculative
(c) Scurrilous (d) Sarcastic
70. Identify the meaning of the highlighted phrase: I knew he had an "*axe to grind*" and turned down his offer of help.
(a) A blunt axe (b) A sharp tongue
(c) A private interest to serve (d) A tendency to be aggressive
71. Identify the correct figure in the sequence given below



72. Which number replaces the question mark?



- (a) 1
- (b) 3
- (c) 2
- (d) 4

73. Below in each of the questions are given two statements I and II. These statements may be either independent causes or may be effects of independent causes or a common cause. One of these statements may be the effect of the other statements. Read both the statements and decide which of the following answer choice correctly depicts the relationship between these two statements.

- I. The prices of food grains and other essential commodities in the open market have risen sharply during the past three months.
 - II. The political party in opposition has given a call for general strike to protest against the government's economic policy.
- (a) Statement I is the cause and statement II is its effect.
 - (b) Statement II is the cause and statement I is its effect.
 - (c) Both the statements I and II are independent causes.
 - (d) Both the statements I and II are effects of independent causes.

74. Select a pair of sentences that relate logically with the given statement.

All irresponsible parents shout if their children do not horse around.

- A. All irresponsible parents do not shout.
 - B. Children horse around.
 - C. Children do not horse around.
 - D. All irresponsible parents shout.
- (a) AB
 - (b) BA
 - (c) CA
 - (d) All of these

75. *All Indian politicians, except for Indira Gandhi, are corrupt.*

From which of the following can the statement above be most properly inferred?

- (a) Except for Indira Gandhi, if someone is a corrupt politicians, then he or she is Indian.
- (b) If an Indian is corrupt, then he or she is a politician, as long as he or she is not Indira Gandhi.
- (c) Aside from Indira Gandhi, if someone is an Indian politician, then he or she is corrupt.
- (d) Indira Gandhi is the only non-Indian politicians who is corrupt.