To be filled by the candidate:

Roll No. (In figures) _____

Roll No. (In words) _____

_____

Name of the Candidate : _____

Father's Name : _____

Center of Examination : _____

Total No. of Questions : 100   **Total No. of Pages : 14**

Combined Entrance Test (CET)
B.Sc. Medical Technology and B. Pharma (Ayurved)

Time Allowed :180 Minutes   **Maximum Marks : 100**

SEAL

IMPORTANT NOTE:

(i) OMR Answer Sheet will be supplied by the Examination Centre Superintendent for answering the questions.

(ii) Use Blue/Black Ink/ Ball Pen only, to darken the appropriate circle in the OMR Answer Sheet.

(iii) Darken one circle deeply for each question in the OMR Answer Sheet, as faintly darkened circle might be rejected by the Optical Scanner.

(iv) Darkening of more than one circle shall be rejected by the scanner. **Over-writing, cutting, erasing or use of White Fluid is not allowed.**

(v) Before dealing with the question paper, fill-up the required information with Blue/Black Ball Pen correctly both in the Question Booklet and in the OMR Answer Sheet.

(vi) Do not fold the OMR Answer Sheet nor put any mark here and there to avoid rejection by the   software.

(vii) Write Roll. No. carefully on the OMR Answer Sheet and darken the appropriate circle properly.

(viii) **Each question carries One Mark. There will be NO NEGATIVE MARKING.**

(ix) Use of Calculator is not allowed.

(x) Rough work may be done on the sheet(s) at the end.

(xi) **MOBILE TELEPHONES (EVEN ON SWITCH-OFF MODE) AND SUCH OTHER ELECTRONIC DEVICES ARE NOT ALLOWED INSIDE THE EXAMINATION HALL.**

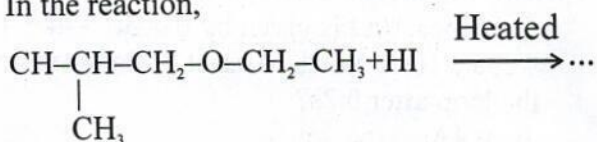(xii) The question paper-booklet will be retained by the candidate after the entrance test is over.

1. National Botanical Institute is located in:
   A. Mumbai
   B. Kolkata
   C. Lucknow
   D. Chennai

2. ICBN stands for:
   A. International Council for Botanical Nature
   B. International Code of Botanical Nomenclature
   C. Indian Code of Botanical Nomenclature
   D. None of the above

3. Which of the following is not a protist ?
   A. Taenia
   B. Amoeba
   C. Paramecium
   D. Euglena

4. Select the mismatched pair:
   A. Cycas – Living fossil
   B. Thuja – Agar production
   C. Pinus – Resin, turpentine production
   D. Araucaria – Ornamental plant.

5. Tap root originate from:
   A. Radicle
   B. Stem
   C. Leaves
   D. Adventitious roots

6. Roots are modified to haustoria in:
   A. Cuscuta
   B. Utricularia
   C. Trapa
   D. Vanda

7. Sclereids are present in:
   A. Fruit walls of nuts
   B. Grit of guava and pear
   C. Seed coats of legumes
   D. All of these.

8. Heartwood differs from sapwood in:
   A. Presence of rays and fibres
   B. Absence of vessels and parenchyma
   C. Having dead and non - conducting elements
   D. Being susceptible to pests and pathogens.

9. Stomata of a plant open when guard cells show:
   A. Influx of hydrogen ions
   B. Efflux of potassium ions
   C. Influx of potassium ions
   D. All of these

10. Reproducing new plants by cells instead of seeds is known as:
    A. Biofertiliser
    B. Mutation
    C. Tissue culture
    D. Antibiotics

11. The coconut water and the edible part of coconut are equivalent to:
    A. Endosperm
    B. Endocarp
    C. Mesocarp
    D. Embryo

12. A person who is trisomic for twenty first pair of chromosomes is:
    A. Klinefelter's syndrome
    B. Down's syndrome
    C. Turner's syndrome
    D. None of these

13. Fossils are generally found in:
    A. Sedimentary rocks
    B. Igneous rocks
    C. Metamorphic rocks
    D. Any type of rock

14. The term 'humulin' is used for:
    A. Hydrolytic enzyme
    B. Powerful antibiotic
    C. Human insulin
    D. Ioenzyme

15. Which of the following risks are associated with genetically modified foods ?
    A. Toxicity in human beings
    B. Allergic reactions in human beings
    C. Antibiotic resistance in micro – organisms present in alimentary canal
    D. All of above.

16. Acclimatization is:
    A. introduction
    B. pure – line breeding
    C. pure – line selection.
    D. adaptation to new environment.

17. First biosphere reserve was established in 1986 at:
    A. Nilgiri
    B. Nanda Devi
    C. Rann of kutch
    D. Sunderbans

18. Ozone hole was first discovered over:
    A. arctic
    B. tropic
    C. Antarctic
    D. polar region.

19. Which is not found in Prokaryotic cell:
    A. Plasma membrane
    B. Cell Wall
    C. Nuclear membrane
    D. Ribosome

20. AIDS is widely diagnosed by:
    A. Widal Test
    B. PCR
    A. ELISA
    D. Chromatography

21. Who amongst the following is regarding as the "Father of Taxonomy":
    A. Takhtajan
    B. Linnaeus
    C. Bentham and Hooker
    D. Theophrastus

22. Who developed the "Key" for identification of animals:
    A. John Ray
    B. Goethe
    C. Georges Cuvier
    D. Theophrastus

23. 'Comma' shaped bacteria are known as:
    A. Coccus
    B. Spiral
    C. Spirillum
    D. Vibrio

24. Ginger is an underground stem. It is distinguished from root because:
    A. It lacks chlorophyll
    B. It stores food
    C. It has nodes and internodes
    D. It has xylem and vessels

25. The chief function of phloem is the conduction of:
    A. Food
    B. Mineral
    C. Water
    D. Air

26. Shedding of leaves, flowers and fruits due to change in hormone balance in plants is:
    A. Senescence
    B. Abscission
    C. Photoperiodism
    D. Vernalization

27. Etiolation occurs when plants:
    A. Are grown in dark
    B. Are grown in intense light
    C. Develop viral infection
    D. Develop mineral deficiency

28. Test cross in plants or in Drosophila involves crossing:
    A. Crossing the F_1 hybrid with a double recessive genotype
    B. Crossing between two genotypes with dominant trait
    C. Crossing between two genotypes with recessive trait
    D. Crossing between two F1 hybrids

29. Golden rice is a promising transgenic crop. When released for cultivation, it will help in:
    A. Producing a petrol- like fuel from rice
    B. Alleviations of vitamin A deficiency
    C. Pest resistance.
    D. Herbicide tolerance

30. Which one is endangered animal?
    A. Lion Tailed Macaque.
    B. Hanuman Monkey
    C. Langur
    D. Antelope

31. One of the following is not a possible reason for use of CNG in automobiles:
    A. It reduces pollution
    B. It can be adulterated.
    C. It is cheaper than petrol
    D. It burns more efficiently

32. The gas responsible for the Bhopal tragedy was:
   A. SO_2 and NO_2
   B. Ethyl isocyanate
   C. Methyl isocyanate
   D. Carbon monoxide

33. Tendons connect:
   A. Nerve to muscle
   B. Muscle to muscle
   C. Muscle to Bone
   D. Bone to Bone

34. Which vitamins used to prevent Bleeding ?
   A. vitamin-A
   B. vitamin-B12
   C. vitamin-C
   D. vitamin-K

35. Which one is incorrect:
   A. New individuals replace the dead ones
   B. Homeostasis produces a self-regulated steady state
   C. Most homeostatic mechanisms operate through feed-back systems
   D. Cell obtains instructions for divisions from a hereditary protein.

36. Nigrum is one species of genus:
   A. Mangifera
   B. Solanum
   C. Triticum
   D. Pisum

37. Scutellum of Maize/Caryopsis is:
   A. Cotyledon
   B. Endosperm
   C. Tegmen
   D. Testa

38. Smallest bone in human body:
   A. Stapes
   B. Scapula
   C. Radius
   D. Femur

39. The blood vessel that carry Blood from heart to various body parts called:
   A. Arteries
   B. Veins
   C. Septum
   D. Capillaries

40. Tubectomy is a method of sterilization in which?
   A. Nucleus is removed
   B. Ovaries are removed.
   C. Small part of fallopian tube is removed
   D. Vasa deferens is removed

41. An organic compound contains 49.30% carbon, 6.84% hydrogen and its vapour density is 73. Molecular formula of the compound is:
   A. $C_3H_8O_2$
   B. $C_6H_{10}O_4$
   C. C_6H_9O
   D. $C_4H_{10}O_2$

42. Which of the following sets of quantum numbers represents the highest energy of an atom?
   A. $n = 3, l = 0, m = 0, s = +1/2$
   B. $n = 3, l = 1, m = 1, s = +1/2$
   C. $n = 3, l = 2, m = 1, s = +1/2$
   D. $n = 4, l = 0, m = 0, s = +1/2$

43. A gas occupies a volume of 300 cc at 27°C and 620 mm pressure. The volume of gas at 47°C and 640 mm pressure is :
   A. 260cc
   B. 310cc
   C. 390cc
   D. 450cc

44. If the enthalpies of formation of Al_2O_3 and Cr_2O_3 are -1596 kJ and -1134 kJ respectively, then the values of ΔH for the reaction ; $2Al + Cr_2O_3 \rightarrow 2Cr + Al_2O_3$ will be:
   A. -462 kJ
   B. -1365 kJ
   C. -2530 kJ
   D. + 2350 kJ

45. For the reaction:
   $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ $K_c = 0.061$ at 500 K. At an instant, the reaction mixture has 3 mol L^{-1} N_2; 2 mol L^{-1} H_2 and 0.5 mol L^{-1} NH_3. Which of the following statement is correct?
   A. Reaction is at equilibrium
   B. Reaction will tend to proceed in forward direction
   C. Reaction will proceed in backward direction
   D. Cannot be predicted

(3)

46. The anions (A) form hexagonal close packing and atoms (M) occupy only two-third of the octahedral voids. The general formula of the compound is:
   A. M_2A_3
   B. MA
   C. MA_2
   D. M_3A_2

47. 36 g of glucose (molar mass = 180 g/mol) is present in 500 g of water, the molarity of the solution is:
   A. 0.2
   B. 0.4
   C. 0.8
   D. 1.0

48. Arrange the following in the increasing order of oxidation state of Mn:
   (i) Mn^{2+} (ii) MnO_2
   (iii) $KMnO_4$ (iv) K_2MnO_4
   A. (i) > (ii) > (iii) > (iv)
   B. (i) < (ii) < (iv) < (iii)
   C. (ii) < (iii) < (i) < (iv)
   D. (iii) < (i) < (iv) < (ii)

49. A reaction A → B follows second order kinetics, doubling the concentration of A will increase the rate of formation of B by a factor of
   A. 2
   B. ½
   C. 4
   D. ¼

50. Greater the valency, the higher is the coagulating power of ion'. This rule was introduced by:
   A. Hardy-Schulze
   B. Graham
   C. Kossel and Lewis
   D. Faraday

51. The correct order of increasing radii of the ions Br^-, F^-, O^{2-} and S^{2-} is as follows:
   A. $Br^- < F^- < O^{2-} < S^{2-}$
   B. $S^{2-} < O^{2-} < F^- < Br^-$
   C. $F^- < O^{2-} < S^{2-} < Br^-$
   D. $F^- < Br^- < O^{2-} < S^{2-}$

52. Which of the following pair has same structure:
   A. PCl_5 and SF_6
   B. SO_2 and NH_3
   C. PH_3 and BCl_3
   D. NH_4^+ and SO_4^{2-}

53. Which of the following solutes will produce temporary hardness in water?
   A. $MgCl_2$
   B. NaCl
   C. $Mg(HCO_3)_2$
   D. $NaHCO_3$

54. The number of 2-electron and 3-centre-2-electron bonds in B_2H_6, respectively, are:
   A. 4 and 2
   B. 2 and 4
   C. 2 and 2
   D. 2 and 1

55. The hybridization of Xe in XeF_2 is:
   A. sp^3
   B. sp^2
   C. sp^3d
   D. sp^2d

56. The IUPAC name of $[Ni(NH_3)_4] [NiCl_4]$ is:
   A. Tetrachloronickel(II) – tetraamminenickel (II)
   B. Tetraamminenickel (II) – Tetrachloronickel (II)
   C. Tetraamminenickel (II) – Tetrachloronickelate (II)
   D. Tetrachloronickel (II) – Tetraamminenickelate (II)

57. In compound $\overset{1}{C}H \equiv \overset{2}{C} - \overset{3}{C} = \overset{4}{C} = \overset{5}{C}H - \overset{6}{C}H_3$,
   with $\overset{3}{C}$ bonded to C,
   the hybridization on $\overset{3}{C} - \overset{4}{C}$ is:
   A. $sp^2 - sp$
   B. $sp^2 - sp^2$
   C. $sp^3 - sp^2$
   D. sp - sp

58. Lindlar's catalyst is:
   A. Pt in ethanol
   B. $Pd + BaSO_4$
   C. Ni in ethanol
   D. Na in liquid NH_3

59. What is DDT among the following?
   A. A fertilizer
   B. Biodegradable pollutant
   C. Non – biodegradable pollutant
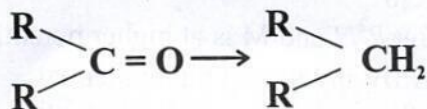   D. Greenhouse gas.

60. In the reaction,

$$\underset{\underset{CH_3}{|}}{CH}-CH-CH_2-O-CH_2-CH_3 + HI \xrightarrow{\text{Heated}} \ldots$$

Which of the following compounds will be formed?

A. $\underset{\underset{CH_3}{|}}{CH_3}-CH-CH_2OH + CH_3CH_3$

B. $\underset{\underset{CH_3}{|}}{CH_3}-CH-CH_3 + CH_3CH_2OH$

C. $\underset{\underset{CH_3}{|}}{CH_3}-CH-CH_2OH + CH_3CH_2I$

D. $\underset{\underset{CH_3}{|}}{CH_3}-CH-CH_3I + CH_3CH_2OH$

61. Which one of the following reactions cannot be used for the reduction of ?

$$\underset{R}{\overset{R}{\diagdown}} C = O \longrightarrow \underset{R}{\overset{R}{\diagdown}} CH_2$$

A. Clemmensen reduction
B. Wolff-Kishner reduction
C. Wurtz reaction
D. HI and red phosphorus at 200°C

62. The compound X, in the reaction, is :

$$X \xrightarrow{CH_3MgI} Y \xrightarrow{\text{hydrolysis}} Mg(OH)I + CH_3COOH$$
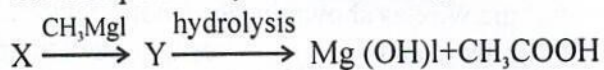
A. CH_3CHO
B. CO_2
C. $(CH_3)_2CO$
D. $HCHO$

63. Arrange the following in increasing order of their basic strength:

$CH_3NH_2;$ (I)
$(CH_3)_2NH;$ (II)
$(CH_3)_3N;$ (III)
$C_6H_5CH_2NH_2$ (IV)
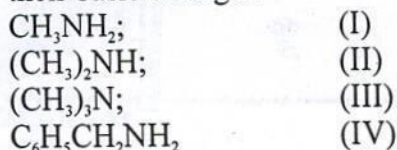
A. IV < III < II < I
B. IV < III < I < II
C. I < II < III < IV
D. IV < III < I = II

64. Oxidation of glucose is one of the most important reactions in a living cell. What is the number of ATP molecules generated in cells from one molecule of glucose ?
A. 36
B. 12
C. 18
D. 28

65. Which of the following is not an artificial sweetener?
A. Aspartame
B. Sucrolose
C. Alitame
D. Sucrose

66. Which is the correct statement about birth control pills?
A. Contain estrogen only
B. Contain progesterone only
C. Contain a mixture of estrogen & progesterone derivatives
D. Progesterone enhances ovulation.

67. The monomers of buna-S rubber are:
A. Vinyl chloride and Sulphur
B. Butadiene
C. Styrene and butadiene
D. Isoprene and butadiene.

68. Which of the following polymer is stored in the liver of animals?
A. Amylose
B. Cellulose
C. Amylopectin
D. Glycogen.

69. Which of the following B-group vitamins can be stored in our body?
A. Vitamin B_1
B. Vitamin B_2
C. Vitamin B_6
D. Vitamin B_{12}

70. Which of the following is 3^0 amine?
A. 1-Methylcyclohexylamine
B. Triethylamine
C. Test-butylamine
D. N-methylaniline

(5)

71. The heat generated in circle is given by Q = I^2Rt, where I is current, R is resistance and t is time. If the percentage errors in measuring I, R and t are 2%, 1% and 1% respectively, then the maximum error in measuring heat is equal to:
A. 2%
B. 3%
C. 4%
D. 6%

72. Angular momentum of the particle rotating with a central force is constant due to:
A. constant torque
B. constant force
C. constant linear momentum
D. zero torque

73. A Carnot engine, whose efficiency is 40%, takes in heat from a source maintained at a temperature of 500K. It is desired to have an engine of efficiency 60%. Then, the intake temperature for the same exhaust (sink) temperature must be:
A. 1200K
B. 750K
C. 600K
D. Efficiency of Carnot engine cannot be made larger than 50%

74. The equivalent capacitance between A and B is (in µF):
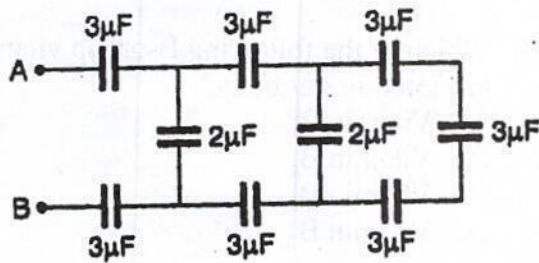
A. 1µF
B. 3µF
C. 2µF
D. 1.5µF

75. The magnetic flux across a loop of resistance 10Ω is given by $\phi = 5t^2 - 4t + 1$ weber. How much current is induced in the loop after 0.2s?
A. 0.4A
B. 0.2A
C. 0.04A
D. 0.02A

76. A thin semicircular conducting ring of radius R is falling with its plane vertical in a horizontal magnetic induction B (fig) At the position MNQ the speed of ring is v and potential difference developed across the ring is
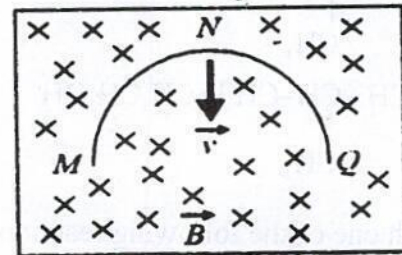
A. zero
B. $Bv\pi R^2/2$ and M is at higher potential
C. πRBv and Q is at high potential
D. $2RBv$ and Q is at higher potential

77. Two parallel wires AL and KM placed at a distance l are connected by a resistance R and placed in a magnetic field B which is perpendicular to the plane containing the wire as shown in fig. Another wire CD now connects two wires perpendicularly and made to slide with velocity v. the rate of mechanical work done needed on the wire CD is

A. $\dfrac{B^2l^2v^2}{R}$
B. $\dfrac{Blv}{R}$
C. $\dfrac{B^2lv^2}{R}$
D. $\dfrac{B^2l^2v}{R}$

(6)
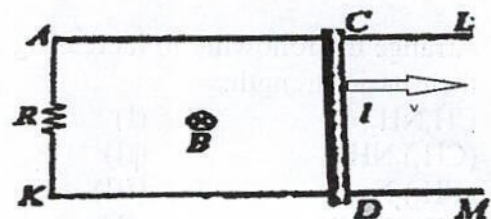
78. In a material medium of permittivity $\in$ and magnetic permeability μ, the velocity of light becomes :

A. $v = \dfrac{1}{\mu \in}$

B. $v = \dfrac{1}{\sqrt{\mu \in}}$

C. $v = \sqrt{\mu \in}$

D. $v = \sqrt{\dfrac{\varepsilon}{u}}$

79. What will be the magnetic energy density, in the magnetic field B?

A. $B^2/2\,\mu_0$

B. $B/2\,\mu_0$

C. $2B/\mu_0$

D. $2B^2\,\mu_0$

80. Two sources of intensity I and 4I are used in an interference experiment. The intensity at a point where the waves from the two sources superimpose with a phase difference of $\dfrac{\pi}{2}$ is :

A. 0

B. 2I

C. 3I

D. 5I

81. Energy E of a hydrogen atom with principal quantum number n is given by E $= \dfrac{-13.6}{n^2}$ eV. The energy of a photon ejected when the electron jumps from $n = 3$ state of $n = 2$ state of hydrogen is approximately :

A. 1.5eV

B. 0.85eV

C. 3.4eV

D. 1.9eV

82. The van der Waals equation of state for some gases can be expressed as,

$\left(P + \dfrac{a}{V^2}\right)(V - b) = RT$

where P is the pressure, V is the molar volume and T is the absolute temperature of the given sample of gas, a, b and R are constants, the dimensional representation of ab/RT is:

A. $[ML^5T^{-2}]$

B. $[M^0L^3T^0]$

C. $[ML^{-1}T^{-2}]$

D. None

83. A body of mass 6kg is hanging from another of mass 10kg as shown in fig. This combination is being pulled up by a string with an acceleration of 2ms^{-2}. The tension T_1 is (g = 10 ms^{-2}) :
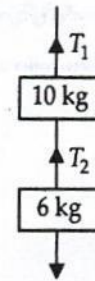
A. 240N

B. 150N

C. 220N

D. 192N

84. The moment of inertia of a disc of mass M and radius R about an axis, which is tangential to the circumference of the disc and parallel to its diameter, is :

A. $\dfrac{3}{2} MR^2$

B. $\dfrac{3}{2} MR^2$

C. $\dfrac{5}{4} MR^2$

D. $\dfrac{4}{5} MR^2$

85. Satellite is revolving around earth. If its's radius of orbit is increased to 4 times of the radius of geostationary statellite, what will become its time period?

A. 8 days

B. 4 days

C. 2 days

D. 16 days

86. A particle is executing linear SHM. The fraction of the total energy that is potential, when its displacement is ¼ of the amplitude is :

A. $\dfrac{1}{16}$

B. $\dfrac{1}{8}$

C. $\dfrac{1}{2}$

D. $\dfrac{1}{4}$

(7)

87. A system is shown in the fig. The time period for small oscillations of the two blocks will be:
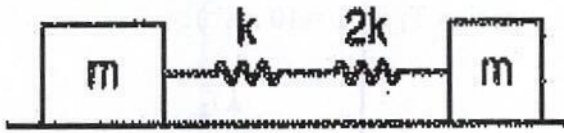
A. $2\pi\sqrt{\dfrac{3m}{k}}$

B. $2\pi\sqrt{\dfrac{3m}{2k}}$

C. $2\pi\sqrt{\dfrac{3m}{4k}}$

D. $2\pi\sqrt{\dfrac{3m}{8k}}$

88. The rate of flow of electric charge through any cross-section of a conductor is known as..............

A. Electric flux
B. Electric potential
C. Electric current
D. Electric field

89. Unit of conductance is ———

A. Dyne
B. Siemen
C. Ohm
D. Volts

90. The force per unit charge is known as —

A. Electric current
B. Electric potential
C. Electric field
D. Electric space

91. The property which differentiates two kinds of charges is called —

A. Equality of charge
B. Polarity of charge
C. Fraction of charge
D. None of the option

92. The process in which a region is made free from any electric field is known as— ———————.

A. Electrostatic forcing
B. Electrostatic binding
C. Electrostatic shielding
D. None of the options

93. 1 Volt = ——————

A. 1 Coulomb
B. 1 Newton / 1 Coulomb
C. 1 Joule / 1 Coulomb
D. 1 Newton / 1 meter

94. The work done in moving a unit positive test charge over a closed path in an electric field is—————.

A. Always 1
B. Infinite
C. Zero
D. Negative

95. Four point charges – Q, - q, 2q and 2Q are placed, one at each corner of the square. The relation between Q and q for which the potential at the centre of the square is zero is:
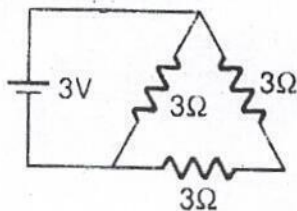
A. $Q = -q$

B. $Q = -\dfrac{1}{q}$

C. $Q = q$

D. $Q = \dfrac{1}{q}$

96. ABC is an equilateral triangle. Charges + q are placed at each corner. The electric intensity at O, the centroid of the triangle will be :
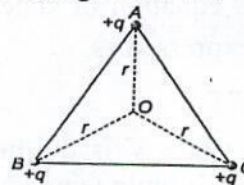
A. $\dfrac{1}{4\pi\varepsilon_0} \cdot \dfrac{q}{r}$

B. $\dfrac{3}{4\pi\varepsilon_0} \cdot \dfrac{q}{r}$

C. 0

D. $\dfrac{1}{4\pi\varepsilon_0} \cdot \dfrac{3q}{r^2}$

(8)

97. A 3-volt battery with negligible internal resistance is connected in a circuit as shown in the fig. The current I in the circuit will be :

$3V$ 3Ω 3Ω 3Ω

A. 1A
B. 1.5A
C. 2A
D. 1/3A

98. A magnet of magnetic moment 10 Am^2 is freely suspended in a uniform magnetic field of strength 5T. The work done is rotating the magnet through an angle 60° is given by :
A. 5J
B. 10J
C. 25J
D. 50J

99. In an oscillation LC circuit, maximum charge on the capacitor is Q The charge on this capacitor, when the energy is stored equally between the electric and magnetic fields is :
A. Q
B. $\frac{Q}{2}$
C. $\frac{Q}{\sqrt{3}}$
D. $\frac{Q}{\sqrt{2}}$

100. The magnetic field of a beam emerging from a filter facing a floodlight is given by
$B_0 = 12 \times 10^{-8} \sin(1.20 \times 10^7 z - 3.60 \times 10^{15} t)$ T.
What is the average intensity of the beam?
A. 1.91 Wm^{-2}
B. 1.71 Wm^{-2}
C. 200 Wm^{-2}
D. 1.5 Wm^{-2}

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