



INSPIRING — MINDS —

IIT-JEE/MEDICAL/BOARDS

NEET

PHYSICS: ELECTROSTATICS

CHEMISTRY: SOLID STATES

BIOLOGY: REPRODUCTION IN FLOWERING PLANTS

2018

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

INSTRUCTIONS

A. General:

- (i) The Test Booklet consists of 180 questions. The maximum marks are 720.
- (ii) Each question is allotted 4 (four) marks for each correct response for physics and chemistry and 2 marks for biology.
- (iii) Candidates will be awarded marks as stated above in instruction No. (ii) for correct response of each question, 1/4 (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
- (iv) There is only one correct response for each question. Filling up more than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instruction (iii) above.
- (v) Use Blue/Black Ball Point Pen only for writing particulars or any marking.
- (vi) Use of calculator is not allowed.
- (vii) Darken the circles in the space provided only.
- (viii) Use of white fluid or any other material which damages the answer sheet, is not permitted.

Name:-.....

Contact no:-.....

MEDICAL [PART(A)]

BIOLOGY

1. Filiform apparatus is characteristic feature of

- (a) aleurone cell (b) synergids
(c) generative cell (d) nucellar embryo

2. In angiosperms, microsporogenesis and megasporogenesis

- (a) involve meiosis
(b) occur in ovule
(c) occur in anther
(d) form gametes without further divisions.

3. Flowers are unisexual in

- (a) china rose (b) onion
(c) pea (d) cucumber.

4. Coconut water from a tender coconut is

- (a) innermost layers of the seed coat
(b) degenerated nucellus
(c) immature embryo
(d) free nuclear endosperm

5. Which of the following fruits is parthenocarpic?

- (a) Jackfruit (b) Banana
(c) Brinjal (d) Apple

6. Male gametophyte in angiosperms produces

- (a) single sperm and two vegetative cells
(b) three sperms
(c) two sperms and a vegetative cell
(d) single sperm and a vegetative cell.

7. Which of the following are the important floral rewards to the animal pollinators?

- (a) Floral fragrance and calcium crystals
(b) Protein pellicle and stigmatic exudates
(c) Colour and large size of flower
(d) Nectar and pollen grains

8. Which of the following may require pollinators, but is genetically similar to autogamy?

- (a) Apogamy (b) Cleistogamy
(c) Geitonogamy (d) Xenogamy

9. Which of the following statement is not true?

(a) The flowers pollinated by flies and bats secrete foul odour to attract them.

(b) Honey is made by bees by digesting pollen collected from flowers

(c) Pollen grains are rich in nutrients and they are used in the form of tablets and syrups.

(d) Pollen grains of some plants cause severe allergies and bronchial affections in some people.

10. The hilum is a scar on the

- (a) fruit, where style was present
(b) seed, where micropyle was present
(c) seed, where funicle was attached
(d) fruit where it was attached to pedicel.

11. Transmission tissue is characteristic feature of

- (a) dry stigma (b) wet stigma
(c) hollow style (d) solid style

12. Which of the following shows isogamy with non-flagellated gametes?

- (a) *Sargassum* (b) *Ectocarpus*
(c) *Ulothrix* (d) *Spirogyra*

13. Geitonogamy involves

- (a) fertilization of flower by the pollen from another flower of the same plant
(b) fertilization of a flower by the pollen from the same flower
(c) fertilization of a flower by the pollen from a flower of another plant in the same population
(d) fertilization of a flower by the pollen from a flower of another plant belonging to a distant population.

14. An aggregate fruit is one which develops from

- (a) multicarpellary syncarpous gynoecium
(b) multicarpellary apocarpous gynoecium
(c) complete inflorescence
(d) multicarpellary superior ovary.

15. Pollen tablets are available in the market for

- (a) in vitro fertilization
(b) breeding programmes
(c) supplementing food
(d) ex situ conservation

16. Function of filiform apparatus is to

- (a) recognize the suitable pollen at stigma
- (b) stimulate division of generative cell
- (c) produce nectar
- (d) guide the entry of pollen tube.

17. Non-albuminous seed is produced in

- (a) maize (b) castor
- (c) wheat (d) pea

18. Meiosis takes place in

- (a) gametophyte (b) megaspore
- (c) meiocyte (d) conidia

19. Seed coat is not thin, membranous in

- (a) groundnut (b) gram
- (c) maize (d) coconut

20. Perisperm differs from endosperm in

- (a) being a diploid tissue
- (b) its formation by fusion of secondary nucleus with several sperms
- (c) being a haploid tissue
- (d) having no reserve food

21. Advantage of cleistogamy is

- (a) no dependence on pollinators
- (b) vivipary
- (c) higher genetic variability
- (d) more vigorous offspring.

22. Megasporangium is equivalent to

- (a) nucellus (b) ovule
- (c) embryo sac (d) fruit

23. Which of the following statement is correct?

- (a) Endothecium produces the microspores
- (b) Tapetum nourishes the developing pollen
- (c) Hard outer layer of pollen is called intine
- (d) Sporogenous tissue is haploid

24. Product of sexual reproduction generally generates

- (a) new genetic combination leading to variation
- (b) large biomass
- (c) longer viability of seeds
- (d) prolonged dormancy

25. Animal vectors are required for pollination in

- (a) Vallisneria (b) mulberry
- (c) cucumber (d) maize

26. Albuminous seeds store their reserve food mainly in

- (a) endosperm (b) cotyledons
- (c) hypocotyl (d) perisperm

27. Megaspores are produced from the megaspore mother cells after

- (a) mitotic division
- (b) formation of thick wall
- (c) differentiation
- (d) meiotic division

28. Which of the following statement is correct ?

- (a) Cleistogamous flowers are always autogamous
- (b) Xenogamy occurs only by wind pollination
- (c) Chasmogamous flowers do not open at all.
- (d) Geitonogamy involves the pollen and stigma of flowers of different plants.

29. Which of the following statement is correct?

- (a) Sporopollenin can be degraded by enzymes
- (b) Sporopollenin is made up of inorganic material
- (c) Sporopollenin can withstand high temperature as well as strong acids and alkalis.
- (d) Sporopollenin can withstand high temperatures but not strong acids.

30. Both, autogamy, and geitonogamy are prevented in

- (a) papaya (b) cucumber
- (c) castor (d) maize.

31. An organic substance that can withstand environmental extremes and cannot be degraded by any enzyme is

- (a) cuticle (b) sporopollenin
(c) lignin (d) cellulose.

32. Which of the following is correctly matched?

- (a) Onion – bulb
(b) Ginger – Sucker
(c) *Chlamydomonas* – Conidia
(d) Yeast – Zoospores.

33. Even in absence of pollinating agents seed-setting is assured in

- (a) *Commelina* (b) *Zostera*
(c) *Salvia* (d) fig

34. What is the function of germ pore?

- (a) Emergence of radicle
(b) Absorption of water for seed germination
(c) Initiation of pollen tube.
(d) Release of male gametes.

35. Which of the following statement is wrong?

- (a) When pollen is shed at two-celled stage. double fertilization does not take place.
(b) Vegetative cell is larger than generative cell.
(c) Pollen grains in some plants remain viable for months
(d) Intine is made of cellulose and pectin.

36. Plants with ovaries having only one or a few ovules. are generally pollinated by

- (a) bees (b) butterflies
(c) birds (d) wind

37. Filiform apparatus is a characteristic feature of

- (a) suspensor (b) egg
(c) synergid (d) zygote

38. Nucellar polyembryony is reported in species of

- (a) *Citrus* (b) *Gossypium*
(c) *Triticum* (d) *Brassica*

39. Which of the following pollinations is autogamous?

- (a) geitonogamy (b) xenogamy
(c) chasmogamy (d) cleistogamy

40. The " eyes" of the potato tuber are

- (a) root buds (b) flower buds
(c) shoot buds (d) axillary buds

41. Wind pollination is common in

- (a) legumes (b) lilies
(c) grasses (d) orchids

42. In angiosperms, functional megaspore develops into

- (a) embryo sac (b) ovule
(c) endosperm (d) pollen sac

43. What is common between vegetative reproduction and apomixis?

- (a) both are applicable to only dicot plants
(b) both bypass the flowering phase
(c) both occur round the year
(d) both produce progeny identical to the parent.

44. Apomictic embryos in Citrus arise from

- (a) synergids (b) maternal sporophytic tissue in ovule
(c) antipodal (d) diploid egg.

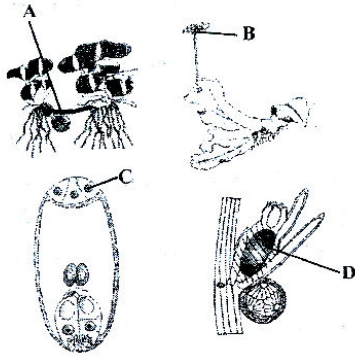
45. Transfer of pollen grains from the anther to the stigma of another flower of the same plant is called

- (a) xenogamy (b) geitonogamy
(c) karyogamy (d) autogamy

46. Wind pollinated flowers are

- (a) small, brightly coloured producing large number of pollen grains
(b) small, producing large number of dry pollen grains
(c) large producing abundant nectar and pollen
(d) small, producing nectar and dry pollen.

47. Examine the figures (A-D) given below and select the right option out of (a-d), in which all the four structure A, B, C and D are identified correctly



	A	B	C	D
(a)	rhizome	sporangiphore	polar cell	globule
(b)	runner	archegoniophore	synergid	antheridium
(c)	offset	antheridiophore	antipodals	oogonium
(d)	Sucker	seta	megaspore mother cell	gemma cup

48. Vegetative propagation in Pistia occurs by

- (a) stolon (b) offset
(c) runner (d) sucker

49. Vegetative propagation in mint occurs by

- (a) offset (b) rhizome
(c) sucker (d) runner

50. Which of the following pairs of plant structure has haploid number of chromosomes?

- (a) nucellus and antipodal cells
(b) egg nucleus and secondary nucleus
(c) megaspore mother cell and antipodal cells
(d) egg cell and antipodal cells.

51. What does the filiform apparatus do at the entrance into ovule?

- (a) It brings about opening of the pollen tube
(b) it guides pollen tube from a synergid to egg
(c) It helps in the entry of pollen tube into a synergid
(d) It prevent entry of more than one pollen tube into the embryo sac.

52. Unisexuality of flowers prevents

- (a) geitonogamy, but not xenogamy
(b) autogamy and geitonogamy
(c) autogamy, but not geitonogamy
(d) both geitonogamy and xenogamy.

53. Which of the following is resistant to enzyme action?

- (a) pollen exine (b) leaf cuticle
(c) cork (d) wood fibre.

54. Male gametes in angiosperms are formed by the division of

- (a) generative cell (b) vegetative cell
(c) microspore mother cell (d) microspore.

55. Two plants can be conclusively said to belong to the same species if they

- (a) have more than 90 per cent similar genes
(b) look similar and possess identical secondary metabolites
(c) have same number of chromosomes
(d) can reproduce freely with each other and form seeds.

56. Which of the following is surrounded by a callose wall?

- (a) male gamete (b) egg
(c) pollen grain (d) microspore mother cell.

57. Parthenocarpic tomato fruits can be produced by

- (a) treating the plants with phenylmercuric acetate
(b) removing androecium of flowers before pollen grains are released.
(c) treating the plants with low concentration of gibberellic acid and auxins
(d) raising the plants from vernalized seeds

58. In a cereal grain the single cotyledon of embryo is represented by

- (a) coleoptile (b) coleorhiza
(c) scutellum (d) prophyll

59. The arrangement of the nuclei in a normal embryo sac in the dicot plants is

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

60. What type of placentation is seen in sweet pea?

- (a) marginal (b) basal
(c) axile (d) free central

61. In which one pair both the plants can be vegetatively propagated by leaf speceis?

- (a) *Agave and kalanchoe*
- (b) *Bryophyllum and kalanchoe*
- (c) *Asparagus and Bryophyllum*
- (d) *Chrysanthemum and Agave.*

62. In a type of apomixis known as adventive embryony, embryos develop directly from the

- (a) *nucellus or int eguments*
- (b) *zygote*
- (c) *synergids or antipodals in an embryo sac*
- (d) *accessory embryo sacs in the ovule.*

63. Which one of the following represents on ovule, where the embryo sac becomes horse-shoe shaped and the funiculus and micropyle are close to each other?

- (a) *amphitropous* (b) *circinotropous*
- (c) *atropous* (d) *anatropous*

64. Through which cell of the embryo sac, does the pollen tube enter the embryo sac?

- (a) *egg cell* (b) *persis tant synergid*
- (c) *degenerated synergids* (d) *central cell*

65. When a diploid female plant is crossed with a tetraploid male, the ploidy of endosperm cells in the resulting seed is

- (a) *tetraploidy* (b) *pentaploidy*
- (c) *anatropous* (d) *orthotropous*

66. An ovule which becomes curved so that the nucellus and embryo sac lie at right angles to the funicle is

- (a) *hemitropous* (b) *campylotropous*
- (c) *anatropous* (d) *orthotropous*

67. Which of the following propagates through leaf - tip?

- (a) *walking fern* (b) *sprout – leaf plant*
- (c) *Marchantia* (d) *moss.*

68. Anthesis is a phenomenon which refers to

- (a) *reception of pollen by stigma*
- (b) *formation of pollen*
- (c) *development of anther*
- (d) *opening of flower bud.*

69 . In a flowering plant, archesporium gives rise to

- (a) *only the wall of the sporangium*
- (b) *both wall and the sporogenous cells*
- (c) *wall and the tapetum*
- (d) *only tapetum and sporogeneous cells*

70. In angiosperms pollen tube liberate their male gametes into the

- (a) *central cell* (b) *antipodal cells*
- (c) *egg cell* (c) *synergids*

71. In angiosperm all the four microspores of tetrad are covered by a layer which is formed by

- (a) *pectocellulose* (b) *callose*
- (c) *cellulose* (d) *sporopollenin*

72. What is the direction of micropyle in anatropous ovule?

- (a) *upward* (b) *downward*
- (c) *right* (d) *left*

73. Adventive embryony in Citrus is due to

- (a) *nucellus* (b) *int eguments*
- (c) *zygotic embryo* (d) *fertilized egg.*

74. In grasses what happens in microspore mother cell for the formation of mature pollen grains?

- (a) *one meiotic and two mitotic divisions*
- (b) *one meiotic and one mitotic divisons*
- (c) *one meiotic division*
- (d) *one mitotic division.*

75. Anemophily type of pollination is found in

- (a) *Salvia* (b) *bottle brush*
- (c) *Vallisnaria* (d) *coconut*

76. Endosperm is formed during the double fertilization by

- (a) *two polar nuclei and one male gamete*
- (b) *one polar nuclei and one male gamete*
- (c) *ovum and male gamete*
- (d) *two polar nuclei and two male gametes.*

77. Eight nucleated embryosac is

- (a) only monosporic (b) only bisporic
 (c) only tetrasporic (d) any of these

78. The endosperm of gymnosperm is

- (a) diploid (b) polyploid
 (c) triploid (d) haploid

79. Type of placentation in which ovary is syncarpous unilocular and ovules are on sutures is called

- (a) marginal placentation
 (b) superficial placentation
 (c) apical placentation
 (d) parietal placentation

80. An interesting modification of flower shape for insect pollination occurs in some orchids in which a male insect mistake the pattern on the orchid flower for the female species and tries to copulate with it, thereby pollinating the flower. This phenomenon is called

- (a) pseudopollination (b) pseudoparthenocarpy
 (c) mimicry (d) pseudocopulation.

(a) $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$

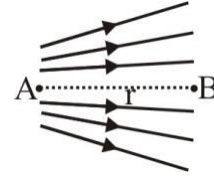
(b) $\frac{1}{2}a : \sqrt{3}a : \frac{1}{2}a$

(c) $\frac{1}{2}a : \frac{\sqrt{3}}{2}a : \frac{\sqrt{2}}{2}a$

(d) $1a : \sqrt{3}a : \sqrt{2}a$

PHYSICS

1. Figure shows the electric lines of force emerging from a charged body. If the electric field at A and B are E_A and E_B respectively and if the distance between A and B is r , then

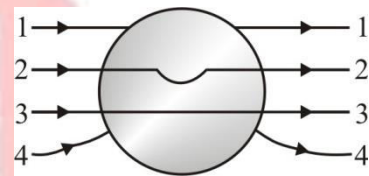


- (a) $E_A > E_B$ (b) $E_A < E_B$
 (c) $E_A = \frac{E_B}{r}$ (d) $E_A = \frac{E_B}{r^2}$

2. The separation at which the force between a proton and an electron will be 1 milli newton is

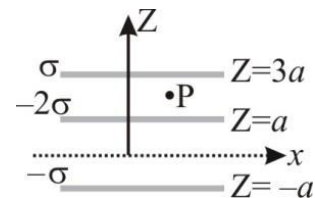
- (a) 4.8×10^{-13} m (b) 4.8×10^{-11} m
 (c) 4.9×10^{-9} m (d) 4.8×10^{-7} m

3. A metallic solid sphere is placed in a uniform electric field. The lines of force follow the path(s) shown in figure as



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

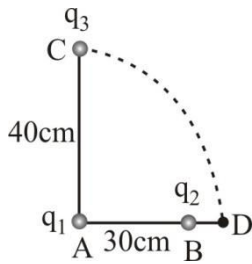
4. Three infinitely long charge sheet are placed as shown in figure. The electric field at point P is



- (a) $\frac{2\sigma}{\epsilon_0} \hat{k}$ (b) $-\frac{2\sigma}{\epsilon_0} \hat{k}$
 (c) $\frac{4\sigma}{\epsilon_0} \hat{k}$ (d) $-\frac{4\sigma}{\epsilon_0} \hat{k}$

5. Two charges q_1 and q_2 are placed 30cm apart, as shown in the figure. A third charge q_3 is moved along the arc of a circle of radius 40 cm

from C to D. The change in the potential energy of the system is $\frac{q_3}{4\pi\epsilon_0}k$, where k is

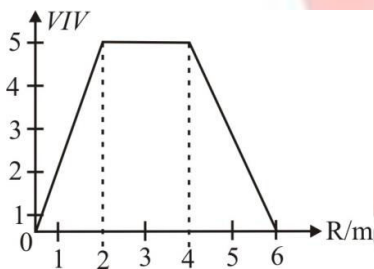


- (a) $8q_2$ (b) $8q_1$
 (c) $6q_2$ (d) $6q_1$

6. An electric field is expressed as $\vec{E} = 2\hat{i} + 3\hat{j}$. Find the potential difference ($V_A - V_B$) between two points A and B whose position vectors are given by $r_A = \hat{i} + 2\hat{j}$ and $r_B = 2\hat{i} + \hat{j} + 3\hat{k}$.

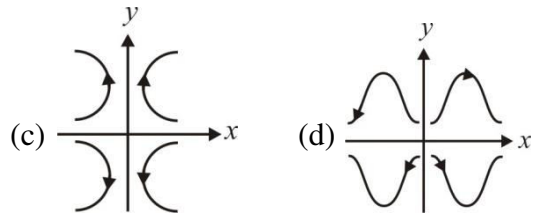
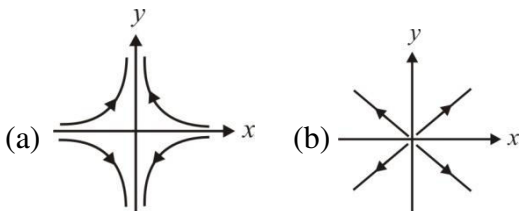
- (a) -1 V (b) 1 V
 (c) 2 V (d) 3 V

7. The variation of potential with distance R from fixed point is shown in figure. The electric field at $R = 5$ m is

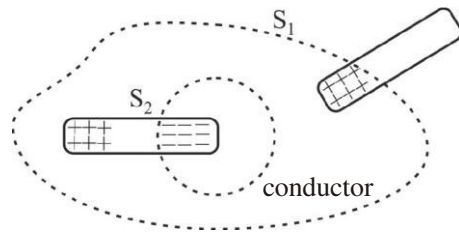


- (a) 2.5 Vm^{-1} (b) -2.5 Vm^{-1}
 (c) 0.4 Vm^{-1} (d) -0.4 Vm^{-1}

8. The potential field depends on x-and y-coordinates as $V = x^2 - y^2$. Corresponding electric field lines in x - y plane are as



9. Charge on an originally uncharged conductor is separated by holding a positively charged rod very nearby, as in figure. Assume that the induced negative charge on the conductor is equal to the positive charge q on the rod. Then, flux through surface S_1 is

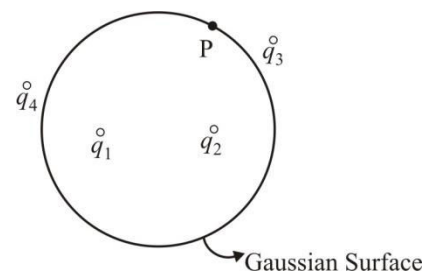


- (a) zero (b) q/ϵ_0
 (c) $-q/\epsilon_0$ (d) none of these

10. A cylinder of length L and radius b has its axis coincident with the x-axis. The electric field in this region is $\vec{E} = 200\hat{i}$. Find the flux through the left end of cylinder.

- (a) 0 (b) $200\pi b^2$
 (c) $100\pi b^2$ (d) $-200\pi b^2$

11. Consider the Gaussian surface that surrounds part of the charge distribution shown in figure. Then, the contribution to the electric field at point P arises from charges



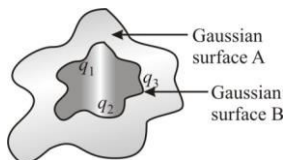
- (a) q_1 and q_2 only
 (b) q_3 and q_4 only
 (c) q_1, q_2, q_3 and q_4
 (d) none of the above

12. A charge q is distributed uniformly on a ring of radius 'a'. A sphere of equal radius 'a' is constructed with its center at the periphery of

the ring. Calculate the flux of the electric field through the surface of the sphere.

- (a) $\frac{q}{3\epsilon_0}$ (b) $\frac{2q}{3\epsilon_0}$
 (c) $\frac{q}{4\epsilon_0}$ (d) $\frac{3q}{4\epsilon_0}$

- 13 The electric flux for Gaussian surface A that enclose the charged particles in free space is (given $q_1 = -14 \text{ nC}$, $q_2 = 78.85 \text{ nC}$, $q_3 = -56 \text{ nC}$)



- (a) $10^3 \text{ Nm}^2 \text{ C}^{-1}$
 (b) $10^3 \text{ CN}^{-1} \text{ m}^{-2}$
 (c) $6.32 \times 10^3 \text{ Nm}^2 \text{ C}^{-1}$
 (d) $6.32 \times 10^3 \text{ CN}^{-1} \text{ m}^{-2}$

14. If the electric flux entering and leaving an enclosed surface respectively is ϕ_1 and ϕ_2 the electric charge inside the surface will be

- (a) $(\phi_1 + \phi_2)\epsilon_0$ (b) $(\phi_2 - \phi_1)\epsilon_0$
 (c) $(\phi_1 + \phi_2)/\epsilon_0$ (d) $(\phi_2 - \phi_1)/\epsilon_0$

15. The inward and outward electric flux for a closed surface in units of $\text{N-m}^2/\text{C}$ are respectively 8×10^3 and 4×10^3 . Then the total charge inside the surface is [where $\epsilon_0 = \text{permittivity constant}$]

- (a) $4 \times 10^3 \text{ C}$ (b) $-4 \times 10^3 \text{ C}$
 (c) $\frac{(-4 \times 10^3)}{\epsilon} \text{ C}$ (d) $-4 \times 10^3 \epsilon_0 \text{ C}$

16. A positively charged ball hangs from a long silk thread. Electric field at a certain point (at the same horizontal level of ball) due to this charge is E . Let us put a positive test charge q_0 at this point and measure F/q_0 on this charge. Then, E

- (a) $> F/q_0$ (b) $< F/q_0$
 (c) $= F/q_0$ (d) none of these

Q17. Two capacitors of $2\mu\text{F}$ and $4\mu\text{F}$ are connected in parallel. A third capacitor of $6\mu\text{F}$ is connected in series. The combination connected across a 12V battery. The voltage across $2\mu\text{F}$ capacitor is

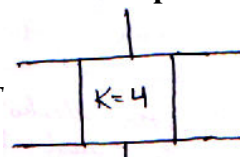
- (a) 2V (b) 8V (c) 6V (d) 1V

Q18 A $40\mu\text{F}$ capacitor in a defibrillator is charged to $3,000\text{V}$. The energy stored in the capacitor is sent through the patient during a pulse of duration 2ms . The power delivered to the patient is.

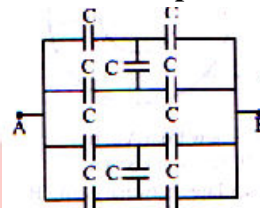
- (A) 45 kW (B) 360 kW
 (C) 180 kW (D) 90 kW

Q19. Consider a parallel plate capacitor of $10\mu\text{F}$ with air filled in the gap between the plates. Now one half of the space b/w the plates is filled with dielectric of dielectric constant 4, as shown fig. The capacity of the capacitor changes to

- (a) $25\mu\text{F}$ (b) $20\mu\text{F}$ (c) $40\mu\text{F}$
 (d) $5\mu\text{F}$

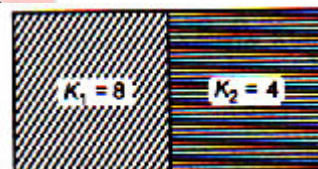


Q20. The effective capacitance of combination of equal capacitors between points A and B shown in fig is



- (a) C (b) $2C$ (c) $3C$ (d) $C/2$

Q21. A capacitor having capacitance 1 micro farad with air, is filled with two dielectric as shown. How many times capacitance will increase?



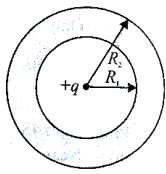
- (a) 12 (b) 6 (c) $8/3$ (d) 3

Q22. Given a number of capacitors labelled as $8\mu\text{F}-250\text{V}$. Find the minimum number of capacitors needed to get an arrangement equivalent to $16\mu\text{F}-1,000\text{V}$.

- (A) 32 (B) 16
 (C) 4 (D) 64

Q23A metallic spherical shell has an inner radius R_1 and outer radius R_2 . A charge is placed at the centre

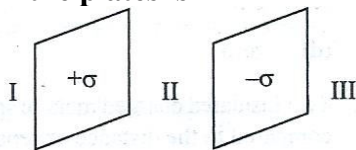
of the spherical cavity. The surface charge density on the inner surface is



- (a) $\frac{q}{4\pi R_1^2}$ (b) $\frac{-q}{4\pi R_1^2}$ (c) $\frac{q^2}{4\pi R_2^2}$ (d) $\frac{q}{4\pi R_2^2}$

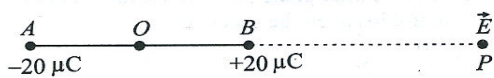
Q24. Two large thin metal plates are parallel and close to each other. On their inner faces, the plates have surface charge densities of opposite signs and magnitude

$27 \times 10^{-22} \text{ Cm}^{-2}$. The electric field \vec{E} in region II in between the plates is



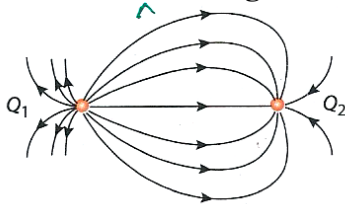
- (a) $4.25 \times 10^{-8} \text{ NC}^{-1}$ (b) $6.28 \times 10^{-10} \text{ NC}^{-1}$
 (d) $3.05 \times 10^{-10} \text{ NC}^{-1}$ (d) $5.03 \times 10^{-10} \text{ NC}^{-1}$

Q25. Two charges $\pm 20 \mu\text{C}$ are placed 10mm apart. The electric field at point P, on the axis of the dipole 10 cm away from its centre O on the side of the positive charge is



- (a) $8.6 \times 10^9 \text{ NC}^{-1}$ (b) $4.1 \times 10^6 \text{ NC}^{-1}$
 (c) $3.6 \times 10^6 \text{ NC}^{-1}$ (d) $4.6 \times 10^5 \text{ NC}^{-1}$

Q26. A few electric field lines for a system of two charges Q_1 and Q_2 fixed at two different points on the x-axis are shown in fig. These lines suggests that



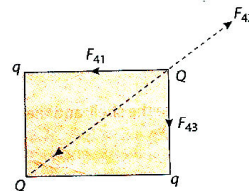
- (a) $|Q_1| > |Q_2|$
 (b) $|Q_1| < |Q_2|$
 (c) At a finite distance to the left of Q_1 , the electric field is zero.
 (d) At a finite distance to the right of Q_2 , the electric field is net zero.

Q27. A dipole of electric dipole moment p is placed in a uniform electric field of strength E . If θ is the

angle between positive directions of p and E , then the potential energy of the electric dipole is largest when θ is

- (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$ (c) π (d) zero

Q28. A charge Q is placed at each of the opposite corners of a square and a charge q is placed at each of the other two corners as shown in fig. If the net electrical force on Q is zero, then Q/q equal



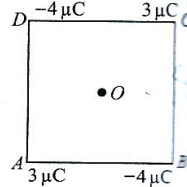
- a) $-2\sqrt{2}$ (b) -1 (c) 1 (d) $-1/\sqrt{2}$

Q29. An electric dipole is placed at an angle of 30° with an electric field of intensity $2 \times 10^5 \text{ N/C}$. It experiences a torque equal to 4 Nm . The charge on the dipole if the dipole length is 2 cm is

- (a) 8 mC (b) 4 mC (c) 6 mC (d) 2 mC

Q30. Four point charges are placed at the corners of a square ABCD of side 10 cm , as shown in figure. The force on a charge of $1 \mu\text{C}$ placed at the centre of square is

- (a) 7 N (b) 8 N (c) 2 N (d) zero



CHEMISTRY

1. Which of the following exists as covalent crystals in the solid state?

- (a) Phosphorus (b) Iodine
(c) Silicon (d) Sulphur

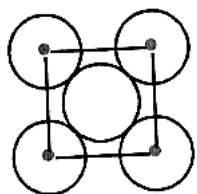
2. In a face centred cubic lattice, atom A occupies the corner positions and atom B occupies the face centre positions. If one atom of B is missing from one of the face centred points, the formula of the compound is :

- (a) AB_2 (b) A_2B_3
(c) A_2B_5 (d) A_2B

3. The fraction of the total volume occupied by the atoms present in a simple cube is

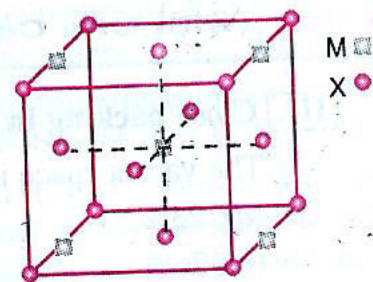
- (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{6}$
(c) $\frac{\pi}{3\sqrt{2}}$ (d) $\frac{\pi}{4\sqrt{2}}$

4. The packing efficiency of the two-dimensional square unit cell shown in the adjoining fig is.



- (a) 39.27% (b) 68.02%
(c) 74.05% (d) 78.54%

5. A compound $M_p X_q$ has cubic close packing (ccp) arrangement of X. Its unit cell structure is shown below. The empirical formula of the compound is

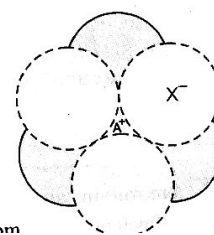


- (a) MX (b) MX_2
(c) M_2X (d) M_5X_{14}

6. If the unit cell of a mineral has a cubic close packed (ccp) array of oxygen atoms with m fraction of octahedral holes occupied by aluminium ions and n fraction of tetrahedral holes occupied by magnesium ions, m and n, respectively are

- (a) $\frac{1}{2}, \frac{1}{8}$ (b) $1, \frac{1}{4}$
(c) $\frac{1}{2}, \frac{1}{2}$ (d) $\frac{1}{4}, \frac{1}{8}$

7. The arrangement of X^- ions around A^+ ion in solid AX is given in the fig. (not drawn to scale). If the radius of X^- is 250 pm, the radius of A^+ is



- (a) 104 pm (b) 125 pm
(c) 183 pm (d) 57 pm

8. In calcium fluoride, having the fluorite structure, the coordination numbers for calcium ion (Ca^{2+}) and fluoride ion (F^-) are

- (a) 4 and 2 (b) 6 and 6
(c) 8 and 4 (d) 4 and 8

9. A solid compound XY has NaCl structure. If the radius of the cation is 100 pm, the radius of the anion (Y^-) will be

- (a) 275.1 (b) 322.5 pm
(c) 241.5 pm (d) 165.7 pm

10. A metal crystallizes with a face-centred cubic lattice. The edge of the unit cells is 408 pm. The diameter of the metal atom is

- (a) 228 pm (b) 408 pm
(c) 144 pm (d) 204 pm

11. Sodium metal crystallizes in a body-centred cubic lattice with a unit cell edge of 4.29 \AA . The radius of sodium metal is approximately

- (a) 5.72 \AA (b) 0.93 \AA
(c) 1.86 \AA (d) 3.22 \AA

12. A given metal crystallizes out with a cubic structure having edge length of 361 pm. If there are four metal atoms in one unit cell, what is the radius of one atom?

- (a) 80 pm (b) 108 pm
(c) 40 pm (d) 127 pm

13. CsCl crystallises in body-centred cubic lattice. If 'a' is its edge length then which of the following expressions is correct?

- (a) $r_{cs} + r_{Cl-} = \sqrt{3}a$
(b) $r_{cs} + r_{Cl-} = 3a$
(c) $r_{cs} + r_{Cl-} = \frac{3a}{2}$
(d) $r_{cs} + r_{Cl-} = \frac{\sqrt{3}}{2}a$

14. If 'a' stands for the edge length of the cubic system: simple cubic, body centred cubic and face-centred cubic, then the ratio of the radii of the spheres in these systems will be respectively

- (a) $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$
(b) $\frac{1}{2}a : \sqrt{3}a : \frac{1}{2}a$
(c) $\frac{1}{2}a : \frac{\sqrt{3}}{2} : \frac{\sqrt{2}}{2}a$
(d) $1a : \sqrt{3}a : \sqrt{2}a$

15. A metal has a fcc lattice. The edge length of the unit cell is 4.4 pm. The density of the metal is 2.72 g cm⁻³. The molar mass of the metal is (N_A , Avogadro's constant = $6.02 \times 10^{23} \text{ mol}^{-1}$)

- (a) 40 g mol⁻¹ (b) 30 g mol⁻¹
(c) 27 g mol⁻¹ (d) 20 g mol⁻¹

16. Lithium has a bcc structure. Its density is 530 kg m⁻³ and its atomic mass is 6.94 g mol⁻¹. Calculate the edge length of the unit cell of lithium metal ($N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$)

- (a) 527 pm (b) 264 pm
(c) 154 pm (d) 352 pm

17. If NaCl is doped with 10⁻⁴ mol% of SrCl₂, the concentration of cation vacancies will be ($N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$)

- (a) $6.02 \times 10^{14} \text{ mol}^{-1}$
(b) $6.02 \times 10^{15} \text{ mol}^{-1}$
(c) $6.02 \times 10^{16} \text{ mol}^{-1}$
(d) $6.02 \times 10^{17} \text{ mol}^{-1}$

18. Experimentally. It was found that a metal oxide has formula $M_{0.98}O$. Metal M is present as M^{2+} and M^{3+} in its oxide. Fraction of the metal which exists as M^{3+} would be

- (a) 5.08% (b) 7.01%
(c) 4.08% (d) 6.05%

19. Which of the following compound is metallic and ferromagnetic?

- (a) CrO_2 (b) VO_2
(c) MnO_2 (d) TiO_2

20. The correct statement (s) regarding defects in solids is (are)

- (a) Frenkel defects are usually favoured by a very small difference in the sizes of the cation and anion
(b) Frenkel defect is a dislocation defect
(c) Trapping of an electron in the lattice leads to the formation of F – centre
(d) Schottky defects have no effect on the physical properties of solids

21. With respect to graphite and diamond, which of the following statement (s) given below is (are) correct?

- (a) Graphite is harder than diamond
(b) Graphite is higher electrical conductivity than diamond
(c) Graphite has higher thermal conductivity than diamond
(d) Graphite has higher C – C bond order than diamond

22. The Correct Statement for cubic close packed (ccp) three-dimensional structure is (are)

- (a) The number of neighbours of an atom present in the topmost layer is 12
- (b) The efficiency of the atom packing is 74%
- (c) The number of octahedral and tetrahedral voids per atom are 1 and 2 respectively
- (d) The unit cell edge length is $2\sqrt{2}$ times the radius of the atom.

23. In the laboratory, sodium chloride is made by burning sodium in the atmosphere of chlorine. The salt obtained is yellow in colour. The cause of yellow colour is

- (a) presence of Na^+ ions in the crystal lattice
- (b) presence of Cl^- ions in the crystal lattice
- (c) presence of electron in the crystal lattice
- (d) presence of face-centred cubic crystal lattice

24. In fcc lattice of NaCl structure, if the diameter of Na^+ is x , and the radius of Cl^- is y , then the edge length of NaCl in the crystal is

- (a) $2x + 2y$ (b) $x + y$
- (c) $x + 2y$ (d) none of these

25. Gold has a close-packed structure which can be viewed as spheres occupying 0.74 of the total volume. What is the radius of gold ion if density of gold is 19.3 g/cc? (Au = 197 amu)

- (a) $1.439 \times 10^{-8} \text{ cm}$
- (b) $4.07 \times 10^{-8} \text{ cm}$
- (c) $1.017 \times 10^{-8} \text{ cm}$
- (d) $8.23 \times 10^{-8} \text{ cm}$

26. Ferrous oxide has a cubic structure. The length of edge of the unit cell is 5 \AA . The density of the oxide is 4.0 g cm^{-3} . Then the number of Fe^{2+} and O^{2-} ions present in each unit cell will be

- (a) four Fe^{2+} and four O^{2-}
- (b) two Fe^{2+} and two O^{2-}
- (c) four Fe^{2+} and two O^{2-}
- (d) two Fe^{2+} and four O^{2-}

27. KCl crystallizes in the same type of lattice as NaCl does. If $r_{\text{Na}}/r_{\text{K}}$ 0.7 then the ratio of the sides of unit cell for KCl to that for NaCl is

- (a) 1.1 (b) 0.8
- (c) 0.4 (d) 1.7

28. The arrangement of the first two layers, one above the other, in hcp and ccp arrangement is

- (a) exactly same in both cases
- (b) partly same and partly different
- (c) different from each other
- (d) nothing definite

29. In a cubic unit cell, seven of eight corner are occupied by atom A and corners of faces are occupied by B. The general formula of the substance having this type of structure would be

- (a) A_7B_6 (b) A_7B_{24}
- (c) A_7B_{12} (d) A_7B_{36}

30. Certain crystals produce electric signals on application of pressure. This phenomenon is called

- (a) pyroelectricity (b) ferroelectricity
- (c) piezoelectricity (d) ferrielectricity

NEET Answer key
Biology Answer key

1	2	3	4	5	6	7	8	9	10
b	a	d	d	b	c	d	c	b	c
11	12	13	14	15	16	17	18	19	20
d	d	a	b	c	d	d	c	d	a
21	22	23	24	25	26	27	28	29	30
a	a	b	a	c	a	d	a	c	a
31	32	33	34	35	36	37	38	39	40
b	a	a	c	a	d	c	a	d	d
41	42	43	44	45	46	47	48	49	50
c	a	d	b	b	b	c	b	c	d
51	52	53	54	55	56	57	58	59	60
b	c	a	a	d	d	c	c	c	a
61	62	63	64	65	66	67	68	69	70
b	a	a	c	a	a	a	d	b	d
71	72	73	74	75	76	77	78	79	80
a	b	a	b	d	a	d	d	a	d

PHYSICS Answer key

1	2	3	4	5	6	7	8	9	10
a	a	d	b	a	a	a	a	b	d
11	12	13	14	15	16	17	18	19	20
c	a	a	b	d	a	c	d	a	b
21	22	23	24	25	26	27	28	29	30
b	a	b	c	c	a,d	c	a	d	d

CHEMISTRY Answer key

1	2	3	4	5	6	7	8	9	10
c	c	b	d	b	a	a	c	c	a
11	12	13	14	15	16	17	18	19	20
c	d	d	a	c	d	d	c	a	b,c
21	22	23	24	25	26	27	28	29	30
b,d	b,c,d	c	c	a	a	a	a	b	c