Unit 15: Electrostatics

65 MCQs. Correct option in bold. 1 mark each.

1. The SI unit of charge is the
A. farad B. volt C. ampere **D. coulomb**

2. Electrons carry a
A. positive charge B. variable charge
C. negative charge D. no charge

3. The charge on an electron is
A. $+1.6\times10^{-19}$ C **B. -1.6×10^{-19} C**
C. -1.6×10^{19} C D. 0 C

4. Like charges
A. repel each other B. combine
C. have no force D. attract each other

5. Unlike charges
A. have no force B. repel each other
C. attract each other D. combine permanently

6. Charge cannot be created or destroyed, only
A. doubled **B. transferred**
C. reduced D. melted

7. In charging by friction, the charge that is transferred is
A. neutrons B. atoms C. protons **D. electrons**

8. When a glass rod is rubbed with silk, electrons move from
A. the glass rod to the silk B. neither
C. the rod to the air D. the silk to the glass rod

9. When a rubber rod is rubbed with animal fur, the rubber rod becomes
A. neutral B. positively charged
C. magnetic **D. negatively charged**

10. A rubber rod is rubbed with fur. The fur is brought near the bulb of an uncharged electroscope. The sign of charge on the leaves is
A. positive B. negative C. neutral D. zero

11. If you remove electrons from an object, it will have a
A. variable charge **B. positive charge**
C. negative charge D. zero charge

12. A positive ion is formed when a
A. negative atom gains an electron B. neutral atom gains a proton
C. neutral atom loses an electron D. neutral atom gains an electron

13. Materials that conduct electric charge efficiently are called
A. dielectrics only B. magnets
C. insulators **D. conductors**

14. Which of the following is an insulator?
A. Copper B. Silver **C. Rubber** D. Aluminium

15. In conductors, the valence electrons are
A. inside the nucleus **B. loosely bound to their atoms**
C. absent D. firmly attached to their atoms

16. In insulators, even the least tightly bound electrons are
A. firmly attached to their atoms B. absent
C. free to move D. moving randomly

17. The mobile electrons in a conductor are called
A. protons **B. free electrons**
C. ions D. bound electrons

18. On a non-spherical conductor, charges tend to move towards the
A. centre B. flat areas
C. more pointed areas D. hollow parts

19. The three main ways to charge objects are
A. friction, heating and cooling
B. contact, magnetism and induction
C. induction, radiation and conduction of heat
D. friction, contact and induction

20. Charging by contact is also called
A. conduction B. induction
C. polarisation D. friction

21. In charging by induction, the charge acquired by the object is
A. random B. zero
C. the same as the inducing charge **D. opposite to the inducing charge**

22. A change in the distribution of charge in an object due to nearby charges is called electrostatic
A. induction B. friction
C. radiation D. conduction

23. Earthing or grounding means
A. storing the charge
B. producing charge
C. giving the charge a path to escape into the ground
D. heating the body

24. A negatively charged object is brought close to a conductor and the opposite side is grounded. The conductor is left with
A. a negative charge **B. a positive charge**
C. a changing charge D. no charge

25. A small metal ball hangs by an insulating thread and is attracted to a positively charged rod. The ball must be
A. positive B. negative only
C. positive or neutral **D. negative or neutral**

26. A charged rod is brought near a suspended object which is repelled. The suspended object is
A. charged with the same sign B. charged with the opposite sign
C. uncharged D. neutral

27. A negatively charged sphere touches a neutral identical sphere. Afterwards the spheres will
A. attract each other B. neutralise each other
C. repel each other D. exert no force

28. An insulator can be discharged by
A. rubbing it more **B. heating it above a flame**
C. charging it more D. cooling it

29. An insulator can also be discharged by
A. exposing it to humid conditions B. exposing it to dry air
C. placing it in a dry box D. keeping it in vacuum

30. Static electricity is more noticeable on dry days because
A. humid air is hot B. dry air is a good conductor
C. dry air does not conduct charge away D. dry air has more electrons

31. Pieces of paper are attracted to a charged comb because of
A. diffraction B. radiation
C. friction **D. polarisation**

32. An electroscope is used to
A. store charge **B. detect charge on an object**
C. measure current D. produce light

33. An electroscope works on the principle that
A. heat flows to cold B. like charges attract
C. light is refracted **D. like charges repel**

34. The leaves of a charged electroscope diverge because of
A. air pressure B. attraction of unlike charges
C. repulsion of like charges D. neutral leaves

35. A negatively charged electroscope has its leaves diverge more when a _____ rod is brought near.
A. neutral **B. negatively charged**
C. positively charged D. magnetic

36. A positively charged rod brought near a negatively charged electroscope causes the leaf to
A. collapse B. diverge more
C. remain unchanged D. vibrate

37. An electroscope can be positively charged by induction using a negatively charged rod by
A. touching the disk with the rod
B. grounding the electroscope with a finger and then removing it
C. wetting it
D. heating it

38. An electric field is the region around a charge where it
A. produces heat B. emits light
C. emits sound **D. exerts a force on other charges**

39. Electric field intensity is the
A. force per unit area
B. work per unit time
C. electrostatic force per unit positive test charge
D. charge per unit force

40. The formula for electric field intensity is
A. E = F/q B. E = Fq C. E = q/F D. E = F + q

41. The SI unit of electric field intensity is
A. C N^{-1} B. N C C. J C **D. N C^{-1}**

42. The direction of the electric field at a point is the direction of force on a
A. positive test charge B. neutral charge
C. negative test charge D. moving magnet

43. Electric field lines for a positive charge are directed
A. in circles **B. away from the charge**
C. towards the charge D. parallel to the charge

44. Electric field lines for a negative charge are directed
A. in circles B. away from the charge
C. towards the charge D. perpendicular to the charge

45. The density of electric field lines indicates the
A. colour of the field **B. strength of the field**
C. charge only D. direction only

46. Inside a charged conducting sphere, the electric field is
A. maximum B. infinite
C. zero D. uniform and non-zero

47. A positive test charge of 30 μC experiences a force of 0.600 N. The electric field is
A. 2.00×10^{4} N/C B. 2.00×10^{-5} N/C
C. 0.05 N/C D. 18 N/C

48. A positive test charge experiences a force of 0.5 N in a field of 2.0 N/C. The charge is
A. 1 C B. 2.5 C C. 4 C **D. 0.25 C**

49. A charge of 3.0 μC is in a uniform field of 1.5 N/C. The force on it is
A. 0.5 μN **B. 4.5 μN** C. 2 μN D. 4.5 N

50. An electron experiences a force of 0.01 N. The electric field strength is (e = 1.6×10^{-19} C)
A. 1.6×10^{17} N/C B. 1.6×10^{-21} N/C
C. 6.25×10^{16} N/C D. 6.25×10^{-17} N/C

51. The force on an electron in a uniform field of 20 N/C is
A. 3.2×10^{-17} N B. 3.2×10^{-19} N
C. 8×10^{-21} N **D. 3.2×10^{-18} N**

52. A charge of -1.0×10^{-4} C is in a field of 1.7×10^{4} N/C directed right. The force is
A. 1.7 N to the left B. 0.17 N to the left
C. 17 N to the left D. 1.7 N to the right

53. An electrostatic precipitator is used to
A. detect charge B. make photocopies
C. remove dust from smoke in chimneys D. produce electricity

54. Most photocopy machines use an electrostatic process called
A. xerography B. radiography
C. photography D. lithography

55. Selenium acts as a photoconductor, meaning it is an insulator in the dark and a _____ in light.
A. insulator **B. conductor**
C. magnet D. semiconductor only in dark

56. A faint glow around sharp points of conductors at high voltage is called
A. Lichtenberg figure B. static charge
C. lightning **D. corona discharge**

57. Corona discharge is most likely to occur at
A. smooth spheres **B. sharp points**
C. flat surfaces D. insulated areas

58. Branching tree-like patterns formed on insulators by high-voltage discharges are called
A. corona discharge B. step leaders
C. Lichtenberg figures D. streamers

59. Lightning occurs when charges separate in clouds, with positive charges rising to the
A. ground B. bottom of the cloud
C. middle only **D. top of the cloud**

60. The zigzag path of excess electrons travelling from the cloud base to the ground is called a
A. step leader B. streamer
C. corona D. sprite

61. In lightning, negative charge may move to the ground at speeds up to about
A. 100 km/s B. 1000 km/s
C. 100,000 km/s D. 10 km/s

62. A lightning rod was invented by
A. Michael Faraday B. Robert Van de Graaff
C. Charles Coulomb **D. Benjamin Franklin**

63. A lightning rod protects a building by providing
A. a safe path for current to the ground B. a source of lightning
C. heat D. a store for charge

64. To be safe during a lightning storm, it is best to be
A. in the middle of a grassy meadow **B. inside a metal car**
C. next to a tall tree D. on a metal observation tower

65. The hair of a person touching a Van de Graaff generator lifts because the strands
A. are magnetised
B. are attracted to the dome
C. have the same charge and repel each other
D. are heated