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2019-20

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PG-TRB-PHYSICS-2019-20

Duration :1/2 hour **MODEL TEST** **Max.Marks:50**

1. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

a.1/2 b.2/5 C.8/5 d.9/20 ANS.D

2. A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

a.10/2 1 b.11/21 C.2/7 d.5/7 ANS.A

3. In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green?

a.1/3 b.3/4 C.7/19 d.8/21 ANS.A

4. What is the probability of getting a sum 9 from two throws of a dice?

a.1/6 b.1/8 C.1/9 d.1/12 ANS.C

5. Three unbiased coins are tossed. What is the probability of getting at most two heads?

a.3/4 b.1/4 C.3/8 d.7/8 ANS.D

6. Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even?

a.1/2 b.3/4 C.3/8 d.5/16 ANS.B

7. In a class, there are 15 boys and 10 girls. Three students are selected at random. The probability that 1 girl and 2 boys are selected, is:

a.21/46 b.25/117 C.1/50 d.3/25 ANS.A

8. In a lottery, there are 10 prizes and 25 blanks. A lottery is drawn at random. What is the probability of getting a prize?

a.1/10 b.2/5 C.2/7 d.5/7 ANS.C

9. From a pack of 52 cards, two cards are drawn together at random. What is the probability of both the cards being kings?

a.1/15 b.25/57 C.35/256 d.1/221 ANS.d

10. Two dice are tossed. The probability that the total score is a prime number is:

a.1/6 b.5/12 C.1/2 d.7/9 ANS.b

11. A card is drawn from a pack of 52 cards. The probability of getting a queen of club or a king of heart is:

a.1/13 b.2/13 C.1/26 d.1/52 ANS.c

12. A bag contains 4 white, 5 red and 6 blue balls. Three balls are drawn at random from the bag. The probability that all of them are red, is:

a.1/22 b.3/22 C.2/91 d.2/77 ANS.c

13. Two cards are drawn together from a pack of 52 cards. The probability that one is a spade and one is a heart, is:

a.3/20 b.29/34 C.47/100 d.13/102 ANS.c

14. One card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is a face card (Jack, Queen and King only)?

a.1/13 b.3/13 C.1/4 d.9/52 ANS.b

15. A bag contains 6 black and 8 white balls. One ball is drawn at random. What is the probability that the ball drawn is white?

a.3/4 b.4/7 C.1/8 d.3/7 ANS.b

16. Consider an anti-symmetric tensor *Pij* with indices *i* and *j* running from 1 to 5. The number of independent components of the tensor is

(a) 3 (b) 10 (c) 9 (d) 6 Ans: (b)

17.For the set of all Lorentz transformations with velocities along the *x*-axis consider the two statements given below:

P:If L is a Lorentz transformation then, L^{-1} is also a Lorentz transformation.

Q:If $L1$ and $L2$ are Lorentz transformations then, $L1L2$ is necessarily a Lorentz transformation.
Choose the correct option

(A) P is true and Q is false (B) Both P and Q are true
(C) Both P and Q are false (D) P is false and Q is true Ans:(b)

18. The number of non-zero rows in an echlon form is called ?

(a) rank of a matrix (b) cofactor of the matrix
(c) reduced echlon form (d)conjugate of the matrix Ans.A

19.Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

(a).1/2 (b).2/5 (c).8/15 (d).9/20 Ans.D

20. A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

(a).10/21 (b).11/21 (c).2/7 (d).5/7 Ans.A

21. The SI standard of time is based on:

(a). the daily rotation of the earth (b). the frequency of light emitted by Kr86
(c). the yearly revolution of the earth about the sun (d). none of these Ans:D

22. A nanosecond is:

A. 10^{9} s B. 10^{-9} s C. 10^{-10} s D. 10^{-10} s Ans: B

23. The SI standard of length is based on:

A. the distance from the north pole to the equator along a meridian passing through Paris
B. wavelength of light emitted by Hg198
C. wavelength of light emitted by Kr86
D. the speed of light Ans: D

24. In 1866, the U. S. Congress defined the U. S. yard as exactly 3600/3937 international meter. This was done primarily because:

A. length can be measured more accurately in meters than in yards
B. the meter is more stable than the yard
C. this definition relates the common U. S. length units to a more widely used system
D. there are more wavelengths in a yard than in a meter Ans: C

25. Which of the following is closest to a yard in length?

A. 0.01m B. 0.1m C. 1m D.0.001m Ans.c

26. A current carrying coil is subjected to a uniform magnetic field. The coil will orient so that its plane becomes ?

(a) inclined at 45° to the magnetic field
(b) inclined at any arbitrary angle to the magnetic field
(c) parallel to the magnetic field
(d) perpendicular to magnetic field Ans:c

27. Tesla is the unit of

(a) magnetic flux (b) magnetic field
(c) magnetic induction (d) magnetic moment Ans:b

28. Energy in a current carrying coil is stored in the form of?

(a) electric field (b) magnetic field (c) dielectric strength (d) heat Ans:b

29. The total charge induced in a conducting loop when it is moved in magnetic field depends on?

(a) the rate of change of magnetic flux
(b) initial magnetic flux only
(c) the total change in magnetic flux
(d) final magnetic flux only. Ans:c

30. The magnetic induction at a point P which is at the distance of 4 cm from a long current carrying wire is 10-3 T. The field of induction at a distance 12 cm from the current will be ?

(a) 3.33 x 10-4 T (b) 1.11x 10-4 T (c) 3×10-3 T (d) 9×10-3 T Ans:a

31. A charge moving with velocity v in X-direction is subjected to a field of magnetic induction in negative X-direction. As a result, the charge will

(a) remain unaffected (b) start moving in a circular path in Y—Z plane
(c) retard along X-axis (d) moving along a helical path around X-axis Ans:a

32. A uniform magnetic field acts right angles to the direction of motion of electrons. As a result, the electron moves in a circular path of radius 2cm. If the speed of electrons is doubled, then the radius of the circular path will be ?

(a)2.0 cm (b) 0.5 cm (c)4.0cm (d) 1.0cm Ans:c

33. A deuteron of kinetic energy 50 keV is describing a circular orbit of radius 0.5 metre in a plane perpendicular to magnetic field B. The kinetic energy of the proton that describes a circular orbit of radius 0.5 metre in the same plane with the same B is

(a)25 keV (b) 50 keV (c)200 keV (d) 100 keV Ans:d

34. A straight wire of length 0.5 metre and carrying a current of 1.2 ampere is placed in uniform magnetic field of induction 2 Tesla. The magnetic field is perpendicular to the length of the wire. The force on the wire is ?

(a) 2.4N (b) 1.2N (c) 3.0 N (d) 2.0 N Ans:b

35. To convert a galvanometer into an ammeter, one needs to connect a ?

(a) low resistance in parallel (b) high resistance in parallel
(c) low resistance in series (d) high resistance in series. Ans:a

36. A coil carrying electric current is placed in uniform magnetic field

(a) torque is formed (B) e.m.f is induced
(c) both (a) and (b) are correct (d) none of the above Ans:a

37. The magnetic field at a distance ‘r’ from a long wire carrying current ‘i’ is 0.4 Tesla. The magnetic field at a distance ‘2r’ is ?

(a)0.2Tesla (b) 0.8 Tesla (c)0.1 Tesla (d) 1.6 Tesla Ans:a

38. A electron enters a region where magnetic (B) and electric (E) fields are mutually perpendicular, then ?

(a) it will always move in the direction of B

(b) it will always move in the direction of E
(c) it always possesses circular motion
(d) it can go un deflected also. Ans:d

39. A straight wire of diameter 0.5 mm carrying a current of 1 A is replaced by another wire of I mm diameter carrying same current. The strength of magnetic field far away is?

(a) twice the earlier value (b) same as the earlier value
(c) one-half of the earlier value (d) one-quarter of the earlier value Ans:b

40. At what distance from a long straight wire carrying a current of 12 A will the magnetic field be equal to 3×10-6 Wb/metre Square

(a) 8×10-2 m (b) 12×10-2 m (c)18x 10-2 m (d) 24×10-2 m Ans:a

41. An electron moves in a circular orbit with a uniform speed v. It produces a magnetic field B at the centre of the circle. The radius of the circle is proportional to ?

(a) √(B/v) (b) B/v (c) √(v/B) (d)v/B Ans:d

42. A 10 eV electron is circulating in a plane at right angles to a uniform field at magnetic induction 10-4 Wb/m2 (= 1.0 gauss). The orbital radius of the electron is ?

(a) 12cm (b) 16cm (c) 11cm (d) 18cm Ans:c

43. A galvanometer acting as a voltmeter will have?

(a) a low resistance in series with its coil.
(b) a high resistance in parallel with its coil
(c) a high resistance in series with its coil
(d) a low resistance in parallel with its coil Ans:c

44. A beam of electrons is moving with constant velocity in a region having simultaneous perpendicular electric and magnetic fields of strength 20 Vm-1 and 0.5 T respectively at right angles to the direction of motion of the electrons. Then the velocity of electrons must be?

(a) 8m/s (b) 20 m/s (c) 40m/s (d) 1/40 m/s Ans:c

45. A galvanometer of resistance 20 Ohms gives full scale deflection with a current of 0.004 A. To convert it into an ammeter of range 1 A, the required shunt resistance should be?

(a) 0.38 Ohms (b) 0.21 Ohms (c) 0.08 Ohms (d) 0.05 Ohms Ans:c

46. A long solenoid carrying a current produces a magnetic field B along its axis. If the current is doubled and the number of turns per cm is halved, the new value of the magnetic field is ?

(a) 4B (b) B/2 (c)both inside and outside the pipe (d) no where

Ans:b

47. A charged particle moves through a magnetic field in a direction perpendicular to it. Then the

(a) velocity remains unchanged
(b) speed of the particle remains unchanged
(c) direction of the particle remains unchanged
(d) acceleration remains unchanged

Ans:b

48. Two long parallel wires P and Q are both perpendicular to the plane of the paper with distance of 5 m between them. If P and Q carry current of 2.5 amp and 5 amp respectively in the same direction, then the magnetic field at a point half-way between the wires is ?

(a)3μ/2Π (b)μ/Π (c)√3μ/2Π (d)μ/2Π Ans:a

49. A proton moving with a velocity 3 x 105 m/s enters a magnetic field of 0.3 Tesla at an angle of 30° with the field. The radius of curvature of its path will be (e/m for proton – 108 C/kg)

(a)2cm (b) 0.5 cm (c)0.02 cm (d) 1.25 cm Ans:b

50. A charged particle of charge q and mass m enters perpendicularly in a magnetic field B. Kinetic energy of the particle is E; then frequency of rotation is?

(a)qB/mΠ (b) qB/2mΠ (c)qBE/2mΠ (d) qB/2EΠ Ans:b

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