GGSIPU physics 2007

1. The width of the diffraction band varies

a inversely as the wavelength

b directly as the width of the slit

c directly as the distance between the slit and the scre en

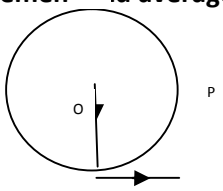
d inversely as the size of the source from which the slit is illuminated

2. An unpolarised beam of intensity I_0 is incident on a pair of nicols making an angle of 60^0 with each other.The intensity of light emerging from the pair is

a I_0 b $I_0/2$

c $I_0/4$ d $I_0/8$

3. A cyclist stats trom the centre O of a circular park of radius 1 km,reaches the edge P of the park,then cycles along the circumference and returns to the centre along QO as shown I the figure.If the round trip takes 10 min,the net displacemen Q id average speed of the cyclistin meter and kilometer per hour are



a 0,1

b $\frac{\pi+4}{2}$, 0

c 21.4, $\frac{\pi+4}{2}$

d 0, 21.4

4. A beam of light of wavelength 600 nm from a distant source falls on a single slit 1 nm wide and the resulting diffraction pattern is observed on a screen 2m away.The distance between the first dark finges on either side of the central bright frings is :

a 1.2 cm b 1 .2 mm

c 2.4 cm d 2.4 mm

5. The physical quantity having the dimensions [$M^{-1}L^{-3}T^{3}A^{2}$] is :

a resistance b resistivity

c electrically conductivity

d electromotive force

6. A battery of emf 10 V and internal resistance 3 Ω is connected to a resistor.The current in the circuit is 0.5 A.The terminal voltage of the battery when the circuit is closed is :

a 10 V b zero

c 1.5 V d 8.5 V

7. A galvanometer coil has a resistance of 15 Ω and gives full scale deflection for a current of 4mA.To convert it to an ammeter of range 0 to 6 A

a 10 m Ω resistance is to be connected in parallel to the galvanometer

b 10 m Ω resistance is to be connected in series with the galvanometer

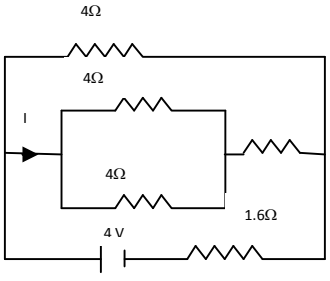
c 0.1 Ω resistance is to be connected in parallel to the galvanometer

d 0.1 Ω resistance is to be connected in series with the galvanometer

8. A straight wire of mass 200 g and length 1.5 m carries a current of 2 A.It is suspended in mid air by a uniform horizontal magnetic field B.The magnitude of Bin tesla is assume that = 9.8 ms $^{-2}$

a 2 b 1.5 c 0.55 d 0.65

9. In the circuit shown the value of I in ampere is :



a 1 b 0.60

c 0.4 d 1.5

10. A sphere encloses an electric dipole with in it.The total flux across the sphere Is

a zero

b h alf that due to a single charge

c double that due to a single charge

d dependent on the position of th e dipole

11. A parallel plate air capacitor has a capacitance C.Whenit is half filled with a dielectric of dielectric constant 5,the percentage increases in the capacitance will be

a 400% b 66.6%

c 33.3% d 200%

12. A comb run through one's dry hair attracts small bits of paper.This is due to small bits of paper.This is due to

a comb is a good conductor

b paper is a good conductor

c the atoms in the paper get polarized by the charged comb

d the comb possesses magnetic properties

13. The specific charge of a proton is $9.6X10^{7}$ C kg^{-1} The specific charge of an alpha particle will be :

a 9.6 X 10 ^{7} Ckg^{-1}

b 19.2 X 10 ^{7} Ckg^{-1}

c 4.8 X 10 ^{7} Ckg^{-1}

d 2.4 X 10 ^{7} Ckg^{-1}

14. When light of wavelength 300 nm falls on a photoelectric emitter ,photoelectrons are liberated.For another emitter ,light of wavelength 600 nm is sufficient for liberating photoelectrons .The ratio of the work function of the two emitters is :

a 1:2 b 2:1

c 4:1 d 1:4

15. Whight light is passed through a dilute solution of potassium permagnate.The spectrum produced by the emergent light is :

a band emission spectrum

b line emission spectrum

c band absorption spectrum

d line absorption spectrum

16. If λ_1 and λ_2 are the wavelengths of the first members of theLyman and Paschen series respectively,then $\lambda_1 : \lambda_2$ is :

a 1:3 b 1:30

c 7:50 d 7:108

17. Activity of a radioactive sample decreases to 1/3 rd of its original value in 3 days.Then,in 9 days its activity will become :

a 1/27 of the original value

b 1/9 of the original value

c 1/18 of the original value

d 1/3 of the original value

18. In a transistor the collector current is always less than the emitter current bcause

a collector side is reverse biased and the emitter side is forward based

b a few electrons are lost in the base a nd only remaining ones reach the collector

c collector bein reverse biased ,attracts less electrons

d collector side is forward biased and emitter side is reserve biased

19. A transparent cube of 0.21 m edge contains a small air bubble .Its apparent distance whenviewd through one face of the cube is 0.10 m and when viewed from the opposite face is 0.04 m.The actual distance of the bubble from the second face of the cube is :

a o.o6 m b 0.17 m

c 0.05 m d 0.04 m

20. White light is incident on one of the refracting surfaces of a prism of of angle 5^0.If the refractive indices for red and blue colours are 1.641 and 1.659 respectively,the angular separation between these two colours when they emerge out of the prism is :

a 0.9 ^{0} b 0.09 ^{0}

c 1.8 ^{0} d 1.2 ^{0}

21. For a given lens,the magnification was found to be twice as large as when the object was 0.15 m distant from it as when the distance was 0.2 m.The focal length of the lens is

a 1.5 m b 0.20 m

c 0.10 m d 0.05 m

22. To a fish under water ,viewing obliquely a fisherman standing on the bank of a lake ,the man looks

a taller than what he actually is

b shorter than what he actually is

c the same height as he actually is

d depenend on the obliquity

23. A thin prism p_1 with angle 4^0 made from a glass of refractive index 1.54 is combined with another thin prism p_2 made from glass of refractive index 1.72 to produce dispersion without deviation.The angle of the prism p_2 is

a 5.33 ^{0} b 4 ^{0}

c 3 ^{0} d 2.6 ^{0}

24. Specific rotation of sugar solution is 0.5 deg m^2/kg.200 kg-m^{-3} of impure sugar solution is taken In a sample polarimeter tube of length 20 cm and optical rotation is found to be 19^0.The percentage of purity of sugar is :

a 20% b 80%

c 95% d 89%

25. A simple pendulum has a length l and the mass of the bob is m.The bob is given a charge of q coulomb.The pendulum is suspended between the vertical eplates of charged parallel plates capacitor.If E is the electric field strength between the plates,the time period of the pendulum is given by :

a $2\ \pi\sqrt{\frac{l}{g}}$ b $2\ \pi\sqrt{\frac{l}{\sqrt{g+\frac{qE}{m}}}}$

c $2\pi\sqrt{\frac{l}{\sqrt{g-\frac{qE}{m}}}}$ d $2\ \pi\sqrt{\frac{l}{\sqrt{g^2+\left(\frac{qE}{m}\right)^2}}}$

26. A satellite in a circular orbit of radius R has a period of 4 h.Another satellite with orbital radius 3 R around the same planet will have a period in hours

a 16 b **4**

c 4 $\sqrt{7}$ **d 4 $\sqrt{8}$**

27. A freezer in a refrigerator is located at the top section so that

a the entire chamber of the refrigerator is cooled quickly due to convection

b the motor is not heated

c the heat gained from the environment is high

d the heat gained from the environment I low

28. The unit of Stefan's constant is

a $Wm^{-2}K^{-1}$ **b WmK^{-4}**

c $Wm^{-2}K^{-4}$ **d $Nm^{-2}K^{-4}$**

29. A monoatomaic gas is suddenly compressed to 1/8 th of its initial volume adiabatically.The ratio of its final pressure to the initial pressure is given the ratio of the specific heats of the given gas to be 5/3

a 32 **b 40/3**

c 24/5 **d 8**

30. A carnot engine takes heat from a reservoir at 627^0 C and rejects heat to a sink at 27^0 C.Its efficiency will be

a 3/5 **b 1/3**

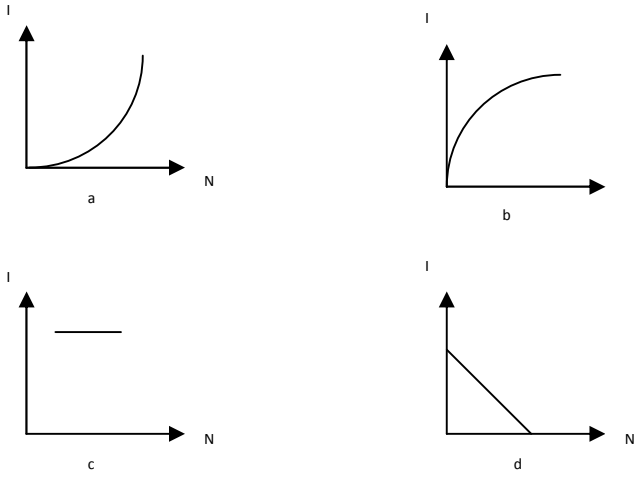
c 2/3 **d 200/209**

31. A 30 V,90 W lamp is to be operated on a 120 V DC line.For proper glow,a resistor of ….. Ω should be connected in series with the lamp .

a 40 **b 10**

c 20 **d 30**

32. A battery consists of a variable number n of identical cells,each having an internal resistance r connected in series.The terminals of the battery are short-circuited.A graph of current I in the circuit versus the number of cells with be as shown in figure



33. A tuning fork A produces 4 beat/s with another tuning fork B of frequency 320 H_z.On filing one of the prongs of A,4 beat/s are again heard when sounded with the same fork B.Then the frequency of the fork A before filing is :

a 328 H_z **b 316 H_z**

c 324 H_z **d 320 H_z**

34. When the length of the vibrating segment of a sonometer wie is increased by 1%,the percentage change in its frequency is ;

a $\frac{100}{101}$ **b** $\frac{99}{100}$

c 1 **d 2**

35. The sprinkling of water reduces slightly the temperature of a closed room because

a temperature of water is less than that of the room

b specific heat of water is high

c wate r has large latent heat of vaborisation

d water is bad conductor of heat

36. The equation of a simple harmonic wave is given by y = 5sin $\frac{\pi}{2}$100t – x,where x and y are in meter and time is in second.The period of the wave in second will be

a 0.04 b 0.01

c 1 d 5

37. The loudness and pitch of a sound note depends on

a intensity and frequency

b frequency and number of harmonics

c intensity and velocity

d frequency and velocity

38. For ordinary terrestrial experiment,the observe in an inertial frame in the following cases is

a a child revolving in a giant wheel

b a driver in a sports car moving with a constant high speed of 200 kmh^{-1} on a straight rod

c the pilot of an aeropla ne which is taking off

d a cyclist negotiating a sharp curve

39. A rectangular vassel when full of water ,takes 10 min to be emptied through an orifice in its buttom.How much time will it take to be emptied when half filled with water ?

a 9 min b 7 min

c 5 min d 3 min

40. If there were no gravity ,which of the following will not be there for a fluid ?

a Viscosity b Suraface tension

c Pressure d Archimede's upward trust

41. In a LGR series circuit,the potential difference between the terminals of the inductance is 60 V,between the terminals of the capacitor is 30 V and that across the resistance is 40 V.Then,supply voltage will be equal to

a 50 V **b 70 V**

c 130 V **d 10 V**

42. When deuterium and helium are subjected to an accelerating field simultaneously,then

a both acquire same energy

b deuterium accelerates faster

c helium accelerates faster

d neither of them is accelerated

43. A solenoid 1.5 m long and o.4 cm in diameter possesses 10 turns per cm length.A current of 5 A falls through it.The magnetic field at the axis inside the solenoid is

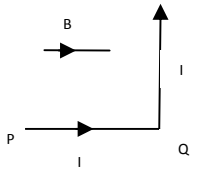
a 2 π X 10^{-3} T **b 2 π X 10^{-5} T**

c 4 π X 10^{-2} T **d 4 π X 10^{-3} T**

44. A wire PQR is bent as shown in figure and is placed in a region of uniform magnetic field B.The length of PQ=QR=l.A current I ampere shown.The magnitude of the force on PQ ar QR will be

a BIL, O **b 2BIL, O**

c O, BIL **d O,O**



45. A choke is preferred to a resistance for limiting current in AC circuit because

a choke is cheap

b there is no wastage of power

c choke is compact in sijze

d choke is good absorber of heat

46. To a germanium crystal equal number of aluminium and indium atoms are added.Then

a it remains an intrinsic semiconductor

b it becomes a n-type semiconductor

c it becomes a p -type semiconductor

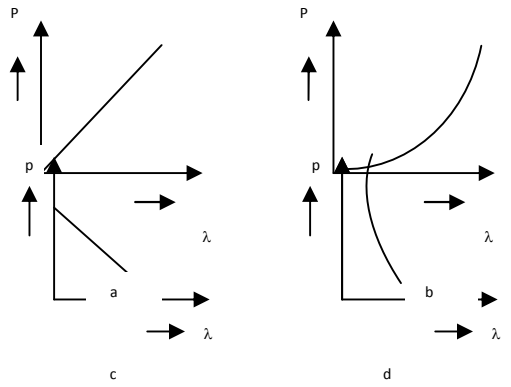
d it becomes an insulator

47. maximum velocity of the photoelectrons emitted by a metal surface is 1.2 X 10^6 ms^{-1}. Assuming the specific charge of the electron to be 1.8 X 10^{11} Ckg^{-1}.The value of the stopping potential in volt will be

a 2 b 3

c 4 d 6

48. Which of the following figure represents the variation of particle momentum and associated de-Broglie wavelength?



49. The team liquid crystal refers to a state that is intermediate between

a crystalline solid and amorphous liquid

b crystalline solid and vapour

c amorphous liquid and its vapour

d a crystal immersed in a liquid

50. If r_1 and r_2 are the radii of the atomic nuclei of mass number 64 and 125 respectively,then the ratio r_1/r_2 is

a $\frac{64}{125}$ **b** $\sqrt{\frac{64}{125}}$

c $\frac{5}{4}$ **d** $\frac{4}{5}$