PHYSICS

BOOKS - UNITED BOOK HOUSE

QUESTION PAPER 2017

Exercise

1. Radio wave of fixed amplitude can be produced by-

A. using filter

B. using rectifier

C. using FET

D. using oscillator

Answer:

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2. For a transistor if β =100, the α will be-

A. 0.99

B. 1.01

C. 100

D. 0.01

Answer:

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3. A radioactive element emits 2 α-particles and 3 β-particles . The values of atomic number (Z) and mass number (A) of the new element will be

A. (A/5),(z-1

B. (A-5),(z+1

C. (A-5),(z+1

D. (A-5),(z+1

Answer:

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4. When green light is incident on a certain metal surface electrons are emitted but no

electrons are emitted with yellow light. IF red light is incident on the same metal surface-

A. more energetic electrons will be emitted

B. less energetic electons will be emitted

C. emission of electrons will depend on the intensity of light

D. no electrons will be emitted.

Answer:

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5. A paralles beam of white light falls on one face of a prism. The light emerging from the other face suffers-

A. Angular deviation, no dispersion

B. disperson, no angular derviation

C. both dispersion and angular deviation

D. none of these

Answer:

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6. A luminous object is separated from a screen by a distance D. What is the greatest focal length that a lens should have to focus the image of the object on the screen?

A. D/4

B. D/2

C. D

D. 4D

Answer:

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7. Electro magnetic wave does not carry-

A. energy

B. charge

C. information

D. momentum

Answer:

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8. If L and R denote inductance and resistance respectively, then the dimension of $\frac{L}{R}$ is

A. $M^0L^0T^0$

B. $M^2L^2T^2$

C. $M^1L^1T^2$

D. $M^1L^1T^2$

Answer:

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9. A proton with a speed of 2×10^{7} m.s-1 enters a magnetic field of flux density $1.5Wb.\, m^{-2}$, making an angle of 30° with the field. The force acting on the proton is

A. 2.4×10^{-14}N

B. 2.4×10^{-12}N

C. 0.024×10^{-24}N

D. 24×10^{-12}N

Answer:

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10. A straight conductor of length l m carrying a current 1A is bent in the form of a semicircle. The magnetic field (in tesla) at the centre of the semicircle is-

A. $\frac{\pi^2}{L} \times 10^7$

B. $\frac{\pi^I}{I^2} \times 10^{-7}$

C. $\pi^2 \frac{I}{I} \times 10^{-7}$

D. $\pi^2 \frac{I^2}{I} \times 10^{-7}$

Answer:

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11. Mutual inductance of two coils can be increased by

A. decreasing the number of turns on the coils

B. increasing the number of turns on the coils

C. winding the coils on the wooden core

D. none of these.

Answer:

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12. Two capacitors of capacitances C_1 and C_2, are connected in parallel. A charge q given to the combination is distributed between the two. The ratio between this charges on the two capacitors is

A. $\frac{C_1}{C_2}$

B. $\frac{C_2}{C_1}$

C. $\frac{C_1}{C_2}s$

D. $\frac{C_1}{C_2}$

Answer:

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13. The number of electrons in 2 coulomb of charge is-

A. 12.5X10^18

B. $12.5X$10_19`

C. $12.5X$10^18`

D. $12.5X$10^19`

Answer:

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14. Write down the values of $\left(\overline{X}+X\right)$ and $\left(X.\overline{X}\right)$ in Boolean algebra.

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15. The cirtical angle of a transparent crystal for green light is 30°. Find the angle of polarisation of that crystal.

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16. What will be the change in focal length f of a concave mirror when immerged in a liquid of refractive index n?

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17. State one difference between a dynamo and a motor.

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18. On what physical quantity does the magnetic moment of an electron revolving in an orbit depend ?

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19. Is Burlow's wheel a motor? Give reason.

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20. Very high or very low resistance cannot be measured correctly by using the Wheatstone bridge principle Give reason .

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21. Define the corrent sensitivity and voltage sensitivity of a moving coil galvanometer.

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22. What are the quantities that oscillate in an electromagnetic wave? Show by means of a diagram, the relative orientation of the directions of the electric vector, magnetic vector and propagation of the electromagnetic wave.

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23. The small ozone layer on top of the stratosphere is crucial for human survival. Why?

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24. The voltage applied across the cathode and anode of an X-ray generating machine is 50,000 V. Determine the shortest wavelength

of the X-ray emitted. Given $h = 6.62 \times 10^{-34}$ js.

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25. Write the basic nuclear process of neutron undergoing β-decay . Why is the detection of neutrons found very difficult ?

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26. Define amplitude modulation. The height of a TV tower is 125 metre. Find the maximum distance up to which transmitted signal from the tower is available (Radius of the earth= $6.4 \times 10^6 m$)

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27. Define surface density of electric charge.

Two large conducting spheres carrying charges Q_1 and Q_2 are brought close to each

other. Is the magnitude of the electrostatic force between them exactly given by $\frac{Q_1 Q_2}{4\pi\varepsilon_0 r^2}$ where r is the distance betwen their centres?

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28. Define dielectric constant. Two charges $\pm 20 \times 10^{-6} C$, placed 2 mm apart from an electric dipole. Determine the electric field at a point 10 cm away from the centre of the dipole on its perpendicular bisector. Given, $\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 N.m^2.C^{-2}$

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29. Define dielectric polarisation.

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30. Deduce an expression from the potential energy stored in a parallel plate capacitor.

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31. What is cyclotron frequency? It is possible for a cyclotron to accelerate neutrons?

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32. Write down the mathematical form of Ampere's circuital law related to magnetic field produced by electric current.

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33. Define electromagnetic unit of current.

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34. A wire of length 'l' is bent in the form a circular loop. With a number of turns and is suspended in a magnetic field of intensity B. Find the expression for the maximum torque produced on the circular loop when a current 'I' is passed through it.

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35. State one defect of Huygens wave theory.

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36. State that laws of reflection of light .State the laws of refraction of light.

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37. Define resolving power of an optical instrument.

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38. The resolving power of a microscope at 6000 $\overset{\circ}{A}$ is 10^4. What is its resolving power at 4000 $\overset{\circ}{A}$?

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39. Under what condition will the object and image always be on the same side of the focus of a concave mirror?

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40. An image of size 1/n times the object size is formed in a convex mirror. If r is the radius of curvature of the mirror what would be the object distance?

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41. Why is red light used as danger signal?

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42. Explain by using graph the minimum angle of deviation of a ray of light passing through a prism. (Graph sheet is not required.)

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43. Production of X-rays and emissions of electron in photoelectric effect are two opposite phenomena." Justify the statement.

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44. Find the energy required by an electron to have its de Broglie wavelength reduced from $10^{-10}m$ to $0.5 \times 10^{-10}m$.

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45. State the features of photoelectric effect

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46. In a magnetic field the curvature of the path of a β- particle is greater than that of a α -particle of the same speed. Expalin why.

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47. What will be the wavelength of the light emitted due to a transition of electron from n=3 orbit to n=2 orbit in hydrogen atom ? Given : in the Rydbeg constant for hydrogen atom is $R_H = 1.09 \times 10^7 m^{-1}$.

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48. Which kind of nuclear reaction produces energy in a nuclear reactor?

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49. In a nuclear decay, a nucleus emits one α-particle and then two β-particles one after another. Show that the final nucleus is an isotope of former nucleus.

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50. If two inputs of a NAND gate are joined, what type of a gate is formed?

Draw the V-I characteristic curve for forward

and reverse bias of a p-n junction diode. (Graph sheet is not required.)

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51. State one difference between n-type and p-type semiconductors.

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52. In a transistor emitter-base junction is always forward biased while the collector-base

junction is reverse biased. Why ?

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53. Show that equivalent resistance in parallel combination is always less than each of the individual resistances connected in the combination.

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54. How can the sensitivity of a potentimeter be increased ?

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55. A Potentiometer has 10 wires each of 1 metre length and the total resistance is 20Ω. Find the resistance to be connected to the driving battery of emf 2 volts to produce a potential drop of 1 μV per millimetre. (Graph sheet is not required).

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56. Draw a graph representing the change in specific resistance with temperature.

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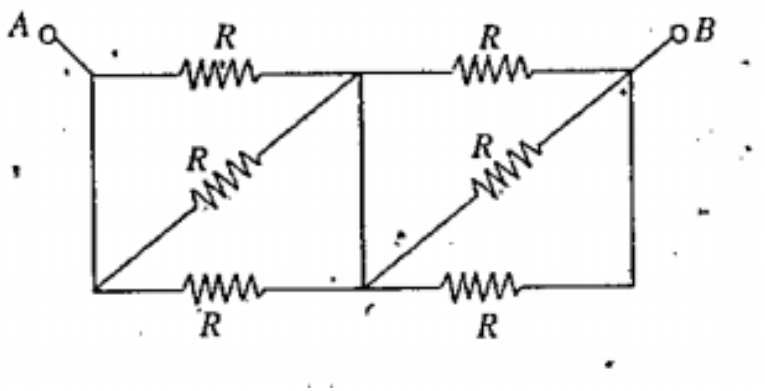
57. Find the equivalent resistance between the two ends A and B of the following circuit.



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58. Define lost volt,State the factors on which the internal resistance of a cell depends.

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59. Define Wattless current.

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60. Show that Lenz's law obeys the law of conservation of enrgy.

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61. Show that in a.c. circuit the, average power dissipated per cycle in a pure inductor is zero.

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62. Compare between inductive reactance and capacitive reactance.

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63. State the factors on which the peak value of alternating emf depend.

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64. In an LCR series combination, $R = 400\Omega$, L=100 mH and `C=1muF. This combination is connected to a 25 sin 2000t volt voltage source. Find (1) the impedance of the circuit and the

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65. In an LCR series combination, $R = 400\Omega$, L=100 mH and `C=1muF. This combination is connected to a 25 sin 2000t volt voltage

source. Find(ii) the peak value of the circuit current.

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66. With diagram, state the reason for short sightedness and mention its remedies.

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67. In a certain midium the path difference 5×10^{-5} cm corresponds to a phase

difference π. Estimate the speed of the light waves of frequency 3×10^{14} Hz in the medium.

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68. The optic axes of two polaroids are inclined at an angle of 45° with each other. Unpolarised light of intensity I_0 being incident on the first polaroid emerges from the second polaroid. Find the intesity of the emergent light.

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