JEE Main 2024 Physics Question Paper Jan 29 Shift 2 (B.E./B.Tech)

JEE Main Physics Questions

Ques 1. An electromagnetic wave has electric field given by $\vec{E} = (9.6\hat{j})\sin\left[2\pi\left\{30\times10^{6}t - \frac{1}{10}x\right\}\right]$ **, x and t are in SI units. The maximum magnetic field is**

A. 3.2 × 10−8
B. 9.6 × 10−8
C. 1.7 × 10−8
D. 10−7

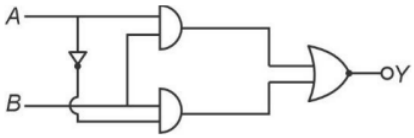
Ans. A

Ques 2. A planet at distance r from sun takes 200 days to complete one revolution around sun. What will be time period for a planet at distance r/4 from the sun?

A. 50 days
B. 25 days
C. 100 days
D. 12.5 days

Ans. B

Ques 3. The truth table for the combination of logical gates



A.

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

B.

A	B	Y
0	0	0
0	1	0
1	0	1
1	1	1

C.

A	B	Y
0	0	0
0	1	1
1	0	0
1	1	1

D.

A	B	Y
0	0	0
0	1	1
1	0	0
1	1	0

Ans. C

Ques 4. A uniform wire has length L and radius r. It is acted on by a force F as shown. The elongation is l. If F and r are both halved, the new elongation will be :

A. Δl/2
B. Δl
C. 4Δl
D. 2Δl

Ans. D

Ques 5. Two forces F1 and F2 are applied on two rods P and Q of same materials such that elongation in rods are same. If ratio of their radii is x : y and ratio of length is m : n, then ratio of F1 : F2 is

A. $(y/x)^2$ n/m
B. $(x/y)^2$ n/m
C. $(y/x)^2$ m/n
D. $(y/x)^2$ m/n

Ans. B

Ques 6. In a simple pendulum of length 10 m, the string is initially kept horizontal and the bob is released. 10% of energy is lost till the bob reaches the lowest position. Then find the speed of the bob at the lowest position.

A. 6 m/s
B. $6\sqrt{5}$ m/s
C. $7\sqrt{5}$ m/s
D. $4\sqrt{2}$ m/s

Ans. B

Ques 7. The intensity at each slit is equal for a YDSE and it is maximum I_{max} at 7π central maxima. If I is intensity for phase difference 7π/2 between two waves on screen. Then I/I_{max} is?

A. ½
B. ¼
C. ⅜
D. $1/\sqrt{2}$

Ans. A

Ques 8. Two charged particles A and B have charge q each while masses are m1 & m2. Both have same velocity v and enter into a transverse magnetic field B such that their radii are r1 & r2. Then the ratio m1 : m2 is

A. r_2/r_1
B. $(r_1/r_2)^2$
C. r_1/r_2
D. $(r_2/r_1)^2$

Ans. C

Ques 9. A liquid drop of radius R is divided into 27 identical drops. If surface tension of the drops is T, then find work done in this process.

A. $4\pi R^2T$
B. $3\pi R^2T$
C. $8\pi R^2T$
D. $1/8\pi R^2T$

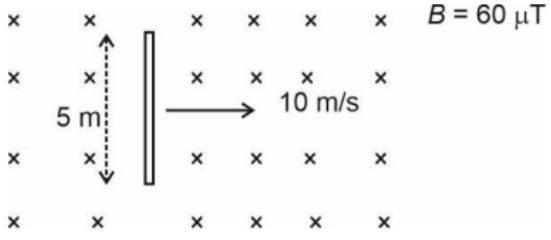
Ans. C

Ques 10. Alternating voltage and current in circuit is given as V = (100 sin ωt) volt
I = 100sin(ωt+π/3)mA
Find average power dissipated in circuit.

A. 2.5 w
B. 5 w
C. 10 w
D. 20 w

Ans. A

Ques 11. Consider a rod moving in a magnetic field as shown:

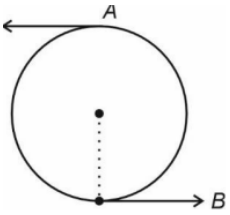


The induced emf across the ends of the rod is

A. 3 mV
B. 6 mV
C. 0 V
D. 1 mV

Ans. A

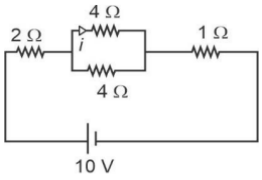
Ques 12. A particle connected with light thread is performing vertical circular motion. Speed at point B (Lowermost point) is of just sufficient, so that it is able to complete its circular motion. Ignoring air friction, find the ratio of kinetic energy at A to that at B. (A being top-most point)



A. 1 : 5
B. 5 : 1
C. 1: 7√2
D. 1: 5√2

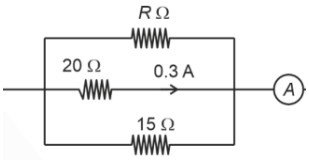
Ans. A

Ques 13. In given circuit, an ideal battery is connected with four resistances as shown. Find current i as mentioned in diagram.



A. 2 A
B. 1 A
C. 4 A
D. 0.5 A

Ans. B

Ques 14. Consider the circuit shown : 

. The ammeter reads 0.9 A. Value of R is

Ans. 30

Ques 15.Distance between twice-magnified virtual image of an object placed in front of mirror is 15 cm. Find focal length of spherical mirror in cm.

Ans. 10