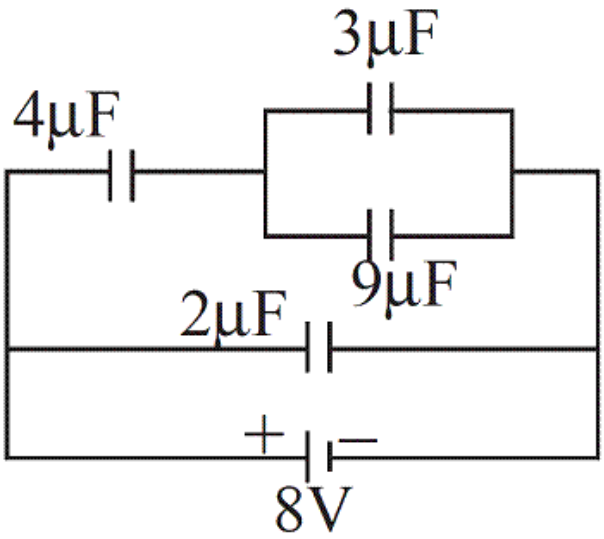
NEET-2020 Model Paper-1

Physics

1) A combination of capacitor is set up as shown in the figure. The magnitude of the electric field, due to a point charge Q (having a charge equal to the sum of the charges on the 4õF and 9õF capacitors), at a point distance 30 m from it, would equal:



1. 360 N/C
2. 420 N/C
3. 480 N/C
4. 240 N/C

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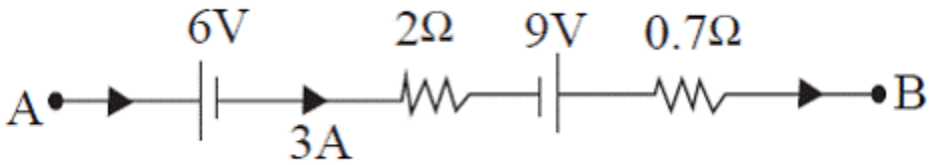
2) The potential difference between points A and B in the figure is:



1. 3 V
2. 15 V
3. -5.1 V
4. +5.1 V

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3) A source of sound produces waves of wavelength 48 cm. This source is moving towards north with speed one-fourth that of sound. The apparent wavelength of the waves to an observer standing south of the moving source will be:

1. 60 cm

2. 72 cm
3. 48 cm
4. 96 cm

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4) If the efficiency of a carnot engine is 'h' and coefficient of performance of a refrigerator is 'a' then the relation between them is:

1. $\eta = \frac{1}{1-\alpha}$
2. $\eta = \frac{1}{1+\alpha}$
3. $\eta=1+\alpha$
4. $\eta=1-\alpha$

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5) An ideal gas is found to obey the additional law VP^3 = constant. The gas is initially at a temperature T and volume V. When it expands to volume 8V, its temperature becomes:

1. T
2. $\sqrt{3}$ T
3. $\sqrt{8}$ T
4. 4T

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6) Along the X-axis, three charges $\frac{q}{2}, -q, \text{ and } \frac{q}{2}$ are placed at *x* = 0, *x* = a and *x* = 2a respectively. The resultant electric potential at a point 'P' located at a distance r from the charge -q (a << r) is ($\in 0$is the permittivity of free space)

1. $\frac{qa}{4\pi\in_0 r^2}$
2. $\frac{qa^2}{4\pi\in_0 r^3}$
3. $\frac{q\left(\frac{a^2}{4}\right)}{4\pi\in_0 r^3}$
4. $\frac{q}{4\pi\in_0 r}$

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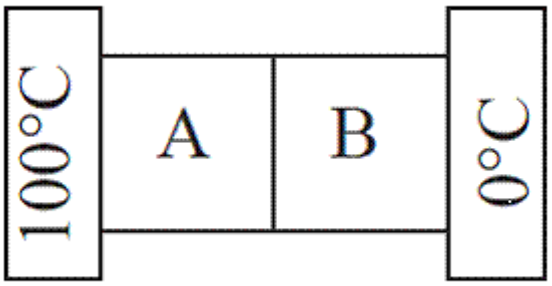
7) Two cubes A and B of the same size are arranged as shown in the figure. If KA = 300 W m^{-1} °C^{-1} and KB = 200 W m^{-1} °C^{-1}, then at steady state the interface temperature will be:



1. 45°C
2. 90°C
3. 60°C
4. 30°C

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8) Two charges q and -q are kept apart. Then at any point on the perpendicular bisector of line joining the two charges:

1. The electric field strength is zero
2. The electric potential is zero
3. Both electric potential and electric field strength are zero
4. Both electric potential and electric field strength are non-zero

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9) When a monochromatic point source of light is at a distance of 0.2 m from a photoelectric cell, the cut-off voltage and the saturation current are respectively 0.6 volt and 18.0 mA. If the same source is placed 0.6m away from the photoelectric cell, then which of the following are true?

a) The stopping potential will be 0.2 volt
b) The stopping potential will be 0.6 volt
c) The saturation current will be 6.0 mA
d) The saturation current will be 2.0 mA

1. a and c are true
2. b and c are true
3. a and d are true
4. b and d are true

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10) Let g be the acceleration due to gravity at earth's surface and k be the rotational kinetic energy of the earth. If the earth's radius decreases by 2% mass remaining the same, then:

1. g decreases by 2% and k decreases by 4%
2. g decreases by 4% and k increases by 2%
3. g increases by 4% and k decreases by 4%
4. g increases by 4% and k increases by 4%

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11) A light ray of wavelength λ is passing through a pin hole of diameter 'D' and the effect is observed on a screen placed at a distance 'L' from the pin hole. The approximations of geometrical optics are applicable if:

1. $D \leq 1$

2. $\frac{L\lambda}{D^2} = 1$
3. $\frac{L\lambda}{D^2} << 1$
4. $\frac{L\lambda}{D^2} >> 1$

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12) A ball 'A' of mass 'm' moving along positive X-direction with kinetic energy 'K' and momentum P undergoes elastic head on collision with a stationary ball B of mass M.

After collision the ball A moves along negative X- direction with kinetic energy $\frac{K}{9}$ Final momentum of B is:

1. P
2. $\frac{P}{3}$
3. $\frac{4P}{3}$
4. 4P

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13) A shell is thrown vertically up. The shell at the highest point explodes into two equal fragments. The centre of mass of the two fragments:

1. Goes further up and then falls
2. Falls down with an initial speed
3. Falls down with zero initial velocity
4. Comes to rest

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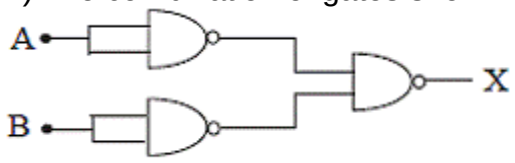
14) The combination of gates shown below yields:



1. OR gate
2. NOT gate
3. XOR gate
4. NAND gate

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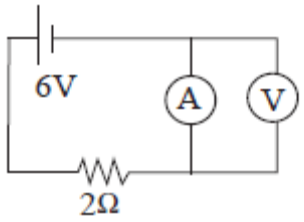
15) In the circuit shown, if devices are ideal which of the following are true?



A) Ammeter reading is 3 A.

B) Voltmeter reading is zero
C) Ammeter reading is zero
D) Voltmeter reading is 4 V
1. A and B are true
2. C and D are true
3. A and D are true
4. B and C are true

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16) For a certain organ pipe, three successive resonance frequencies are observed at 270, 450 and 630 Hz respectively. The length of pipe is: (approximately)
(speed of sound in air = 330 $ms^{-1)}$
1. 1m
2. 1.5 m
3. 2 m
4. 2.75 m

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17) In an experiment with potentiometer to measure the internal resistance of a cell, when the cell is shunted by 5 W resistance, the null point is obtained at 2 m. When the cell is shunted by 20W resistance, the null point is obtained at 3 m. The internal resistance of cell is:
1. 2Ω
2. 4Ω
3. 6Ω
4. 8Ω

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18) A microscope consists of an objective of focal length 1.9 cm and eye piece of focal length 5 cm. The two lenses are kept at a distance of 10.5 cm. If the image is to be formed at the least distance of distinct vision, the distance at which the object is to be placed before the objective is: (Least distance of distinct vision is 25 cm)
1. 6.2 cm
2. 2.7 cm
3. 21.0 cm
4. 4.17 cm

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19) The natural frequency of an LC circuit is 100 KHZ when the capacitor is totally filled with a dielectric material, the natural frequency decreases by 50 KHZ. Then the Dielectric constant of the material is:
1. 2
2. 4
3. 1.15
4. 0.5

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20) The explosion of an atom bomb released an energy of 7.6×10^{14} J. If on the average, 200 MeV energy is released in one fission of U^{235} atom, (i) the number of Uranium atoms fissioned and (ii) the mass of Uranium used in the bomb are respectively:
1. 2.375×10^{20}, 9.3 kg
2. 2.375×10^{25}, 9.3 kg
3. 2.375×10^{23}, 0.93 kg
4. 2.375×10^{25}, 0.93 kg

21) The radio activity of a sample is 'X' at a time 't_1' and 'Y' at a time 't_2'. If the mean life time of the specimen is t, the number of atoms that have disintegrated in the time interval (t_1- t_2) is:

1. Xt_1-Xt_2
2. X-Y
3. $\frac{X-Y}{\tau}$
4. $(X-Y)\tau$

22) In pure rolling motion on horizontal plane the fraction of total kinetic energy associated with rotation is 'a' for disc and 'b' for solid sphere. Then $\frac{\alpha}{\beta}$ is:

1. $\frac{2}{3}$
2. $\frac{3}{5}$
3. $\frac{5}{7}$
4. $\frac{7}{6}$

23) When a long straight uniform rod is connected across an ideal cell, the drift velocity of electrons in it is V. If a uniform hole is made along the axis of the rod and the same battery is used, then the drift velocity of electron becomes?

1. V
2. > V
3. < V
4. Zero

24) Drops of liquid of density d1 are floating half immersed in a liquid of density d2. If r is the radius of the liquid drop, the surface tension of that liquid is:

1. $\frac{(d_1-d_2)gr^2}{3}$
2. $\frac{(d_1-2d_2)gr^2}{3}$
3. $\frac{(2d_1-d_2)gr^2}{3}$
4. $\frac{2(d_1+d_2)gr^2}{3}$

25) If C, R, L and I denote Capacity, Resistance, Inductance and Electric current respectively, the quantities having the same dimensions of time are:

a) CR

b) $\frac{L}{R}$
c) $\sqrt{LC}$
d) LI^2
[1] a, b only
[2] a, c only
1. a, d only
2. a, b, c

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26) A particle is projected from the ground with velocity 'u' making an angle 'q' with the horizontal. At half of its maximum height which of the following is correct?
1. Its horizontal velocity is $u\cos\theta$
2. Its vertical velocity is $\frac{u\sin\theta}{\sqrt{2}}$
3. Its velocity is $u\left(\frac{1+\cos^2\theta}{2}\right)^{1/2}$
4. All of these are true

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27) The displacement of a particle executing SHM is given by y = 5sin $t=\frac{T}{4}$. If T is the time period and the mass of the particle is 2 gms, the kinetic energy of the particle when $t=\frac{T}{4}$ is given by:
1. 0.4 Joule
2. 0.5 Joule
3. 3 Joule
4. 0.3 Joule

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28) A charge q is spread uniformly over an isolated ring of radius 'R'. The ring is rotated about its natural axis with an angular velocity 'ω'. Magnetic dipole moment of the ring is:
1. $q\omega R^2$
2. $\frac{q\omega R^2}{2}$
3. $\frac{q\omega}{2R}$
4. $\frac{q\omega R}{2}$

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29) A mass of 2 kg oscillates on a spring with force constant 50 N/m. By what percentage the frequency of oscillation decreases when a damping force with a constant b = 16 is introduced?
1. 10 %
2. 20 %
3. 30 %

4. 40 %

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30) A constant voltage of 50V is applied to a series L-R circuit at t = 0, by closing a switch. What is the potential difference across the resistor and the inductor at time t = 0?

1. 0 V, 50 V
2. 50V, 0V
3. 35V, 15V
4. 25V, 25V

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31) Identify the correct order in which the value of normal reaction increases when object is placed on rough horizontal surface.

a) The object is pushed with the force F at an angle q with the horizontal.
b) The object is pulled with the force F at an angle q with the horizontal.
c) The object is pushed down with the force F normally.
d) The object is pushed up with the force F normally.

1. a, b, c, d
2. d, b, a, c
3. a, c, b, d
4. b, d, c, a

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32) If a transmitting antenna of height 105 m is placed on a hill, then its coverage area is:

1. 3264 km^2
2. 4224 km^2
3. 6400 km^2
4. 4864 km^2

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33) A sphere of material of relative density 8 has a concentric spherical cavity and just sinks in water. If the radius of the sphere is 2 cm, then the volume of the cavity is:

1. $\frac{76}{3} cm^3$
2. $\frac{88}{3} cm^3$
3. $\frac{79}{3} cm^3$
4. $\frac{82}{3} cm^3$

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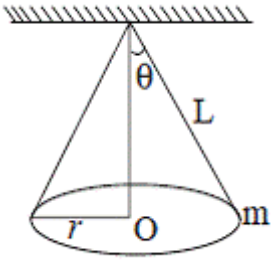
34) A particle of mass 'm' is suspended from a ceiling through a string of length 'L'. If the particle moves in a horizontal circle of radius 'r' as shown in the figure, then speed of the particle is



1. $r\sqrt{\frac{g}{\sqrt{L^2-r^2}}}$
2. $g\sqrt{\frac{r}{\sqrt{L^2-r^2}}}$
3. $r\sqrt{\frac{g}{L^2-r^2}}$
4. $g\sqrt{\frac{r}{L^2-r^2}}$

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35) Two bodies of masses 'm' and '9m' are placed at a distance 'r'. The gravitational potential at a point on the line joining them, where gravitational field is zero, is: (G is universal gravitational constant)

1. $\frac{-14Gm}{r}$
2. $\frac{-16Gm}{r}$
3. $\frac{-12Gm}{r}$
4. $\frac{-8Gm}{r}$

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36) On a temperature scale y, water freezes at -160°y and boils at - 50°y. On this y scale, at temperature of 340 k is:

1. -160.3°y
2. -96.3°y
3. -86.3°y
4. -76.3°y

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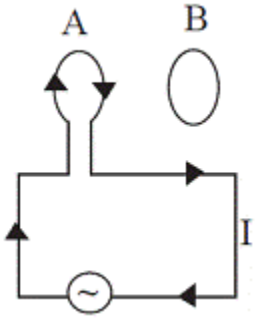
37) A loop of flexible conducting wire lies in a magnetic field of 2.0 T with its plane perpendicular to the field. The length of the wire is 1 m. when a current of 1.1A is passed through the loop, it opens into a circle, then the tension developed in the wire is:

1. 0.15 N
2. 0.25 N
3. 0.35 N
4. 0.45 N

38) Two circular coils A and B are facing each other as shown in the figure. The current I through A can be altered. Then:



1. There will be repulsion between A and B if I is increased
2. There will be attraction between A and B if I is increased
3. There will be neither attraction nor repulsion when I is changed
4. Attraction or repulsion between A and B depends on the direction of current. It does not depend whether the current is increased or decreased

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39) Statement (A): Hooke's Law can be applied to the free surface of a liquid.
Statement (B): Angle of contact between a liquid and solid at constant temperature depends on nature of both solid and liquid.
1. A, B both are true
2. A, B both are false
3. A is false, B is true
4. A is true, B is false

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40) When the absolute temperature of the source of a Carnot heat engine is increased by 25%, its efficiency increased by 80%. The new efficiency of the engine is:
1. 12%
2. 36%
3. 24%
4. 48%

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41) A car, starting from rest, has a constant acceleration a1 for a time interval t1 during which it covers a distance s1. In the next time interval t2, the car has a constant retardation a2 and comes to rest after covering a distance s2 in time t2. If the total distance covered by the car is s, the maximum speed attained by it will be:

1. $\left(2s.\frac{a_1a_2}{a_1+a_2}\right)^{1/2}$
2. $\left(2s.\frac{a_1a_2}{a_1-a_2}\right)^{1/2}$
3. $\left(\frac{s}{2}.\frac{a_1a_2}{a_1+a_2}\right)^{1/2}$

4. $\left(\frac{s}{2}\cdot\frac{a_1a_2}{a_1-a_2}\right)^{1/2}$

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42) A diatomic gas (g =1.4) does 200J work when it is expanded isobarically. The heat given to the gas in this process is

1. 1050 J
2. 700 J
3. 1200 J
4. 500 J

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43) A motor car moves with the same speed on (i) a horizontal level bridge, (ii) a concave bridge and (iii) a convex bridge. If F_1, F_2 and F_3 are forces exerted by the car on the bridges when it is at the centre of the bridge, then:

1. $F_1 > F_2 > F_3$
2. $F_2 > F_1 > F_3$
3. $F_3 > F_1 > F_2$
4. $F_2 > F_3 > F_1$

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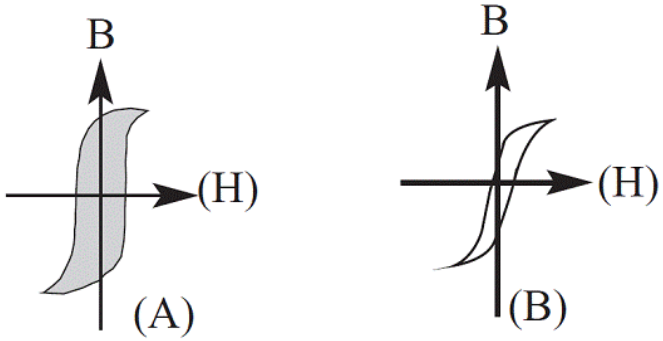
44) Hysteresis loops for two magnetic materials A and B are given below:



These materials are used to make magnets for electric generators, transformer core and electromagnet core. Then it is proper to use:

1. A for electromagnets and B for electric generators
2. A for transformers and B for electric generators
3. B for electromagnets and transformers
4. A for electric generators and transformers

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45) Arrange the following electromagnetic radiation per quantum in the order of increasing energy:

A) Blue light B) Yellow light C) X - ray D) Radio wave

1. A, B, D, C
2. C, A, B, D
3. B, A, D, C
4. D, B, A, C

Physics

1) 2	2) 3	3) 1	4) 2	5) 4	6) 2	7) 3	8) 2	9) 4	10) 4	11) 3	12) 3
13) 3	14) 1	15) 1	16) 1	17) 2	18) 2	19) 2	20) 2	21) 4	22) 4	23) 2	24) 3
25) 2	26) 4	27) 4	28) 2	29) 4	30) 1	31) 2	32) 2	33) 2	34) 1	35) 2	36) 3
37) 3	38) 1	39) 3	40) 2	41) 1	42) 2	43) 2	44) 3	45) 4			