Based on
FTS-07 Code A & B

Aakash + BYJU'S

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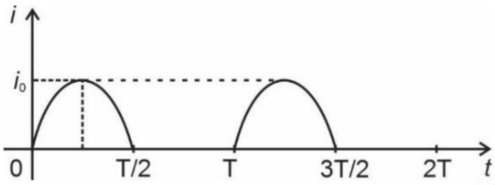
CONCEPT STRENGTHENING SHEET

CSS-04

PHYSICS

Q.16 (Code-B) rms value

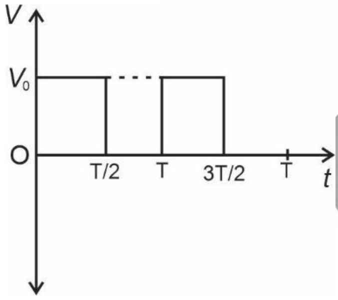
1. Variation of a sinusoidal current with time is shown in the graph below. The rms value of the current from t = 0 to t = T is



(1) i_0 (2) $\frac{i_0}{\sqrt{2}}$

(3) $\frac{i_0}{2}$ (4) $\frac{i_0}{2\sqrt{2}}$

2. Determine the rms value of potential difference V as shown in graph from t = 0 to = T is



(1) $\frac{V_0}{\sqrt{2}}$ (2) $\frac{V_0}{\sqrt{3}}$

(3) $\frac{V_0}{2}$ (4) V_0

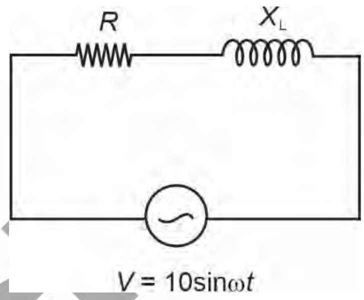
3. In an ac circuit, Alternating current is given as I = 3sin ωt + 4 cos ωt. Determine the rms value of current?

(1) $\frac{3}{\sqrt{2}}$ A (2) $\frac{4}{\sqrt{2}}$ A

(3) $\frac{5}{\sqrt{2}}$ A (4) $\frac{7}{\sqrt{2}}$ A

Q.13 (Code-B) AC voltage applied to capacitor/Inductor

1. An ac circuit having supply voltage V, consists of resistor of resistance 4 Ω and inductor of reactance 3 Ω as shown in figure. The voltage across the inductor at $t = \frac{2\pi}{\omega}$ s is



(1) 5 V (2) 9.6 V

(3) 4.8 V (4) 10 V

2. A series R–C circuit is connected to an alternating voltage source. Consider two situations

(a) When the capacitor is air filled

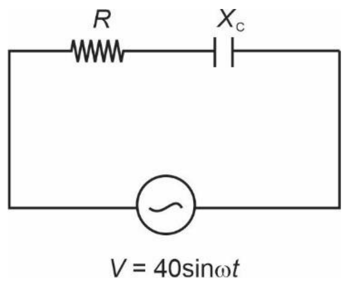
(b) When the capacitor is mica filled

Current passing through the resistor is I and voltage drop on capacitor is V. Then

(1) $V_a > V_b$ (2) $V_a < V_b$

(3) $V_a = V_b$ (4) Can't be predicted

3. An ac circuit having supply voltage V, consist of capacitor of reactance 10 Ω and resistor of resistance 10 Ω as shown in figure. The voltage across the capacitor at time $t = \frac{\pi}{\omega}$ s is



(1) $10\sqrt{2}$ V (2) 20 V

(3) $20\sqrt{2}$ V (4) 40 V

Q.4 (Code-B) Transformers

1. A transformer with 8 : 1 turns ratio has 50 Hz, 100 volt input. The frequency of output is

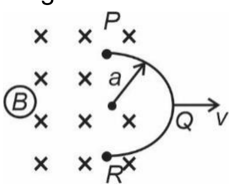
(1) 40 Hz (2) 50 Hz

(3) 400 Hz (4) 500 Hz

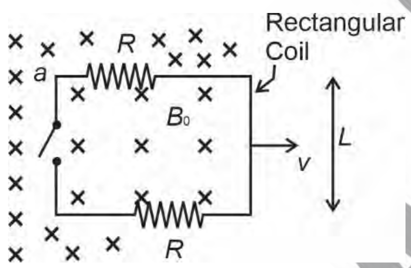
2. A dc voltage of 20 V is applied to primary coil of a transformer of turn ratio 4 : 1. The voltage in secondary coil will be
   (1) 20 V (2) 5 V
   (3) 80 V (4) Zero
3. The primary winding of transformer has 100 turns whereas its secondary coil has 1000 turns. The primary coil is connected to an ac supply of 10 V; 50 Hz. The secondary coil will have output of
   (1) 10 V ; 500 Hz (2) 100 V; 500 Hz
   (3) 100 V; 50 Hz (4) 10 V; 50 Hz

Q.20 (Code-A) Motional EMF

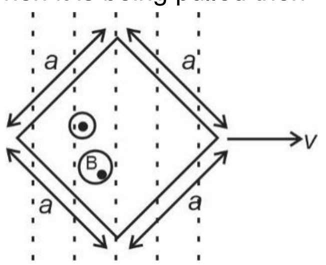
1. A semicircular conducting ring PQR of radius a is coming out of the uniform magnetic field. The potential difference developed across the ring when it is coming out



   (1) Increases with time (2) Decreases with time
   (3) Remains constant (4) No emf is induced
2. Magnetic field B_0 exists perpendicular to plane of coil as shown in the figure. The coil is coming out of magnetic field at steady speed. The instantaneous current in circuit when key is closed is



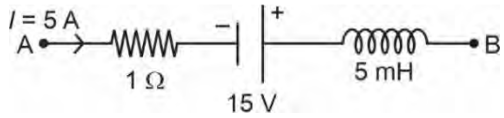
   (1) $\frac{B_0Lv}{R}$ (2) $\frac{B_0Lv}{2R}$
   (3) $\frac{2B_0Lv}{R}$ (4) Zero
3. A square conducting frame of uniform thickness and homogeneous material is pulled from a magnetic field at a constant velocity as shown in figure. When it is being pulled then



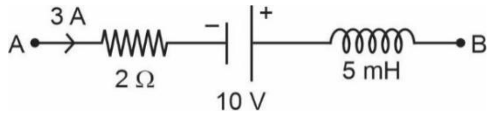
   (1) Magnitude of current remains constant but its direction reverses
   (2) Magnitude of current changes but direction remains constant
   (3) Magnitude of current as well as its direction changes
   (4) No current is induced in loop

Q.12 (Code-B) Induced EMF

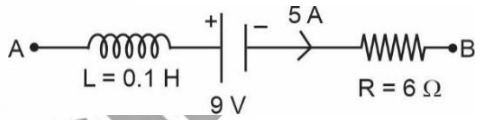
1. The network shown in figure is part of a complete circuit. If at a certain instant, the current I is 5A and decreasing at a rate of 10^3 A/s then $V_B – V_A$ is



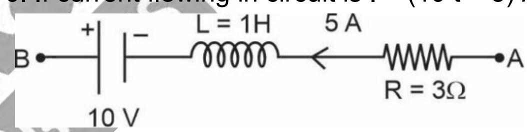
   (1) 20 V (2) 15 V
   (3) 10 V (4) –15 V
2. The network shown in figure is a part of complete circuit. If at certain instant, the current is 3A and it is increasing at a rate of 200 A/s, then potential difference ($V_A – V_B$) is



   (1) –3 V (2) 6 V
   (3) –5 V (4) 15 V
3. The network shown in figure is part of a complete circuit. If at instant current is 5 A and decreasing at rate of 100 A/s and the potential of end B is 5 V then potential of end A is



   (1) 29 V (2) 34 V
   (3) 19 V (4) 30 V
4. The network shown in figure is part of a complete circuit. What is potential difference ($V_B – V_A$) at t = 0. If current flowing in circuit is I = (10 t + 5) A



   (1) 15 V (2) 5 V
   (3) –5 V (4) –15 V

Q.21 (Code-B) Eddy Currents

1. The induced circulating currents produced in metal itself due to change in magnetic flux linked with metal are called
   (1) Displacement current
   (2) Conduction current
   (3) Foucault currents
   (4) Alternating currents
2. Eddy currents can be minimised by
   (1) Reducing relative motion between core and magnet in an electric motor
   (2) By make the core of thin laminations
   (3) By increasing the conductor cross-sectional area
   (4) Both (1) and (2) are correct
3. The eddy currents are helpful in some applications but cannot be used in other. One in which eddy currents are not used is
   (1) Electromagnetic braking in trains
   (2) Induction furnace
   (3) Speedometer
   (4) Venturi meter

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CONCEPT STRENGTHENING SHEET

CSS-04

PHYSICS

Q.19 (Code-A) Diffraction of light Wave

1. What is the angular spread between central maxima and first ordered minima of diffraction pattern due to single slit of width 0.20 mm, when light of wavelength 500 nm is incident on it normally?

   (1) 2×10^{-3} rad (2) 2.5×10^{-3} rad

   (3) 3×10^{-3} rad (4) 4×10^{-3} rad

2. In diffraction pattern due to single slit of width a, the first minimum is observed at an angle 30° when light of wavelength 500 nm is incident on the slit. The first secondary maxima is observed at an angle of

   (1) $\sin^{-1}\left(\frac{1}{4}\right)$ (2) $\sin^{-1}\left(\frac{1}{2}\right)$

   (3) $\sin^{-1}\left(\frac{2}{3}\right)$ (4) $\sin^{-1}\left(\frac{3}{4}\right)$

3. At the first minimum adjacent to the central maximum of a single slit diffraction pattern, the phase difference between the huygen's wave front from the edge of the slit and the wavefront from the midpoint of the slit is

   (1) $\frac{\pi}{4}$ radian (2) $\frac{\pi}{2}$ radian

   (3) π radian (4) $\frac{3\pi}{2}$ radian

Q.6 (Code-B) Dispersion by prism

1. The dispersive power of prism depends upon

   (1) The angle of prism

   (2) The shape of prism

   (3) Refractive index of prism

   (4) Height of prism

2. Dispersion of light is caused due to

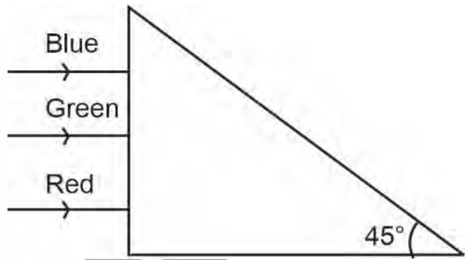
   (1) Intensity of light

   (2) Density of the medium

   (3) Wavelength of light

   (4) Amplitude of light

3. A beam of light consisting of red, green and blue colours is incident on a right-angled prism. The refractive index of the material of the prism for the above red, green and blue wavelengths are 1.39, 1.44 and 1.47 respectively. Which of the following colour(s) will suffer total internal reflection?



   (1) Green and Red (2) Blue and Green

   (3) Only Red (4) Only Blue

Q.8 (Code-B) Optical instruments (compound microscope

1. In a compound microscope magnification will be large, if the focal length of the eye piece is

   (1) Smaller than objective

   (2) Small but greater than objective

   (3) Large

   (4) Any of the above three

2. The objective lens of a compound microscope as compared to eyepiece is essentially

   (1) A concave lens of small focal length and small aperture

   (2) A convex lens of small focal length and large aperture

   (3) A convex lens of small focal length and small aperture

   (4) A convex lens of large focal length and large aperture

3. If the focal length of the objective lens is increased then

   (1) Magnifying power of microscope will increase but that of telescope will decrease

   (2) Magnifying power of microscope and telescope both will increase

   (3) Magnifying power of microscope and telescope both will decrease

   (4) Magnifying power of microscope will decrease but that of telescope will increase

Q.16 (Code-A) Resolving Power of Instruments

1. Limit of resolution of compound microscope is proportional to (symbols have their usual meaning)

(1) $d \propto \frac{\lambda}{\mu \sin\theta}$ (2) $d \propto \frac{\mu \sin\theta}{\lambda}$

(3) $d \propto \frac{\lambda\mu}{\sin\theta}$ (4) $d \propto \frac{\sin\theta}{\lambda\mu}$

2. Resolving power increase, if wavelength
(1) Decreases (2) Increases
(3) Both (1) and (2) (4) Neither (1) and (2)

3. For a telescope, limit of resolution is given by
(1) $\alpha = \frac{1.22\lambda}{D}$ (2) $\alpha = \frac{D}{1.22\lambda}$
(3) $\alpha = \frac{D^2}{\lambda}$ (4) $\alpha = \frac{\lambda^2}{D}$

4. For a telescope, resolving power is given by
(1) $RP = \frac{1.22\lambda}{D}$ (2) $RP = \frac{D}{1.22\lambda}$
(3) $RP = \frac{D^2}{\lambda}$ (4) $RP = \frac{\lambda^2}{D}$

Q.24 (Code-B) Fringe Width

1. In YDSE an electron beam is used to obtain interference pattern. If the speed of the electron increases then
(1) Distance between consecutive fringes decreases
(2) Distance between consecutive fringes increases
(3) Distance between consecutive fringes remains same
(4) Moe information if required

2. As speed of electron increases, its de-Broglie wavelength
(1) Decreases
(2) Increase
(3) Remains same
(4) Either if (2) and (3) possible

3. With increase in wavelength of interfering beam, the fringe width in YDSE
(1) Decreases
(2) Increases
(3) Remains same
(4) Either of (2) and (3) is possible

Q.26 (Code-B) YDSE with White Lights

1. In YDSE experiment with white light, the fringe at center of screen is
(1) Red (2) Blue
(3) Green (4) White

2. In context of YDSE with white light. The fringe closest on either side of the central white fringe is red and the farthest will appear _____. (Fill in the blank)
(1) Red (2) Blue
(3) Green (4) Yellow

3. In YDSE with white light, after few fringes
(1) Fringe pattern becomes more clear
(2) Fringe pattern becomes more reddish
(3) Clear fringe pattern is not seen
(4) None of the above

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CONCEPT STRENGTHENING SHEET
CSS-04
PHYSICS
ANSWER KEY

Q.16 (Code-B) rms value
1. (3)
2. (1)
3. (3)

Q.13 (Code-B) AC voltage applied to capacitor/Inductor
1. (3)
2. (1)
3. (2)

Q.4 (Code-B) Transformers
1. (2)
2. (4)
3. (3)

Q.20 (Code-A) Motional EMF
1. (1)
2. (2)
3. (2)

Q.12 (Code-B)
1. (2)
2. (1)
3. (2)
4. (4)

Q.21 (Code-B)
1. (3)
2. (4)
3. (4)

Based on
FTS-08 Code A & B

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CONCEPT STRENGTHENING SHEET

CSS-04

PHYSICS

Answer key

Q.19 (Code-A) Diffraction of light Wave

1. (2)
2. (4)
3. (3)

Q.6 (Code-B) Dispersion by prism

1. (3)
2. (3)
3. (2)

Q.8 (Code-B) Optical instruments (compound microscope

1. (2)
2. (3)
3. (4)

Q.16 (Code-A) Resolving Power of Instruments

1. (1)
2. (1)
3. (1)
4. (2)

Q.24 (Code-B) Fringe Width

1. (1)
2. (1)
3. (2)

Q.26 (Code-B) YDSE with White Lights

1. (4)
2. (2)
3. (3)