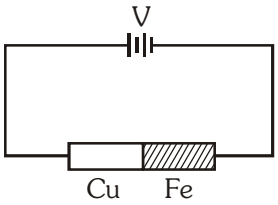
NEET-UG (KARNATAKA) 2013 TEST PAPER WITH ANSWER KEY
(HELD ON SATURDAY 18th MAY, 2013)

136. In Young's double slit experiment the distance between the slits and the screen is doubled. The separation between the slits is reduced to half. As a result the fringe width :
(1) is halved
(2) become four times
(3) remains unchanged
(4) is doubled

Ans. (2)

137.



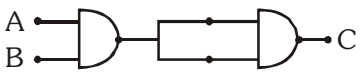
Two rods are joined end to end, as shown. Both have a cross-sectional area of 0.01 cm^2. Each is 1 meter long. One rod is of copper with a resistivity of 1.7×10^{-6} ohm-centimeter, the other is of iron with a resistivity of 10^{-5} ohm-centimeter.
How much voltage is required to produce a current of 1 ampere in the rods ?
(1) 0.00145 V (2) 0.0145 V
(3) 1.7×10^{-6} V (4) 0.117 V

Ans. (4)

138. A long straight wire carries a certain current and produces a magnetic field $2 \times 10^{-4} \frac{\text{Weber}}{m^2}$ at a perpendicular distance of 5 cm from the wire. An electron situated at 5cm from the wire moves with a velocity 10^7 m/s towards the wire along perpendicular to it. The force experienced by the electron will be (charge on electron 1.6×10^{-19}C):
(1) 3.2 N
(2) 3.2×10^{-16} N
(3) 1.6×10^{-16} N
(4) Zero

Ans. (2)

139. The output from a NAND gate is divided into two in parallel and fed to another NAND gate. The resulting gate is a :



(1) AND gate (2) NOR gate
(3) OR gate (4) NOT gate

Ans. (1)

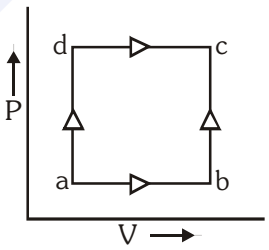
140. The ratio of radii of gyration of a circular ring and a circular disc, of the same mass and radius, about an axis passing through their centres and perpendicular to their planes are :
(1) 1 : $\sqrt{2}$ (2) 3 : 2
(3) 2 : 1 (4) $\sqrt{2}$: 1

Ans. (4)

141. The pair of quantities having same dimensions is :
(1) Impulse and Surface Tension
(2) Angular momentum and Work
(3) Work and Torque
(4) Young's Modulus and Energy

Ans. (3)

142. A system is taken from state a to state c by two paths adc and abc as shown in the figure. The internal energy at a is U_a = 10J. Along the path adc the amount of heat absorbed δQ_1 = 50 J and the work obtained δW_1 = 20J whereas along the path abc the heat absorbed δQ_2 = 36J. The amount of work along the path abc is :



(1) 10J (2) 12J (3) 36J (4) 6J

Ans. (4)

143. The primary of a transformer when connected to dc battery of 10 Volt draws a current of 1mA. The number of turns of the primary and secondary windings are 50 and 100 respectively. The voltage in the secondary and the current drawn by the circuit in the secondary are respectively :
(1) 20 V and 2.0 mA
(2) 10 V and 0.5 mA
(3) Zero volt and therefore no current
(4) 20 V and 0.5 mA

Ans. (3)

144. How does the Binding Energy per nucleon vary with the increase in the number of nucleons ?
(1) Decrease continuously with mass number
(2) First decreases and then increases with increase in mass number
(3) First increases and then decreases with increase in mass number
(4) Increases continuously with mass number

Ans. (3)

145. The length of the wire between two ends of a sonometer is 100cm. What should be the positions of two bridges below the wire so that the three segments of the wire have their fundamental frequencies in the ratio 1 : 3 : 5

(1) $\frac{1500}{23}$cm, $\frac{500}{23}$cm (2) $\frac{1500}{23}$cm, $\frac{300}{23}$cm

(3) $\frac{300}{23}$cm, $\frac{1500}{23}$cm (4) $\frac{1500}{23}$cm, $\frac{2000}{23}$cm

Ans. (4)

146. An electric dipole of dipole moment p is aligned parallel to a uniform electric field E. The energy required to rotate the dipole by 90° is :

(1) p^2E (2) pE

(3) infinite (4) pE^2

Ans. (2)

147. A charge 'q' is placed at the centre of the line joining two equal charges 'Q'. The system of the three charges will be in equilibrium if 'q' is equal to :

(1) –Q/4 (2) Q/4

(3) –Q/2 (4) Q/2

Ans. (1)

148. A car is moving in a circular horizontal track of radius 10m with a constant speed of 10m/s. A bob is suspended from the roof of the car by a light wire of length 1.0m. The angle made by the wire with the vertical is :

(1) $\frac{\pi}{3}$ (2) $\frac{\pi}{6}$ (3) $\frac{\pi}{4}$ (4) 0°

Ans. (3)

149. A bar magnet of magnetic moment M is placed at right angles to a magnetic induction B. If a force F is experienced by each pole of the magnet, the length of the magnet will be :

(1) MB/F (2) BF/M

(3) MF/B (4) F/MB

Ans. (1)

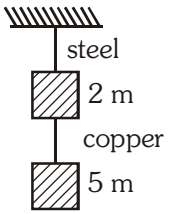
150. The radius of a planet is twice the radius of earth. Both have almost equal average mass-densities. If V_P and V_E are escape velocities of the planet and the earth, respectively, then :

(1) $V_P = 1.5\ V_E$ (2) $V_P = 2\ V_E$

(3) $V_E = 3\ V_P$ (4) $V_E = 1.5\ V_P$

Ans. (2)

151. If the ratio of diameters, lengths and Young's modulus of steel and copper wires shown in the figure are p, q and s respectively, then the corresponding ratio of increase in their lengths would be :



(1) $\frac{5q}{(7sp^2)}$ (2) $\frac{7q}{(5sp^2)}$ (3) $\frac{2q}{(5sp)}$ (4) $\frac{7q}{(5sp)}$

Ans. (2)

152. A parallel beam of light of wavelength λ is incident normally on a narrow slit. A diffraction pattern is formed on a screen placed perpendicular to the direction of the incident beam. At the second minimum of the diffraction pattern, the phase difference between the rays coming from the two edges of slit is :

(1) 2π (2) 3π (3) 4π (4) πλ

Ans. (3)

153. A particle of mass 'm' is kept at rest at a height 3R from the surface of earth, where 'R' is radius of earth and 'M' is mass of earth. The minimum speed with which it should be projected, so that it does not return back, is :

(g is acceleration due to gravity on the surface of earth)

(1) $\left(\frac{GM}{2R}\right)^{\frac{1}{2}}$ (2) $\left(\frac{gR}{4}\right)^{\frac{1}{2}}$

(3) $\left(\frac{2g}{R}\right)^{\frac{1}{2}}$ (4) $\left(\frac{GM}{R}\right)^{\frac{1}{2}}$

Ans. (1)

154. A current of 2.5 A flows through a coil of inductance 5H. The magnetic flux linked with the coil is :

(1) 0.5 Wb (2) 12.5 Wb

(3) Zero (4) 2 Wb

Ans. (2)

155. The reddish appearance of the sun at sunrise and sunset is due to :
(1) the scattering of light
(2) the polarisation of light
(3) the colour of the sun
(4) the colour of the sky

Ans. (1)

156. An electron in hydrogen atom makes a transition $n_1 \rightarrow n_2$ where n_1 and n_2 are principal quantum numbers of the two states. Assuming Bohr's model to be valid, the time period of the electron in the initial state is eight times that in the final state. The possible values of n_1 and n_2 are :
(1) $n_1 = 6$ and $n_2 = 2$ (2) $n_1 = 8$ and $n_2 = 1$
(3) $n_1 = 8$ and $n_2 = 2$ (4) $n_1 = 4$ and $n_2 = 2$

Ans. (4)

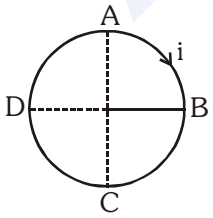
157. A person holding a rifle (mass of person and rifle together is 100 kg) stands on a smooth surface and fires 10 shots horizontally, in 5s. Each bullet has a mass of 10g with a muzzle velocity of 800 ms^{-1}. The final velocity acquired by the person and the average force exerted on the person are :
(1) $-0.08\ ms^{-1}$; 16 N (2) $-0.8\ ms^{-1}$; 8 N
(3) $-1.6\ ms^{-1}$; 16 N (4) $-1.6\ ms^{-1}$; 8 N

Ans. (Bonus)

158. In a vessel, the gas is at a pressure P. If the mass of all the molecules is halved and their speed is doubled, then the resultant pressure will be :
(1) 2P (2) P
(3) P/2 (4) 4P

Ans. (1)

159. A circular coil ABCD carrying a current 'i' is placed in a uniform magnetic field. If the magnetic force on the segment AB is $\vec{F}$, the force on the remaining segment BCDA is :



(1) $-\vec{F}$ (2) $3\vec{F}$
(3) $-3\vec{F}$ (4) $\vec{F}$

Ans. (1)

160. Two metal rods 1 and 2 of same lengths have same temperature difference between their ends. Their thermal conductivities are K_1 and K_2 and cross sectional areas A_1 and A_2, respectively. If the rate of the heat conduction in 1 is four times that in 2, then:
(1) $K_1A_1 = 4K_2A_2$
(2) $K_1A_1 = 2K_2A_2$
(3) $4K_1A_1 = K_2A_2$
(4) $K_1A_1 = K_2A_2$

Ans. (1)

161. α-particles, β-particles and γ-rays are all having same energy. Their penetrating power in a given medium in increasing order will be :-
(1) γ, α, β (2) α, β, γ
(3) β, α, γ (4) β, γ, α

Ans. (2)

162. A source of light is placed at a distance of 50 cm from a photo cell and the stopping potential is found to be V_0. If the distance between the light source and photo cell is made 25 cm, the new stopping potential will be :
(1) $V_0/2$ (2) V_0
(3) $4V_0$ (4) $2V_0$

Ans. (2)

163. Vectors $\vec{A}$, $\vec{B}$ and $\vec{C}$ are such that

$\vec{A} \cdot \vec{B} = 0$ and $\vec{A} \cdot \vec{C} = 0$

Then the vector parallel to $\vec{A}$ is :
(1) $\vec{A} \times \vec{B}$ (2) $\vec{B} + \vec{C}$
(3) $\vec{B} \times \vec{C}$ (4) $\vec{B}$ and $\vec{C}$

Ans. (3)

164. One way in which the operation of a n-p transistor differs from that a p-n-p :
(1) The emitter junction injects minortiy carriers into the base region of the p-n-p
(2) The emitter injects holes into the base of the p-n-p and electorns into the base regions of n-p-n
(3) The emitter injects holes into the base of n-p-n
(4) The emitter junction is reversed biased in n-p-n

Ans. (2)

165. Which of the following relations, does not give the equation of an adiabatic process, where terms have their usual meaning ?

(1) $P^{1-\gamma} T^{\gamma}$ = constant (2) PV^{γ} = constant

(3) $TV^{\gamma-1}$ = constant (4) $P^{\gamma}T^{1-\gamma}$ = constant

Ans. (4)

166. Two discs are rotating about their axes, normal to the discs and passing through the centres of the discs. Disc D_1 has 2kg mass and 0.2 m radius and initial angular velocity of 50 rad s^{-1}. Disc D_2 has 4 kg mass, 0.1 m radius and initial angular velocity of 200 rad s^{-1}. The two discs are brought in contact fact to face, with their axes of rotation coincident. The final angular velocity (in rad.s^{-1}) of the system is :

(1) 60 (2) 100 (3) 120 (4) 40

Ans. (2)

167. A fluid is in stream line flow across of a horizontal pipe of variable area of cross section. For this which of the following statements is correct ?

(1) The velocity is maximum at the narrowest part of the pipe and pressure is maximum at the widest part of the pipe

(2) Velocity and pressure both are maximum at the narrowest part of the pipe

(3) Velocity and pressure both are maximum at the widest part of the pipe

(4) The velocity is minimum at the narrowest part of the pipe and the pressure is minimum at the widest part of the pipe

Ans. (1)

168. An electromagnetic wave of frequency ν= 3.0 MHz passes from vacuum into a dielectric medium with relative permittivity ϵ = 4.0. Then :

(1) Wavelength is doubled and frequency becomes half

(2) Wavelength is halved and frequenc remains unchanged

(3) Wavelength and frequency both remain unchanged

(4) Wavelength is doubled and frequency unchanged

Ans. (2)

169. A particle with total energy E is moving in a potential energy regions U(x). Motion of the particle is resticted to the region when :

(1) U(x) < E (2) U(x) = O

(3) U(x) $\leq$ = E (4) U(x) > E

Ans. (4)

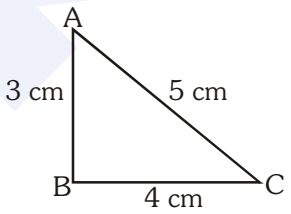
170. The displacement 'x' (in meter) of a particle of mass 'm' (in kg) moving in one dimension under the action of a force, is related to time 't' (in sec) by $t = \sqrt{x} + 3$. The displacement of the particle when its velocity is zero, will be :

(1) 4m (2) 0 m (zero)

(3) 6 m (4) 2 m

Ans. (2)

171. A 12 cm wire is given a shape of a right angled triangle ABC having sides 3 cm, 4 cm and 5 cm, as shown in the figure. The resistance betwen two ends (AB, BC, CA) of the respective sides are measured one by one by a multi-meter. The resistances will be in the ratio :



(1) 9 : 16 : 25 (2) 27 : 32 : 35

(3) 21 : 24 : 25 (4) 3 : 4: 5

Ans. (2)

172. Two soucres P and Q produce notes of frequency 660 Hz each. A listener moves from P to Q with a speed of 1 ms^{-1}. If The speed of sound is 330 m/s, then number of beats heard by the listener per second will be :

(1) 4 (2) 8 (3) 2 (4) zero

Ans. (1)

173. The de- Broglie wavelength of neutrons is thermal eqilibrium at temperature T is :

(1) $\frac{3.08}{\sqrt{T}}$ Å (2) $\frac{0.308}{\sqrt{T}}$ Å

(3) $\frac{0.0308}{\sqrt{T}}$ Å (4) $\frac{30.8}{\sqrt{T}}$ Å

Ans. (4)

174. Two Carnot engines A and B are operated in series. The engine A receives heat from the source at temperature T_1 and rejects the heat to the sink at temperature T. The seconds engine B receives the heat at temperature T and rejects to its sink at temperature T_2. For what value of T the efficiencies of the two engines are equal :

(1) $\frac{T_1 - T_2}{2}$ (2) T_1T_2 (3) $\sqrt{T_1T_2}$ (4) $\frac{T_1 + T_2}{2}$

Ans. (3)

175. A particle of mass m oscillates along *x* - axis according to equation x = a sin ωt. The nature of the graph between momentum and displacement of the particle is :

(1) Circle

(2) Hyperbola

(3) Ellipse

(4) Straight line passing throgh origin

Ans. (3)

176. Ten identical cells connected in series are needed to heat a wire of length one meter and redius 'r' by 10° C in time 't'. How many cells will be required ot heat the wire of length two meter of the same radius by the same temperature in time 't' ?

(1) 20 (2) 30 (3) 40 (4) 10

Ans. (1)

177. The density of water at 20º C is 998 kg/m^3 and at 40° C 992 kg / m^3. The coefficient of volume expansion of water is :

(1) 3×10^{-4} / ℃ (2) 2×10^{-4} / ℃

(3) 6×10^{-4} / ℃ (4) 10^{-4} / ℃

Ans. (1)

178. Two plane mirrors are inclined at 70°. A ray incident on one mirror at angle, θ after reflection falls on second mirror and is reflected from there parallel to first mirror. The value of θ is :

(1) 45° (2) 30° (3) 55° (4) 50°

Ans. (4)

179. In an unbiased p-n junction, holes diffuse from the p-regions to n-region because of :

(1) The attraction of free electrons of n-region

(2) The higher hole concentration in p-region than that in n-region

(3) The higher concentration of electrons is the n-region than that in the p-region

(4) The potential difference across the p-n junction

Ans. (2)

180. One coolie takes 1 minute to raise a sucitcase through a height of 2 m but the second coolie takes 30s to raise the same suitcase to the same height. The powers of two coolies are in the ratio :

(1)1 : 3 (2) 2 : 1 (3) 3 : 1 (4) 1 : 2

Ans. (4)