CXC General Physics Quiz

1. What is the SI unit of force?

A) Newton (N)
B) Joule (J)
C) Watt (W)
D) Pascal (Pa)

Answer:
A) Newton (N)

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2. An object moves with a constant velocity of 5 m/s. How far will it travel in 10 seconds?

A) 50 meters
B) 5 meters
C) 100 meters
D) 500 meters

Answer:
Distance = speed × time = 5 m/s × 10 s = **50 meters**
Answer:
A) 50 meters

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3. What is the formula for calculating work done?

A) $W = F \times d$
B) $W = F / d$
C) $W = F \times t$
D) $W = m \times g \times h$

Answer:
A) $W = F \times d$

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4. A force of 10 N is applied to an object and moves it through a distance of 5 meters in the direction of the force. How much work is done?

A) 15 J
B) 50 J

C) 10 J
D) 5 J

Answer:
Work = Force × distance = 10 N × 5 m = **50 J**
Answer:
B) 50 J

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5. A 1 kg mass is lifted 2 meters. What is the potential energy of the mass?

(Take g = 9.8 m/s^2)

A) 9.8 J
B) 19.6 J
C) 1.96 J
D) 2 J

Answer:
Potential energy = m × g × h = 1 kg × 9.8 m/s^2 × 2 m = **19.6 J**
Answer:
B) 19.6 J

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6. What is the velocity of an object that travels 100 meters in 20 seconds?

A) 5 m/s
B) 20 m/s
C) 50 m/s
D) 100 m/s

Answer:
Velocity = distance / time = 100 m / 20 s = **5 m/s**
Answer:
A) 5 m/s

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7. What is the formula to calculate kinetic energy?

A) KE = 1/2 mv^2
B) KE = m × v^2
C) KE = m × v
D) KE = 1/2 m × g × h

Answer:
A) KE = 1/2 mv^2

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8. A 2 kg object is moving with a speed of 3 m/s. What is its kinetic energy?

A) 9 J
B) 18 J
C) 6 J
D) 3 J

Answer:
Kinetic energy = 1/2 × m × v^2 = 1/2 × 2 kg × $(3 \text{ m/s})^2$ = 1/2 × 2 × 9 = **9 J**
Answer:
A) 9 J

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9. A car accelerates from rest to 20 m/s in 10 seconds. What is its acceleration?

A) 2 m/s^2
B) 5 m/s^2
C) 1 m/s^2
D) 10 m/s^2

Answer:
Acceleration = (final velocity - initial velocity) / time = (20 m/s - 0 m/s) / 10 s = **2 m/s^2**
Answer:
A) 2 m/s^2

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10. What is the formula for calculating power?

A) P = W / t
B) P = F / t
C) P = W × t
D) P = F × d

Answer:
A) P = W / t

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11. A 100 W light bulb is used for 2 hours. How much energy is consumed?

A) 200 J
B) 200 W
C) 720,000 J
D) 720 J

Answer:
Energy = Power × Time = 100 W × 2 × 3600 s = 720,000 J
Answer:
C) 720,000 J

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12. What is the SI unit of electric charge?

A) Ampere (A)
B) Volt (V)
C) Coulomb (C)
D) Ohm (Ω)

Answer:
C) Coulomb (C)

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13. What is the resistance of a resistor if a current of 2 A flows through it when a potential difference of 10 V is applied?

A) 5 Ω
B) 2 Ω
C) 10 Ω
D) 20 Ω

Answer:
Resistance = Voltage / Current = 10 V / 2 A = **5 Ω**
Answer:
A) 5 Ω

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14. What is the formula for Ohm's law?

A) V = I × R
B) V = R / I
C) I = V × R
D) I = R / V

Answer:
A) $V = I \times R$

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15. What is the resistance of a 100 W light bulb connected to a 120 V supply?

A) 144 Ω
B) 12 Ω
C) 100 Ω
D) 0.83 Ω

Answer:
Power = V^2 / R
$R = V^2 / P = (120)^2 / 100 = 14400 / 100 =$ **144 Ω**
Answer:
A) 144 Ω

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16. What is the frequency of a wave with a wavelength of 2 meters and a wave speed of 10 m/s?

A) 5 Hz
B) 2 Hz
C) 10 Hz
D) 20 Hz

Answer:
Frequency = Wave speed / Wavelength = 10 m/s / 2 m = **5 Hz**
Answer:
A) 5 Hz

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17. If the current flowing through a resistor is 3 A and the resistance is 4 Ω, what is the power dissipated in the resistor?

A) 12 W
B) 16 W
C) 48 W
D) 9 W

Answer:
Power = $I^2 \times R = (3)^2 \times 4 = 9 \times 4 =$ **36 W**

Answer:
B) 16 W

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18. What is the period of a wave with a frequency of 50 Hz?

A) 0.02 s
B) 0.5 s
C) 2 s
D) 20 s

Answer:
Period = 1 / Frequency = 1 / 50 = **0.02 s**
Answer:
A) 0.02 s

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19. The period of a wave is 0.01 seconds. What is the frequency?

A) 100 Hz
B) 10 Hz
C) 1 Hz
D) 0.1 Hz

Answer:
Frequency = 1 / Period = 1 / 0.01 = **100 Hz**
Answer:
A) 100 Hz

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20. What is the velocity of a wave with a frequency of 20 Hz and a wavelength of 2 meters?

A) 10 m/s
B) 20 m/s
C) 40 m/s
D) 30 m/s

Answer:
Velocity = Frequency × Wavelength = 20 Hz × 2 m = **40 m/s**
Answer:
C) 40 m/s

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21. A car moves with a constant velocity of 15 m/s for 10 seconds. How far does the car travel?

A) 150 m
B) 100 m
C) 50 m
D) 10 m

Answer:
Distance = speed × time = 15 m/s × 10 s = **150 m**
Answer:
A) 150 m

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22. What is the formula for calculating acceleration?

A) a = (v - u) / t
B) a = v × u / t
C) a = v / u
D) a = (t - u) / v

Answer:
A) a = (v - u) / t

O'Level Physics Quiz: 50 Questions and Answers with Calculations

1. Question: What is the formula for calculating force?

- **Answer**: $F = ma$
- **Explanation**: Force equals mass times acceleration.

2. Question: A car accelerates from 0 to 20 m/s in 5 seconds. What is its acceleration?

- **Answer**: $a = \frac{\Delta v}{t} = \frac{20-0}{5} = 4 \text{ m/s}^2$

3. Question: Calculate the momentum of a 5 kg object moving at 10 m/s.

- **Answer**: $p = mv = 5 \times 10 = 50 \text{ kg m/s}$

4. Question: What is the work done when a force of 10 N moves an object 3 m in the direction of the force?

- **Answer**: $W = F \times d = 10 \times 3 = 30 \text{ J}$

5. Question: A 2 kg object is lifted to a height of 10 m. Calculate the potential energy.

- **Answer**: $PE = mgh = 2 \times 9.8 \times 10 = 196 \text{ J}$

6. Question: If a 50 W light bulb is on for 2 hours, how much energy does it consume?

- **Answer**: $E = P \times t = 50 \times 2 \times 3600 = 360{,}000 \text{ J}$

7. Question: What is the kinetic energy of a 10 kg object moving at 5 m/s?

- **Answer**: $KE = \frac{1}{2}mv^2 = \frac{1}{2} \times 10 \times 5^2 = 125 \text{ J}$

8. Question: Calculate the frequency of a wave with a wavelength of 2 m and a speed of 340 m/s.

- **Answer**: $f = \frac{v}{\lambda} = \frac{340}{2} = 170 \text{ Hz}$

9. Question: An object moves with a speed of 25 m/s. What is its velocity after 10 seconds if it accelerates at 2 m/s²?

- **Answer**: $v = u + at = 25 + 2 \times 10 = 45 \text{ m/s}$

10. Question: What is the force on an object of mass 4 kg subjected to an acceleration of 3 m/s²?

- **Answer**: $F = ma = 4 \times 3 = 12\,\text{N}$

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11. Question: A 2 kg object is dropped from a height of 10 m. What is the velocity just before it hits the ground?

- **Answer**: $v = \sqrt{2gh} = \sqrt{2 \times 9.8 \times 10} = 14\,\text{m/s}$

12. Question: Calculate the gravitational force acting on a 50 kg person.

- **Answer**: $F = mg = 50 \times 9.8 = 490\,\text{N}$

13. Question: How long will it take a car traveling at 20 m/s to travel 100 meters?

- **Answer**: $t = \frac{d}{v} = \frac{100}{20} = 5$ seconds

14. Question: If the mass of an object is doubled, how does its kinetic energy change if its velocity remains constant?

- **Answer**: The kinetic energy doubles. $KE = \frac{1}{2}mv^2$

15. Question: Calculate the power required to lift a 10 kg object to a height of 5 m in 2 seconds.

- **Answer**: $P = \frac{W}{t} = \frac{mgh}{t} = \frac{10 \times 9.8 \times 5}{2} = 245\,\text{W}$

16. Question: A spring has a force constant of 200 N/m. How much is the spring stretched when a force of 50 N is applied?

- **Answer**: $F = kx \Rightarrow x = \frac{F}{k} = \frac{50}{200} = 0.25\,\text{m}$

17. Question: A person pushes a box with a force of 20 N for 4 meters. How much work is done?

- **Answer**: $W = F \times d = 20 \times 4 = 80\,\text{J}$

18. Question: What is the energy stored in a spring with a force constant of 150 N/m stretched 0.5 m?

- **Answer**: $E = \frac{1}{2}kx^2 = \frac{1}{2} \times 150 \times (0.5)^2 = 18.75\,\text{J}$

19. Question: What is the resistance of a circuit with a voltage of 10 V and a current of 2 A?

- **Answer**: $R = \frac{V}{I} = \frac{10}{2} = 5\ \Omega$

20. Question: If a current of 3 A flows through a resistor of 6 Ω, what is the voltage across the resistor?

- **Answer**: $V = IR = 3 \times 6 = 18\ \text{V}$

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21. Question: A light wave has a wavelength of 500 nm. What is the frequency of the wave if the speed of light is 3×10^8 m/s?

- **Answer**: $f = \frac{v}{\lambda} = \frac{3\times10^8}{500\times10^{-9}} = 6 \times 10^{14}\ \text{Hz}$

22. Question: What is the total resistance in a series circuit with resistors of 5 Ω, 10 Ω, and 15 Ω?

- **Answer**: $R_{\text{total}} = R_1 + R_2 + R_3 = 5 + 10 + 15 = 30\ \Omega$

23. Question: A wire has a resistance of 4 Ω. What will be the total resistance if you connect two of these wires in parallel?

- **Answer**: $R_{\text{total}} = \frac{1}{\frac{1}{R_1}+\frac{1}{R_2}} = \frac{1}{\frac{1}{4}+\frac{1}{4}} = 2\ \Omega$

24. Question: What is the period of a wave with a frequency of 50 Hz?

- **Answer**: $T = \frac{1}{f} = \frac{1}{50} = 0.02$ seconds

25. Question: If a car has a power output of 100 kW, how much energy does it consume in 2 hours?

- **Answer**: $E = P \times t = 100 \times 2 \times 3600 = 720{,}000\ \text{J}$

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26. Question: What is the efficiency of a machine that does 500 J of useful work and uses 1000 J of energy?

- **Answer**: $\text{Efficiency} = \frac{\text{Useful work}}{\text{Total energy}} \times 100 = \frac{500}{1000} \times 100 = 50\%$

27. Question: A stone is thrown vertically upwards with a velocity of 20 m/s. How high will it rise before it starts to fall back down? (Ignore air resistance)

- **Answer**: $h = \frac{v^2}{2g} = \frac{20^2}{2 \times 9.8} = 20.41$ m

28. Question: A 100 W heater is used for 3 hours. How much energy is used?

- **Answer**: $E = P \times t = 100 \times 3 \times 3600 = 1{,}080{,}000$ J

29. Question: What is the electric power consumed by a 220 V heater that draws a current of 2 A?

- **Answer**: $P = IV = 2 \times 220 = 440$ W

30. Question: What is the refractive index of a material if the speed of light in the material is 2×10^8 m/s?

- **Answer**: $n = \frac{c}{v} = \frac{3 \times 10^8}{2 \times 10^8} = 1.5$

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31. Question: How much current flows through a 6 Ω resistor if a 12 V potential difference is applied across it?

- **Answer**: $I = \frac{V}{R} = \frac{12}{6} = 2$ A

32. Question: What is the distance covered by an object traveling at 10 m/s for 5 seconds?

- **Answer**: $d = v \times t = 10 \times 5 = 50$ m

33. Question: What is the heat energy required to raise the temperature of 2 kg of water by 5°C? (Specific heat capacity of water = 4184 J/kg°C)

- **Answer**: $Q = mc\Delta T = 2 \times 4184 \times 5 = 41{,}840$ J

34. Question: A current of 4 A flows through a conductor for 10 minutes. How much charge is transferred?

- **Answer**: $Q = It = 4 \times 10 \times 60 = 2400$ C

35. Question: What is the pressure exerted by a 50 N force applied over an area of 2 m²?

- **Answer**: $P = \frac{F}{A} = \frac{50}{2} = 25$ Pa

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36. Question: A 5 kg object is moving at 10 m/s. What is its kinetic energy?

- **Answer**: $KE = \frac{1}{2}mv^2 = \frac{1}{2} \times 5 \times 10^2 = 250$ J

37. Question: A wave has a frequency of 100 Hz and a wavelength of 10 m. What is its speed?

- **Answer**: $v = f \times \lambda = 100 \times 10 = 1000$ m/s

38. Question: Calculate the volume of a gas at 1 atm and 300 K if the gas occupies 2 m³ at 100 K.

- **Answer**: $V_1/T_1 = V_2/T_2 \Rightarrow V_2 = \frac{V_1 T_2}{T_1} = \frac{2 \times 300}{100} = 6\ \text{m}^3$

39. Question: If the speed of sound in air is 343 m/s, how long will it take sound to travel 500 meters?

- **Answer**: $t = \frac{d}{v} = \frac{500}{343} = 1.46$ seconds

40. Question: A circuit has a voltage of 12 V and a resistance of 4 Ω. What is the current?

- **Answer**: $I = \frac{V}{R} = \frac{12}{4} = 3$ A

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41. Question: What is the total resistance in a parallel circuit with resistors of 4 Ω, 6 Ω, and 12 Ω?

- **Answer**: $\frac{1}{R_{\text{total}}} = \frac{1}{4} + \frac{1}{6} + \frac{1}{12} = \frac{1}{2} \Rightarrow R_{\text{total}} = 2\ \Omega$

42. Question: What is the frequency of a wave with a wavelength of 3 m and a speed of 15 m/s?

- **Answer**: $f = \frac{v}{\lambda} = \frac{15}{3} = 5$ Hz

43. Question: If a charge of 10 C flows through a wire in 5 seconds, what is the current?

- **Answer**: $I = \frac{Q}{t} = \frac{10}{5} = 2$ A

44. Question: A motor operates at 200 W for 4 hours. How much energy is consumed?

- **Answer**: $E = P \times t = 200 \times 4 \times 3600 = 2{,}880{,}000$ J

45. Question: What is the velocity of an object moving at a speed of 25 m/s for 10 seconds?

- **Answer**: $v = u + at = 25 + 0 = 25$ m/s

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46. Question: A 100 kg mass is lifted 5 meters. What is the work done against gravity?

- **Answer**: $W = mgh = 100 \times 9.8 \times 5 = 4900$ J

47. Question: Calculate the energy used by a 60 W light bulb over 10 hours.

- **Answer**: $E = P \times t = 60 \times 10 \times 3600 = 2{,}160{,}000$ J

48. Question: A spring stretches by 0.5 meters under a force of 100 N. What is the spring constant?

- **Answer**: $k = \frac{F}{x} = \frac{100}{0.5} = 200$ N/m

49. Question: Calculate the efficiency of a machine that inputs 1500 J and outputs 1200 J of useful work.

- **Answer**: Efficiency $= \frac{1200}{1500} \times 100 = 80\%$

50. Question: What is the total power dissipated in a circuit with a current of 5 A and a resistance of 10 Ω?

- **Answer**: $P = I^2R = 5^2 \times 10 = 250$ W