الجامعة المصرية اليابانية للعلوم والتكنولوجيا
E-JUST
Egypt - Japan University of Science and Technology
エジプト日本科学技術大学

جامعة مصرية بحثية حكومية
ذات شراكة يابانية وطبيعة خاصة

E-JUST Entrance Exam model

Faculty of Engineering, Computer Science and Information Technology, (Art & Design) (sustainability Architecture)

Subject: Physics

Time: 20 minutes

Student Name:.....

Application ID No:.....

Undergraduate Entrance Examination Instructions

1. Examinees will be provided with question booklet and answer sheet.

2. Questions are on both the front and back of the page.

3. Question booklet contains scratch papers for use in solving exams.

4. Answer ALL questions to the best of your abilities. Be sure to write legibly and choose your answers clearly using HB or B pencil, not pen.

5. Question booklet will be collected back.

Choose the correct answer for the following questions: (1 Mark for each question)

1. **A body moving with constant velocity has**

   A) Increasing acceleration — B) Zero acceleration

   C) Variable speed — D) Increasing displacement only

2. **Newton's third law states that:**

   A) Force equals mass × acceleration — B) Every action has an equal and opposite reaction

   C) Energy is conserved — D) Momentum increases always

3. **Work done is maximum when force is applied at angle**

   A) 0° — B) 45°

   C) 90° — D) 180°

4. **Kinetic energy depends on**

   A) Only mass — B) Only velocity

   C) Mass and square of velocity — D) Mass and acceleration

5. **Centripetal force acts**

   A) Away from the center — B) Downward always

   C) Tangentially — D) Toward the center

6. **The magnetic field around a straight wire carrying current is**

   A) Parallel lines — B) Circular

   C) Random — D) Zero

7. **Sound waves are**

   A) Transverse — B) Longitudinal

   C) Electromagnetic — D) Stationary only

8. **A car starts from rest and accelerates uniformly at 2 m/s². What is its velocity after 5 s**

A) 5 m/s
B) 10 m/s
C) 15 m/s
D) 20 m/s

Answer: $v = v_i + at = 0 + (2 \times 5) = 10\ m/s$ (B)

9. **A 4 kg body experiences a net force of 20 N. Its acceleration is**

A) 4 m/s²
B) 6 m/s²
c) 5 m/s²
D) 8 m/s²

Answer: $a = F/m = 20/4 = 5\ m/s^2$

10. **A battery of emf 12 V and internal resistance 1 Ω is connected to an external resistor 5 Ω. The terminal voltage of the battery is:**

A) 12 V
B) 10 V
C) 8 V
D) 2 V

Answer: $I = \frac{E}{R+r} = \frac{12}{6} = 2A$
Terminal voltage = $V = E - Ir = 12 - 2(1) = 10V$

11. **Three resistors 6 Ω, 3 Ω, and 2 Ω are connected such that 3 Ω and 6 Ω are in parallel, then connected in series with 2 Ω. Equivalent resistance equals:**

A) 6 Ω
B) 5 Ω
C) 4 Ω
D) 3 Ω

Answer: $Rp = \frac{6\times3}{6+3} = 2\Omega \rightarrow Total = 2 + 2 = 4\Omega$

12. **At a junction, three currents 4A, 2A, and 3A enter the node. One current leaves the node. Its value is:**

A) 4 Ω
B) 2 Ω
C) 9 Ω
D) 5 Ω

Answer: $Sum\ entering\ = 4 + 2 + 3 = 9A$

13. **In a loop, a 20V battery is connected with two resistors 4Ω and 6Ω in series. The potential difference across 6Ω is:**

A) 12V | B. 10V

C. 8V | D. 6V

Answer: $Total\ R\ = 10\Omega \rightarrow I\ = 20/10\ = 2A$
$V_6\ = 2 \times 6\ = 12V$

14. **A 10Ω resistor carries a current of 3A. Power dissipated is:**

A) 60W | B. 30W

C. 300W | D. 90W

Answer: $P = I^2R = 9 \times 10 = 90W$

15. **When current in a circuit becomes zero, the terminal voltage equals:**

A) zero | B) half emf

C. internal resistance | D. emf

16. **If length of a wire doubles and cross-sectional area halves, its resistance becomes:**

A) R | B) 2R

C) 4R | D) ½R

Answer: $R = \frac{\rho L}{A} \rightarrow New\ R\ = \rho\ (2L)\ /\ (A/2)\ = 4R$

17. **Two resistors 4Ω and 8Ω connected in parallel to 24V battery. Total current equals:**

A. 9A | A) 3A

C. 16A | D. 4A

Answer: $Rp = \frac{4\times8}{4+8} = 2.67\Omega \rightarrow I = \frac{24}{2.67} = 9A$

18. **In a parallel circuit:**

A) Current is same in all branches

B) Voltage is same across all branches

C) Resistance increases

D) Current decreases

19. **If the frequency of incident light increases, the kinetic energy of emitted electrons:**

A) Decreases

B) Remains constant

C) Increases

D) Becomes zero

20. **The stopping potential in photoelectric effect depends on:**

A) Intensity of light

B) Frequency of light

C) Number of photons

D) Area of metal

21. **The spectral lines in hydrogen are formed due to:**

A) Nuclear reactions

B) Electron transitions between energy levels

C) Proton collisions

D) Heat only

22. **When an electron jumps from higher to lower level, it:**

A) Absorbs energy

B) Emits energy

C) Gains mass

D) Stops moving