

**HARYANA VISHWAKARMA SKILL UNIVERSITY**

<b>Course</b>	:	B.Sc. (Automotive Mechatronics)
<b>Subject</b>	:	Applied Physics
<b>Semester</b>	:	First
<b>Subject Code</b>	:	BSC-103
<b>Duration</b>	:	3 Hours
<b>Maximum Marks</b>	:	35

**Instructions to the Student:**

This question paper consists of 2 Sections.

1. Section A comprises 10 questions of objective type in nature. All 10 questions are compulsory. Each question carries 1 mark.
2. Section B comprises 6 long answer type questions out of which students need to do any 5. Each question carries 5 marks.

**SECTION-A (OBJECTIVE TYPE QUESTIONS)**

**Q1.** SI unit of acceleration is

- A) m/s
- B)  $m^2/s$
- C)  $m^2/s^2$
- D)  $m/s^2$

**Q2.** When two vectors are perpendicular, their

- A) Dot product is zero
- B) Cross product is zero
- C) Both are zero
- D) Both are not necessarily zero

**Q3.** Dimensional formula of Moment of inertia is

- A)  $[M^2 L^{-1} T^{-2}]$
- B)  $[M^1 L^2 T^0]$
- C)  $[M^1 L^{-1} T^{-1}]$
- D)  $[M^1 L^{-2} T^0]$

Q4. Rate at which angular displacement changes with time is called

- A) Angular displacement
- B) Angular velocity
- C) Angular acceleration
- D) Angular speed

Q5. Orbital angular momentum is associated with motion of body along

- A) Circular path
- B) Straight path
- C) Central point
- D) Pivot axis

Q6. If plates of capacitor are oppositely charged then total charge is equal to

- A) zero
- B) Negative
- C) Positive
- D) Infinite

Q7. The circuit in which current has a complete path to flow is called \_\_\_\_\_ circuit.

- A) Open
- B) Closed
- C) Short
- D) Open loop

Q8. Kirchoff's 2<sup>nd</sup> law deals with

- A) Current in circuit
- B) Voltage in circuit
- C) Electromotive force in circuit
- D) Both B and C

Q9. Two  $10\ \Omega$  resistors are connected in parallel, their equivalent resistance is

- A)  $5\ \Omega$
- B)  $10\ \Omega$
- C)  $15\ \Omega$
- D)  $20\ \Omega$

**Q10.** Biot Savart law in magnetic field is analogous to which law in electric field?

- A) Gauss law
- B) Faraday law
- C) Coulomb's law
- D) Ampere law

**SECTION-B (LONG ANSWER TYPE QUESTIONS)**

**Q11. (i)** Find the value of  $t$  such that the vectors  $A = i + tj - 3k$  and  $B = 2ti - j$  are perpendicular to each other.

**(ii)** Explain vector and rectangular components of a vector.

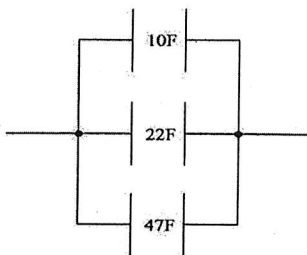
**Q12. (i)** Explain momentum and law of conservation of momentum.

**(ii)** Explain uniformly accelerated motion with example.

**Q13. (i)** Derive an expression for the relation between linear acceleration and angular acceleration.

**(ii)** Derive an expression for the rotational kinetic energy of rigid body.

**Q14.** Derive an expression to calculate the capacitance of series plate capacitor. Calculate the total capacitance for these three capacitors in the figure below:



**Q15. (i)** Write the principle and application of Wheatstone bridge. Also calculate the balancing condition of Wheatstone bridge

**(ii)** What is Kirchhoff's voltage and current laws?

**Q16.** Explain and derive the expression for the Biot Savart law.