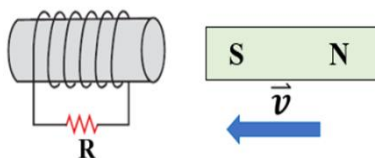


Choose the right answers for the following questions: (two marks for each question)

- Determine the change in gravitational force between two masses if the distance between two masses is doubled:  
 A) becomes four times B) becomes three times C) becomes  $\frac{1}{4}$  D) does not changing
- A point on rim of **CD** in a computer has tangential speed of 1.8 m/s, If radius of **CD** is 0.06 m what is the tangential speed of a point on this **CD** that is 0.03 m from axis of rotation?  
 A) 30 m/s B) 0.03 m/s C) 0.9 m/s D) 3.6 m/s
- What is the length of a simple pendulum, its frequency is 0.525 Hz ,If  $a_g=9.81 \text{ m/s}^2$  ?  
 A) 0.9 m B) 4.5 m C) 1.25 m D) 3.5 m
- All points on a disk rotating around a fixed axis, have the same:  
 A) tangential speed B) angular speed C) tangential acceleration D) both (A) and(C)are correct
- When a wheel is rotating through an angle of  $35^\circ$ , a point on the circumference travels through an arc length of 2.5 m. What is the radius of the wheel?  
 A) 1.4 m B) 4.1 m C) 36 m D) 22.5 m
- A bicyclist rides along a circular track. If the bicyclist travels around exactly half the track in 10 s, what is his average angular speed?  
 A) 0.314 rad/s B) 2.23 rad/s C) 0.63 rad/s D) 31 rad/s
- If a spinning amusement-park ride has an angular speed of 1.2 rad/s, what is the centripetal acceleration of a person standing 12 m from the centre of the ride?  
 A) 17.28 m/s<sup>2</sup> B) 1.728 m/s<sup>2</sup> C) 172 m/s<sup>2</sup> D) 1282 m/s<sup>2</sup>
- Which rotational quantity is equivalent to mass in transitional motion?  
 A) torque( $\tau$ ) B) angular momentum(L) C) moment of inertia(I) D) force(F)
- A bar magnet is positioned near a coil of wire, as shown in figure.  
 What is the direction of the current in the resistor **R** when the magnet is moved to the left:  
 A) from left to right B) from right to left  
 C) in two opposite directions D) All Answers are wrong
- When a part of a sound wave travels from air into water, which property of the wave remains unchanged?  
 A) speed B) frequency C) wavelength D) amplitude
- Which of the following is the component of the magnetic field perpendicular to the plane of the loop.  
 $\theta$  is the angle between the direction magnetic field and the normal to the plane of the loop?  
 A)  $B \sin \theta$  B)  $B \cos \theta$  C)  $B \cos \theta \tan \theta$  D)  $AB \tan \theta$
- A parked ambulance emits a sound of frequency 1200 Hz. What frequency is detected by an observer inside another car moving with a velocity of 72 km/h. when he move towards the ambulance. (Speed of sound in air is 340 m/s.)  
 A) 1000 Hz B) 1129.4 Hz C) 1270.6 Hz D) 1700 Hz
- A pipe that is open at both ends has a fundamental frequency of 456 Hz when the speed of sound in air is 331 m/s. What is the fundamental frequency of this pipe when the speed of sound in air is increased to 367 m/s as a result of increasing the temperature of the air in the pipe?  
 A) 250 Hz B) 507 Hz C) 750 Hz D) 1000 Hz



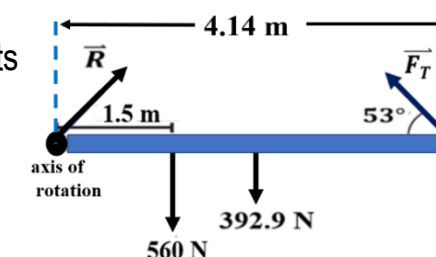
- What happens to the wavelength of a wave on a string when the frequency is doubled? What happens to the speed of the wave?  
 A) The wavelength is halved and the speed doubles  
 B) The wavelength doubles and the speed double too  
 C) The wavelength is halved and the wave speed remains the same  
 D) The wavelength is doubled and the wave speed remains the same

- The unknown quantity in the corresponding table is equal:

- A) -0.25 rad/s<sup>2</sup> B) -0.5 rad/s<sup>2</sup>  
 C) -1.07 rad/s<sup>2</sup> D) -2 rad/s<sup>2</sup>

$\alpha_{avg}$	$\Delta\omega$	$\Delta t$
?	-1.2 rev/s	7 s

- A uniform 4.14 m long horizontal beam (b) that weighs 392.9 N is attached to a wall by a pin connection that allows the beam to rotate. Its far end is supported by a cable that makes an angle of  $53^\circ$  with the horizontal, and a 560 N person (P) is standing 1.5 m from the pin, Find the tension force ( $F_T$ ) ,of the cable ( If beam is in complete equilibrium) as shown in figure?



- A) 500 N B) 400 N C) 663 N D) 952.9 N

- What is the restoring force of the (mass-spring) system:  
 A) Elastic force B) weight C) frictional force D) both (B) and(C)are correct
- Which of the following features of a given pendulum changes when the pendulum is moved from Earth's surface to the Moon?  
 A) Its mass B) Its length C) The equilibrium position D) The restoring force
- A mass attached to a spring vibrates back and forth, about equilibrium position, at maximum displacement, the restoring force and the.....  
 A) speed reaches a maximum B) speed reaches zero  
 C) acceleration reaches a maximum D) acceleration reaches zero
- If a pendulum clock is running slow, what must be done to correct the time?  
 A) make the pendulum shorter B) make the pendulum taller  
 C) increasing the mass D) increasing the amplitude
- A 0.77 kg mass attached to a vertical spring stretches the spring 0.3 m. What is the spring constant?  
 A) 0.25 N/m B) 2.5 N/m C) 20 N/m D) 25 N/m
- Which of the following is a correct interpretation of the expression  $a_g = g = G \frac{m_E}{r^2}$  ?  
 A) Gravitational field strength changes with an object's distance from Earth.  
 B) Free- fall acceleration changes with an object's distance from Earth.  
 C) Free- fall acceleration is independent of the falling object's mass.  
 D) All of the above are correct interpretations.
- The angle between the direction of centripetal force  $\vec{F}_c$  and the direction of centripetal acceleration  $\vec{a}_c$  is equal to ?  
 A)  $0^\circ$  B)  $45^\circ$  C)  $90^\circ$  D)  $180^\circ$
- What is the longest wave length of a standing wave of in pipe closed at one end, its length is L?  
 A)  $\lambda_1 = L$  B)  $\lambda_1 = 2L$  C)  $\lambda_1 = 3L$  D)  $\lambda_1 = 4L$
- The Doppler effect occurs in all but which of the following situations:  
 A) A source of sound moves toward a listener B) A listener moves toward a source of sound  
 C) A listener and a source of the sound remain at rest with respect to each other  
 D) A listener and a source of the sound move toward or away from each other

26. A straight segment of wire has length of 25 cm and carries a current of 5 A, If the wire is perpendicular to a magnetic field of 0.6 T, what is the magnitude of the magnetic force on this segment of the wire?  
**A)** 0.075 N **B)** 7.5N **C)** 0.75 N **D)** 75 N
27. A uniform disk of mass 5 kg and radius 0.1 m rotating at angular speed of 20 rad/s calculate its angular momentum of the disk?  
**A)**  $0.2 \text{ kg} \frac{\text{m}^2}{\text{s}}$  **B)**  $0.3 \text{ kg} \frac{\text{m}^2}{\text{s}}$  **C)**  $1 \text{ kg} \frac{\text{m}^2}{\text{s}}$  **D)**  $0.5 \text{ kg} \frac{\text{m}^2}{\text{s}}$
28. A baseball coach shouts loudly at an umpire standing 5 m away. If the sound power produced by the coach is  $3.14 \times 10^{-3} \text{ W}$ , what is the decibel level of the sound when it reaches the umpire?  
**A)** 0 dB **B)** 30 dB **C)** 40 dB **D)** 70 dB
29. The magnetic field of solenoid depends on which of the following factors:  
**A)** number of turns per unit length **B)** amount a current  
**C)** magnetic permeability of the medium ( $\mu$ ) **D)** All the answers are correct
30. A pair of adjacent coils has a mutual inductance of 1.06 H. Determine the average emf induced in the secondary circuit when the current in the primary circuit changes from 0 A to 9.5 A in a time interval of 0.0336s.  
**A)** 117 V **B)** 245 V **C)** -300 V **D)** 300 V
31. An electric current traverses a one loop circular coil of diameter 50 cm. Calculate the intensity of the current if the magnitude of the magnetic field at the center of the coil is  $2\pi \times 10^{-5} \text{ T}$ , [ $\mu_0 = 4\pi \times 10^{-7} \text{ T.m/A}$ ]  
**A)** 10 A **B)** 20 A **C)** 25 A **D)** 30 A
32. An air solenoid of length 10 cm, cross -sectional area  $24.88 \text{ cm}^2$ , and 400 turns. Calculate the coefficient of self-induction of solenoid [ $\mu_0 = 4\pi \times 10^{-7} \text{ T.m/A}$ ]  
**A)**  $2 \times 10^{-3} \text{ H}$  **B)**  $5 \times 10^{-3} \text{ H}$  **C)**  $3 \times 10^{-5} \text{ H}$  **D)**  $3 \times 10^{-4} \text{ H}$
33. In the figure use the movement of the positively charged particle and the direction of the magnetic force acting on it to find the direction of the magnetic field  
**A)** up the page **B)** to the right of page  
**C)** out of the page **D)** down the page
- 
34. An alpha particle ( $q = 3.2 \times 10^{-19} \text{ C}$ ) moves at a speed of  $2.5 \times 10^6 \text{ m/s}$  perpendicular to a magnetic field of strength  $2 \times 10^{-4} \text{ T}$ . What is the magnitude of the magnetic force on the particle?  
**A)**  $1.6 \times 10^{-16} \text{ N}$  **B)**  $-1.6 \times 10^{-16} \text{ N}$  **C)**  $4.0 \times 10^{-9} \text{ N}$  **D)** zero
35. The rate at which a body rotates about an axis?  
**A)** angular displacement ( $\Delta\theta$ ) **B)** tangential acceleration ( $a_t$ )  
**C)** angular speed ( $\omega$ ) **D)** angular acceleration ( $\alpha$ )
36. The unit of magnetic field  $\vec{B}$  is :  
**A)** Tesla (T) **B)**  $\frac{\text{N}}{\text{A.m}}$  **C)**  $\frac{\text{wb}}{\text{m}^2}$  **D)** All the answers are correct
37. A solid ball with a mass of 4.1 kg and a radius of 0.05 m starts from rest at a height of 2 m and rolls down a  $30^\circ$  slope. What is the translational speed of the ball when it leaves the incline?  
**A)** 6.727 m/s **B)** 4.245 m/s **C)** 5.29 m/s **D)** 24 m/s
38. Rapidly inserting the north pole of a bar magnet into a coil of wire connected to a galvanometer causes the needle of the galvanometer to deflect to the right, what must be done to the needle of the galvanometer to the left?  
**A)** pull the north pole of magnet out of the coil **B)** let the magnet sit at rest in the coil  
**C)** thrust the south pole of the magnet into the coil **D)** both (A) and (C) are correct
39. At the time of producing standing wave in which of the following does number of antinodes is greater than number of nodes?  
**A)** vibrating string **B)** pipes open of both end  
**C)** pipes closed at one end **D)** All the answers are correct
40. The galvanometer can be converted to a voltmeter by connecting a resistor of..... to the galvanometer  
**A)** very high resistance in series **B)** very high resistance in parallel  
**C)** very low resistance in parallel **D)** very low resistance in series
41. If an object is in the state of rotational equilibrium which of the following is true?  
**A)**  $\sum \tau = 0$  **B)**  $\alpha = 0$   
**C)** its angular speed constant **D)** All of the them are correct interpretations
42. A disk of mass 0.5 kg and radius 0.1 m rolls without slipping on an inclined plane. What is the total kinetic energy of the disk at the instant when the instantaneous speed of its centre is 1 m/s [ $I = \frac{1}{2} m r^2$ ].  
**A)** 0.375 J **B)** 3.75 J **C)** 375 J **D)**  $3.75 \times 10^3 \text{ J}$
43. What kind of wave does this graph represent?  
**A)** Transverse wave **B)** longitudinal wave  
**C)** electromagnetic wave **D)** radio wave
- 
44. Which of the following sound waves travel faster in the air?  
**A)** audible waves **B)** infrasonic waves  
**C)** ultrasonic waves **D)** All sound waves travel at the same speed in air
45. Which type of interference will happen When two, pulses meet, (as shown in the figure)?  
**A)** destructive interference. **B)** constructive interference  
**C)** complete destructive interference **D)** no interference occur
- 
46. The combination of an applied force and a frictional force produce a constant torque of 36 N.m on a wheel rotating about a fixed axis. The applied force acts for 6 s , during this time the angular speed of the wheel increases from 0 to 12 rad/s. Then the applied force is removed, and the wheel comes to rest in 65 s, what is the frictional torque?  
**A)** -11 N.m **B)** -26.5 N.m **C)** -33 N.m **D)** -3.3 N.m
47. If we increase the length of the pedal arm then the amount of torque applied to moving the front wheel of a bicycle will?  
**A)** Increases **B)** Decreases **C)** Reduce to half **D)** Does not change
48. The machine that converts mechanical energy into electric energy is called:  
**A)** generator **B)** motor **C)** ammeter **D)** microphone
49. Henry (H) =..... **A)**  $\Omega. \text{ m}$  **B)**  $\text{Wb. m}^2$  **C)**  $\frac{\text{wb}}{\text{A}}$  **D)** N. m
50. If the motor's coil turns faster then:  
**A)** The back emf increases **B)** The back emf decreases  
**C)** current of the coil decreases **D)** both (A) and (C) are correct