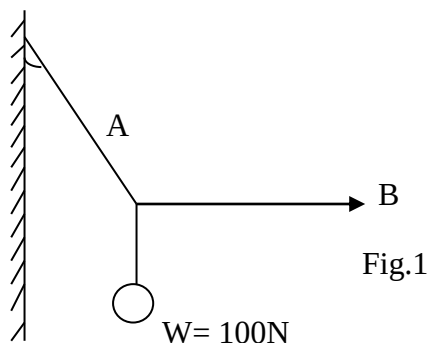


INJIBARA TOWN ADMINISTRATION EDUCATION SECTOR PHYSICS MODEL EXAMINATION FOR GRADE - 12 , June 2012 Time allowed 3 Hrs

- The sum and difference of two non-zero vectors $\vec{A}$ and $\vec{B}$ are equal in magnitude. What can you conclude about these two vectors?
 A. $\vec{A}$ and $\vec{B}$ have the same direction. C. $\vec{A}$ and $\vec{B}$ have the same magnitude.
 B. $\vec{A}$ and $\vec{B}$ have the opposite direction. D. $\vec{A}$ and $\vec{B}$ are perpendicular to each other.
- Suppose $\vec{A} = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k}$, $\vec{B} = -\mathbf{i} - 4\mathbf{j} + 3\mathbf{k}$ and $\vec{C}$ is a vector lying along x-axis with the property that $\vec{A} \cdot (\vec{B} + \vec{C}) = 0$. Then, vector $\vec{C}$ is given by:

A. $-\frac{8}{3}\mathbf{i}$ B. $\frac{3}{\sqrt{10}}\mathbf{j}$ C. $-\frac{11}{3}\mathbf{i}$ D. $\frac{6}{\sqrt{10}}\mathbf{j}$

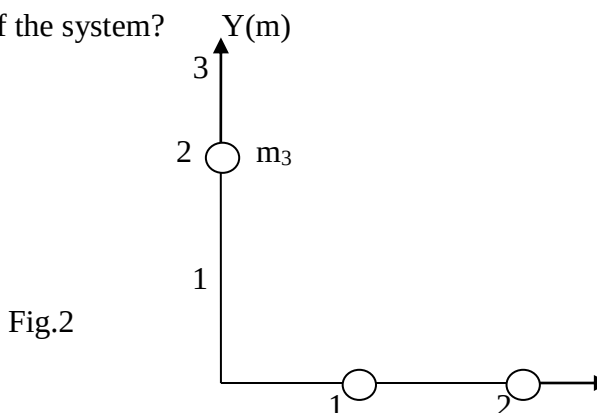
- The x and y coordinates of a particle at any time t is given by $x = 2t + t^3$ and $y = 4t^2 + 8$, x and y are in meters and t in seconds. The magnitude of the acceleration at $t = 1$ second is:
 A. 6m/s^2 B. 10m/s^2 C. 8m/s^2 D. 14m/s^2
- Which of the following is **true** about forces?
 A. The resultant of three forces can never be zero.
 B. The resultant of two forces at right angle can be zero.
 C. The resultant of two forces with different magnitudes is never be zero.
 D. The force acting on a body moving with a constant speed is zero.
- A projectile is fired in a such away that its horizontal range is equal to twice its maximum height. What is the angle of projection? A. 30° B. 45° C. 60° D. 90°
- An object weighing 100N suspended by a rope A shown in fig.1 below is pulled by a horizontal rope B and held so that rope A makes an angle of 30° with the vertical. What are the tensions in the ropes A and B respectively?
 A. 58N, 115N C. 100N, 115N
 B. 115N, 58N D. 100N, 176N



- A ball attached to a string is rotated in a vertical circle. Which one of the following quantity has its maximum value at the lowest point of the path?
 A. The tension in the string C. The acceleration

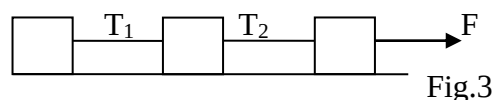
- B. The velocity D. All of the above
8. An object of mass 3kg moving with an initial velocity of $5\mathbf{i}\text{m/s}$, collides with and sticks to an object of mass 2kg with an initial velocity of $-3\mathbf{j}\text{m/s}$. What is the final velocity of the composite object? A. $(3\mathbf{i}+1.2\mathbf{j})\text{m/s}$ B. $(3\mathbf{i}-1.2\mathbf{j})\text{m/s}$ C. $(15\mathbf{i}+6\mathbf{j})\text{m/s}$ D. $(15\mathbf{i}-6\mathbf{j})\text{m/s}$
9. A system consists of three particles where $m_1 = m_2 = 1\text{kg}$ and $m_3 = 2\text{kg}$ located as shown in fig.2 below. What is the center of mass of the system?

- A. $(0.75\mathbf{i}+\mathbf{j})\text{m}$ C. $(2.25\mathbf{i}+3\mathbf{i}+3\mathbf{k})$
B. $(\mathbf{i}+0.75+\mathbf{k})\text{m}$ D. $(0.75\mathbf{i}-\mathbf{j})\text{m}$



10. A 1kg ball moving at 12m/s collides head on with an identical ball moving in opposite direction at 12m/s . After a perfectly elastic collision;
- A. both balls stop.
B. both balls move with the same velocities but direction exchanges.
C. there will not be any change in kinetic energy.
D. B and C are answers
11. An object moves uniformly in circular path. What happens to the centripetal force if the radius of circular path is doubled while it moves with the same speed as before?
- A. It remains the same as before C. It becomes four times as great as before.
B. It becomes half as great as before D. It becomes twice as great as before.
12. A negative point charge of magnitude q is located on the Y-axis at the point $Y=+a$, and second point charge of same magnitude is located at $Y=-a$. If a third positive charge of the same magnitude is located at the origin, then what is the magnitude and direction of force exerted on the charge? A. Zero B. $2kq^2/a^2, (\mathbf{j})$ C. $2kq^2/a^2, (-\mathbf{j})$ D. $2kq^2/a^2, (\mathbf{i})$
13. Three blocks of mass m_1 , m_2 , and m_3 are connected by thread and placed on a horizontal surface as shown in fig.3 below. A force F is applied on the block of mass m_3 in forward diction as shown. Ignoring friction, what is the tension in thread connecting m_2 and m_3 ?

- A. $\frac{m_1 F}{m_1 + m_2 + m_3}$ C. $\frac{m_2 F}{m_1 + m_2 + m_3}$
B. $F - \frac{m_3 F}{m_1 + m_2 + m_3}$ D. $\frac{(m_1 + m_2) F}{m_1 + m_2 + m_3}$



14. In a Young's double slit experiment, the slit separation is doubled. To maintain the same fringe spacing on the screen, the distance D from the slits to the screen must be changed to: A. $D/2$ B. $2D$ C. $\frac{D}{\sqrt{2}}$ D. $4D$

15. If you put a spoon in a cup filled with water, you can observe that the handle of spoon seems to be bent. This is the effect of:

A. reflection of light C. diffraction of light
B. refraction of light D. interference of light

16. The fig 4. below shows, the path of a light ray through three different media. Which one is correctly ranked in order of their indices of the three media?

A. $n_1 > n_2 > n_3$ C. $n_3 > n_2 > n_1$
B. $n_3 > n_1 > n_2$ D. $n_2 > n_1 > n_3$

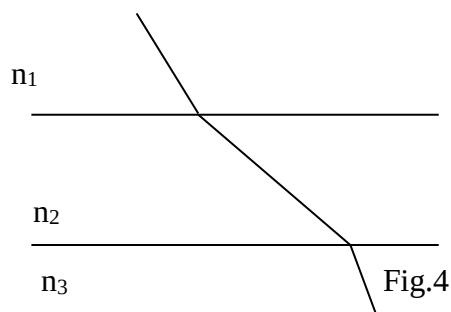


Fig.4

17. We see colourful patterns in soap bubbles or on the surface of puddle oil. This phenomenon is due to:

A. reflection of light waves C. diffraction of light waves
B. refraction of light waves D. interference of light waves

18. An electron travelling **north** enters a region where the electric field is uniform and points **east**. Then the electron: A. speeds up B. slows down C. moves east D. moves west

19. What is the equivalent capacitance of the network shown in fig. 5 below between A and B, where $C_1 = 15\mu\text{F}$, $C_2 = 1\mu\text{F}$ and $C_3 = 3\mu\text{F}$.

A. $1.2\mu\text{F}$
B. $0.83\mu\text{F}$

C. $5\mu\text{F}$
D. $19\mu\text{F}$

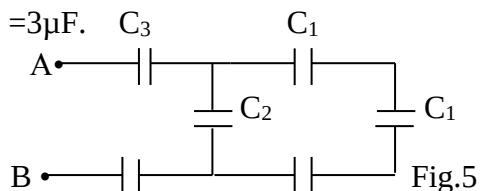


Fig.5

20. A parallel plate capacitor has a fixed charge Q on its plate. The plates are now pulled further apart. Then, the capacitance of the capacitor will:

A. increase B. decrease C. unchanged D. it is impossible to determine

21. What the electrical potential energy of a system of 4 point charges each with charge Q located at the corners of a square of side l?

A. $\frac{KQ(2\sqrt{2}+1)}{l}$ B. $\frac{\sqrt{2}KQ(2\sqrt{2}-1)}{l}$ C. $\frac{KQ(2\sqrt{2}-1)}{l}$ D. $\frac{\sqrt{2}KQ(2\sqrt{2}+1)}{l}$

22. A galvanometer may be used as a voltmeter by

- A. Connecting the galvanometer with shunt resistor in parallel.
 B. Connecting a low resistance in parallel with the galvanometer.
 C. Connecting a low resistance in series.
 D. Connecting a high resistance in series.
23. Two wires of circular cross-section, A and B, are made of the same material and have equal lengths, but the resistance of wire A is three times of that of wire B. What is the ratio of their cross-sectional areas of $\frac{A}{B}$? A. 1/3 B. 3 C. 1/9 D. 9
24. All are correct for a conductor in electrostatic equilibrium, **EXCEPT**:
 A. Electric field is zero inside the conductor.
 B. Any excess charge resides only on the surface.
 C. Electric field is normal to the surface of the conductor.
 D. Electric field is tangent to the surface of the conductor.
25. Consider two point charges +q located at x=a and +q at x= -a. Then the electric potential at any point along y-axis is:
 A. $\frac{2Kq}{a + y}$ B. $\frac{Kq}{\sqrt{a + y}}$ C. $\frac{Kq}{a + y}$ D. $\frac{2Kq}{\sqrt{a + y}}$
26. If electric power is transmitted over long distances through electric cables, then which mode of transmission would result in less power loss?
 A. High current and low voltage. C. High current and high voltage
 B. High voltage and low current. D. Low and low voltage
27. A current of magnitude I divide so as to pass through a 3Ω resistor and 27Ω resistor as shown in fig.6 below. What fraction of current I pass through the 3Ω resistor?

A. $\frac{I}{10}$

B. $\frac{9I}{10}$

C. $\frac{I}{3}$

D. 3I

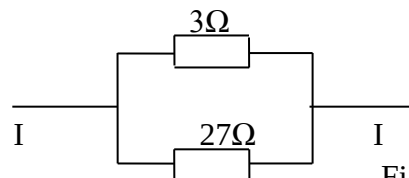
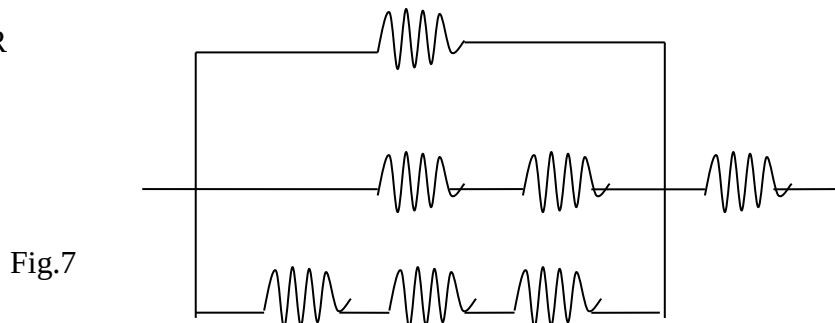


Fig.6

28. Two wires of different materials have uniform current density, they have the same cross-sectional area only if:
 A. their lengths are the same. C. they carry the same current.
 B. their electric fields are the same. D. their potential differences are the same.
29. Why the light in the double slit experiment is most intense in the middle? Since:
 A. The waves produced by each diffraction that reach the middle are in phase.
 B. The waves produced by each diffraction that reach the middle are in antiphase.
 C. The waves produced by each diffraction that reach the middle are interfered destructively. D. B and C are possible answers.

30. Consider the network of identical resistors, each having a resistance R between terminal a and b and a resistor of resistance $\frac{5}{11}R$ between terminal b and d shown in the fig.7 below. What is the equivalent resistance between terminal a and d

- A. $\frac{121}{30}R$ C. R
 B. $\frac{11}{6}R$ D. $3R$



31. The highest theoretical efficiency of a gasoline engine, based on Carnot's cycle is 60%. If this engine expels its gas into atmosphere, that has a temperature of 300K, what is the temperature in the cylinder? A. 180K B. 200K C. 300K D. 750K
32. If the internal energy of the system decreases, then what can be concluded about the heat and the work done? A. Heat is added to the system and work is done by the system
 B. Heat is removed from the system and work is done by the system
 C. Heat is removing from the system and work is done by the system
 D. Heat is added to the system and work is done on the system
33. An ideal gas is at a temperature of 300k. If we wish to double the root mean square (rms) speed of the molecule of the gas, to what value must we rise its temperature?
 A.450k B.600k C.800k D.1200k
- 34.A block of mass 0.25kg is placed on a light vertical spring of a force constant 500N/m and pushed down ward so that the spring compressed to 0.1m.To what maximum height above the point of release it rise?($g=10\text{m/s}^2$) A.1m B.2m C.10m D.20m

35. A ball thrown upward with a speed of $V/2$ reaches height h_1 . Another ball thrown upwards from the same point with a speed of $2V$ reaches a height of h_2 . Then, the ratio of h_2/h_1 is:
- A. $1/16$ B. 16 C. $1/4$ D. 4
36. A boy throws a ball, the ball leaves the boys hand with a velocity of 10m/s and has a mass of 400g . Assuming that the boys hand moved through 1.2m when thrown the ball, what is the average force the boy applied to the ball? A. 12N B. 16.7N C. 18.8N D. 21.3N
37. The necessary and sufficient condition for a rigid body to be in rotational equilibrium if:
- A. the net torque on the body is zero C. its angular acceleration is zero
- B. its center of mass is at rest or moving with constant velocity D. all of the above
38. A block-spring system under goes simple harmonic motion with amplitude A . What happens to the total energy if the mass is doubled?
- A. Doubled B. Halved C. One-fourth D. Quadrupled
39. The sound level at a distance of 4m from a source is 120dB . At what distance is the sound level 100dB ? A. 0.4m B. 4.8m C. 40m D. 48m
40. A ball is thrown downward (not dropped) from the top of a tower. After being released it's downward:
- A. velocity will be uniform C. acceleration will be greater than g
- B. acceleration will be equal to g D. acceleration will be smaller than g
41. The two end fixed string of length 0.5m has a mass per unit length 2g/m . If the tension in the string is 80N , what is the third harmonic frequency?
- A. 400Hz B. 200Hz C. 100Hz D. 600Hz

42. A force is said to be conservative if:

- A. the work done by it on a system moving between two points is independent of the path taken by the system.
- B. the work done by it on a system moving through any closed path is zero.
- C. it acts with in a system causes change in mechanical energy of a system.
- D. A and B are possible answers

43. A uniform ladder of length l weight $W=50N$ rest s against a smooth vertical wall. If the coefficient of static friction between ladder and ground is $\mu=0.5$, what is the minimum angle between the ladder and ground such that the ladder will not slip? A. 45° B. 53° C. 60° D. 37°

44. A large man and a small body stand facing each other on frictionless ice. They put their hands together and put against each other so that they move apart. Who moves away with the higher speed? A. The man B. The boy C. Both have higher speed D. It is difficult to determine

45. A gas is compressed at a constant pressure of $8 \times 10^4 \text{ N/m}^2$ from a volume of $9 \times 10^{-3} \text{ m}^3$ to a volume of $3 \times 10^{-3} \text{ m}^3$. In the process 400J of heat energy flows out of the gas. What are the work done by the gas and the change in internal energy of the gas?

- A. -560J, -160J B. -589J, -189J C. -480J, 80J D. -540J, 140J

46. A point source broadcast sound into a uniform medium. If the distance from the source is tripled, how does the intensity change?

- A. It remains constant
- B. It becomes one-ninth as large
- C. It becomes three times larger
- D. It becomes three times smaller

47. When torque acting upon a system is zero, which one of the following quantities remains constant? A. Force B. Angular momentum C. linear momentum D. Impulse

48. Streamlined object moved more easily through fluid than those of irregular shape. What is the reason for this to happen? A. Viscosity is decreased C. Viscosity is increased
B. Turbulence is decreased D. Turbulence is increased
49. The amount of damping that leads to the oscillator settling back to a stationary state at the equilibrium position in the shortest possible time is; A. light damping C. critical damping
B. heavier damping D. over damping
50. Which one of the following is **not** correct?
- A. The harmonic number is the same as the number of antinodes
 - B. The harmonic number is the same as the number of nodes
 - C. The harmonic is the fundamental frequency
 - D. A string cannot oscillate at several different harmonic frequencies at the same time.
51. A period of oscillation of particle undergoing **SHM** is;
- A. dependent of amplitude of oscillation
 - B. Directly proportional to frequency of oscillation
 - C. Dependent of gravity (g) and spring constant (k) of oscillation
 - D. Independent of mass (m) and length (l) of oscillating object
52. A pipe, 50cm long is open at one end closed at another. When air is blown across the open end sound is produced at 200Hz. What is the velocity of sound along the pipe?
- A. 400m/s B. 800m/s C. 300m/s D.600m/s

53. A single force acts on a 3kg particle like object whose position is given by $X = 3t - 4t^2 + t^3$, with x in meters and t in seconds. What is the work on the object by the force from $t=0$ to $t=3$ second?
- A. 3J B. 6J C. 40.5J D. 67.5J
54. A horizontal pipe has a diameter of 10cm. Fluid flows in the pipe at 1m/s. The pipe is attached to a smaller pipe that has a diameter of 4cm. What is the speed of the fluid in the smaller pipe?
- . A. 0.2m/s B. 1.25m/s C. 6.25m/s D. 12.5m/s
55. Consider a hollow sphere, disc and solid sphere the entire radius starts from rest and roll down without slipping from the top of an inclined plane at the same time, what is the order in which they reach the bottom?
- A. Hollow sphere, disc then solid sphere C. Disk, hollow sphere then solid sphere.
 B. Solid sphere, disc then hollow sphere D. Solid sphere, hollow sphere then disk
56. The position of a particle that under goes a SHM is given by the expression $X = 4m \cos(3\pi t + \pi)$, where x in meters and t in seconds. What is the maximum acceleration of the particle?
- A. $3\pi m/s^2$ B. $3\pi^2 m/s^2$ C. $9\pi m/s^2$ D. $3\pi^2 m/s^2$
57. The first law of thermodynamics takes the form $\Delta Q = \Delta U$, this equation is valid if the process is
- A. isobaric B. isochoric C. isothermal D. adiabatic
58. A string with a string constant 300N/m is stretched 20cm in 2s. What is the power applied to stretched the string?
- A. 3W B. 6W C. 30kW D. 60kW
59. A body of mass 2kg has a moment of inertia about its center of mass of 20 kgm^2 . It is then rotated about an axis which has a displacement of (2,3)m. What is the moment of inertia of the body about the axis (2, 3) m?
- A. 27.2 Kg m^2 B. 20 Kg m^2 C. 37 Kg m^2 D. 53 Kg m^2
60. The flux of the electric field $(24i + 30j + 16k) \text{ N/C}$ through a 2 m^2 portion of the yz- plane is:
- A. $32 \text{ N.m}^2/\text{C}$ B. $60 \text{ N.m}^2/\text{C}$ C. $42 \text{ N.m}^2/\text{C}$ D. $48 \text{ N.m}^2/\text{C}$

61. A disk of mass m and radius R rolls down an inclined plane of height h without slipping. What is the velocity of the disk at the bottom of the inclined plane?
- A. $\sqrt{gh}$ B. $\sqrt{\frac{4}{3}gh}$ C. $\sqrt{2gh}$ D. $2\sqrt{gh}$
62. 600nm light is incident on a diffraction grating with slits separation $2\mu\text{m}$. The second order line occurs at a diffraction angle of: A. 37° B. 53° C. 45° D. 60°
63. The angle of rotation of the reel of a tape recorder is defined as $\theta = 1.2t + t^2$, where θ is measured in radians and t in seconds. What is the linear acceleration of a point on the rim of the reel at $t = 2\text{sec}$? A. 5.2m/s^2 B. 2m/s^2 C. 6.4m/s^2 D. 4m/s^2
64. A 100kg block is pulled at a constant speed of 5m/s across a horizontal floor by an applied force of 122N directed 37° above the horizontal. What is the rate at which the force does work on the block? (Use $\sin 37^\circ = \cos 53^\circ = 0.6$, $\sin 53^\circ = \cos 37^\circ = 0.8$).
- A. 12200W B. 7320W C. 61000W D. 9760W
65. The block moves downward an inclined plane that makes an angle of θ with the horizontal. If the coefficient of friction between the block and inclined plane is μ , an expression for the acceleration when the block moves down on the plane is:
- A. $g \sin \theta$ B. $\mu g \cos \theta$ C. $g (\sin \theta - \cos \theta)$ D. $g (\sin \theta - \mu \cos \theta)$
66. For a system involving a reversible process:
- A. its entropy increases. C. its entropy remains constant.
B. its entropy decreases. D. there is an energy loss.
67. A helium gas ($\gamma = 1.67$) initial at pressure p and with a volume v , is expanded adiabatically to volume $2v$, then the ratio of the final pressure to the initial pressure is:
- A. 2^γ B. $(1/2)^\gamma$ C. 2γ D. $1/\gamma$

68. Which one of the following statements is NOT true about the interference pattern produced by a double slit?
- A. Narrowing the slits will produce a sharper image.
 - B. The wide of the bright fringes and dark fringes is equal.
 - C. Bright fringes occur if the path difference is equal to an integral multiple of a wave length.
 - D. The central maxima is twice as large as the first order maxima.
69. If the molar mass of a gas increases what can we say about the **rms** speed of the gas molecules?
- A. Increases B. Decreases C. Remains constant D. None
70. A dielectric is inserted into a capacitor while the charge on it is kept constant. What happen to the potential difference and the energy stored?
- A. The p.d decreases and the stored energy increases.
 - B. The p.d increases and the stored energy decreases.
 - C. Both the p.d and the stored energy increase.
 - D. Both the p.d and the stored energy decrease.
71. A fixed mass of gas occupies a volume of 3000m³ at a pressure P at temperature T. What will be its volume when both pressure and temperature are doubled? A. 1000cm³ B. 2000cm³
C. 4000cm³ D. 3000cm³

REMARKS FORM SCHOOL:1. Please check current notice of the school every time via Facebook: [agewmidir mesenado](#)2. Please submit your answer with full your information for all subjects from JUNE 4-12/12 via school sites Telegram : [agewmidir mesenado](#) Email: agewmidir2006@gmail.com Or soft copy using any flash ,CDRM.

Answers for physic

1		21		41		61	
2		22		42		62	
3		23		43		63	
4		24		44		64	
5		25		45		65	
6		26		46		66	
7		27		47		67	
8		28		48		68	
9		29		49		69	
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