INDIAN SCHOOL MUSCAT
HALF YEARLY EXAMINATION
SEPTEMBER 2019

## CLASS XI <br> Marking Scheme - SUBJECT [THEORY]

| Q.NO. | Answers | Marks <br> (with split up) |
| :---: | :---: | :---: |
| 1. | (a) That ground exerts on the horse | 1 |
| 2. | (c)OR (a)mark is rewarded if any of these options are written | 1 |
| 3. | (a)Larger friction | 1 |
| 4. | (a)zero | 1 |
| 5. | (a) Impulse | 1 |
| 6. | (a) 4.9 cm | 1 |
| 7. | (b) 100 km | 1 |
| 8. | (b)its acceleration is constant | 1 |
| 9. | (c) $2 \mathrm{r}, \pi \mathrm{r}$ | 1 |
| 10. | (d)The particle moves at a constant velocity upto time $\mathrm{t}_{0}$ and then stops. | 1 |
| 11. | (d) 2 v | 1 |
| 12. | (c) $90^{0}$ | 1 |
| 13. | (c)Taking of an aircraft. | 1 |
| 14. | (a) 55 | 1 |
| 15. | (b) $\sqrt{\frac{2 h}{g}}$ | 1 |
| 16. | C 14\% | 1 |
| 17. | C five | 1 |
| 18. | C gravitational force | 1 |
| 19. | B distance | 1 |
| 20. | A tension and surface tension | 1 |
| 21. | (i) Statement of polygon law of vector addition. <br> (ii) Definition of displacement vector and unit vector. OR <br> (i) Statement of parallelogram law of vector addition. <br> (ii) Definition of equal vector and null vector. | $\begin{aligned} & 1 \\ & 1 / 2+1 / 2 \\ & 1 \\ & 1 / 2+1 / 2 \end{aligned}$ |
| 22. | Proving equation $s=u t+\frac{1}{2} a t^{2}$ is dimensionally correct | 2 |
| 23. | any two differences between inertial mass and gravitational mass. | 2 |
| 24. | (i) any two properties of strong nuclear force. <br> (ii) the relative strength of various forces in nature. | $\begin{aligned} & \hline 1 \\ & 1 \\ & \hline \end{aligned}$ |


| 25. | Both does not represent one dimensional motion <br> (i) speed is never negative <br> (ii) total path length can never be negative | $\begin{aligned} & 1 / 2+1 / 2 \\ & 1 / 2 \\ & 1 / 2 \end{aligned}$ |
| :---: | :---: | :---: |
| 26. | (i) In empty space there is no reaction force <br> (ii) Reason for a cricketer moving his hands backwards while holding a catch. OR <br> (i) Kinetic friction is less than static friction. <br> (ii) rolling friction is less than sliding friction | 1 <br> 1 <br> 1 <br> 1 |
| 27. | Advantages and disadvantages of friction (any 2 points each) | 1+1 |
| 28. | ```Formula;t=10s Formula ; R=980m Formula; \(\mathrm{v}=138.57 \mathrm{~m} / \mathrm{s}\) Initial \(K E=1 / 2 \mathrm{mu}^{2}\) Velocity at the top \(=u \cos \theta\) KE at the top \(=1 / 2 \mathrm{mu}^{2} \cos ^{2} \theta\) \(3 / 4 \quad 1 / 2 m u^{2}=1 / 2 m u^{2} \cos ^{2} \theta\) \(\cos ^{2} \theta=3 / 4\) \(\theta=30\)``` | $\begin{aligned} & 1 / 2+1 / 2 \\ & 1 / 2+1 / 2 \\ & 1 / 2+1 / 2 \\ & 1 / 2 \\ & 1 / 2 \\ & 1 / 2 \\ & 1 / 2 \\ & 1 / 2 \\ & 1 / 2 \\ & 1 / 2 \end{aligned}$ |
| 29. | Free body diagram for a vehicle moving on a banked road obtaining equation for maximum velocity required for a vehicle on a banked circular road | $\begin{aligned} & 1 \\ & 2 \end{aligned}$ |
| 30. | angular velocity $=\pi / 30 \mathrm{rad} / \mathrm{min}$ <br> Proving the vector addition is commutative.(diagram+proof) | $\begin{aligned} & 1 \\ & 1 / 2+11 / 2 \end{aligned}$ |
| 31. | Free body diagrams for pulling and pushing and derivation | $\begin{aligned} & 1 / 2+1 / 2 \\ & 1+1 \\ & \hline \end{aligned}$ |
| 32. | Proving path of a projectile is a parabola Diagram+ introduction proof | $\begin{aligned} & 1 \\ & 2 \end{aligned}$ |


| 33. | Instantaneous velocity-definition <br> Deriving expression for distance travelled in the nth second | $\begin{aligned} & 1 \\ & 2 \\ & \hline \end{aligned}$ |
| :---: | :---: | :---: |
| 34. | (i) any two advantages of SI system over other systems of units. <br> (ii) Dimension of $\mathrm{a}=\left[M L^{1 / 2} T^{-2}\right]$ <br> Dimension of $\mathrm{b}=\left[M L T^{-4}\right\rfloor$ <br> OR <br> (i) any two limitations of the method of dimensional analysis. <br> (ii) Unit of $b=m / s$ <br> Unit of $\mathrm{c}=\mathrm{m} / \mathrm{s}^{2}$ | $\begin{aligned} & \hline 1 \\ & 1 \\ & 1 \end{aligned}$ <br> 1 <br> 1 <br> 1 |
| 35. | (i) Obtaining an expression for centripetal acceleration of an object in uniform circular motion in a plane. <br> (diagram and derivation) <br> (ii) for formula the angle of projection at which the horizontal range and maximum height of a projectile are equal $=75.96^{\circ}$ (getting the answer) <br> OR <br> (i) obtaining an expression for time of flight, horizontal range and maximum height attained. <br> (ii) getting $\mathrm{v}=288.68 \mathrm{~km} / \mathrm{h}$ $\mathrm{V}_{\mathrm{y}}=144.34 \mathrm{~km} / \mathrm{h}$ | $\begin{aligned} & 1+2 \\ & 1 / 2+1 / 2 \\ & 1 \\ & 1+1+1 \\ & 1+1 \end{aligned}$ |
| 36. | (i) <br> (ii) Both the balls will rise to the same height. Because height attained is independent of mass of the body. <br> (iii) velocity-time graph of uniform motion and introduction proving displacement of an object in a time interval is equal to the area under velocity-time graph in that time interval. | 1 <br> $1 / 2+1 / 2$ <br> $1 / 2+1 / 2$ <br> 2 <br> 1 |


|  |  <br> (i) or any relevant graph <br> (ii) Yes. Uniform circular motion <br> (iii) velocity-time graph of uniform motion and introduction Deriving the relation $v^{2}=u^{2}+2$ as for uniformly accelerated motion of an object along a straight line. | $\begin{aligned} & 1 \\ & 1 \\ & 2 \end{aligned}$ |
| :---: | :---: | :---: |
| 37. | (i) Newton's second law of motion(Statement) Getting first law from second law Getting third law from second law <br> (ii) $\mathrm{a}=0.5 \mathrm{~m} / \mathrm{s}^{2}$ $\mathrm{v}=15 \mathrm{~m} / \mathrm{s}$ <br> OR <br> (i) law of conservation of linear momentum(statement) Proof <br> (ii) $\begin{gathered} T_{1} \cos \theta=T_{2}=60 \mathrm{~N} \\ \mathrm{~T}_{1} \sin \theta=50 \mathrm{~N} \\ \tan \theta:=5 / 6 \\ \Theta=39.8 \end{gathered}$ | $\begin{aligned} & \hline 1 \\ & 1 \\ & 1 \\ & 1 \\ & 1 \\ & \\ & 1+2 \\ & 1 / 2+1 / 2 \\ & 1 / 2 \\ & 1 / 2 \end{aligned}$ |

