WEEKLY TEST TYM TEST - 16 Balliwala
SOLUTION Date 11-08-2019

[PHYSICS]

1. (c) $v = r\omega \Rightarrow \omega = \dfrac{v}{r}$ = constant [As v and r are constant]

2. (c) As time periods are equal therefore ratio of angular speeds will be same. $\omega = \dfrac{2\pi}{T}$

3. (b) Work done by centripetal force is always zero.

4. (c) Stone flies in the direction of instantaneous velocity due to inertia

5. (a) $F = \dfrac{mv^2}{r}$. If m and v are constants then $F \propto \dfrac{1}{r}$

   $\therefore \dfrac{F_1}{F_2} = \left(\dfrac{r_2}{r_1}\right)$

6. (a,c) Centripetal force $= \dfrac{mv^2}{r}$ and is directed always towards the centre of circle. Sense of rotation does not affect magnitude and direction of this centripetal force.

7. D

8. (a) Thrust at the lowest point of concave bridge

   $= mg + \dfrac{mv^2}{r}$

9. (a) $\dfrac{a_R}{a_r} = \dfrac{\omega_R^2 \times R}{\omega_r^2 \times r} = \dfrac{T_r^2}{T_R^2} \times \dfrac{R}{r} = \dfrac{R}{r}$ [As $T_r = T_R$]

10. (c) $\omega_{min} = \dfrac{2\pi}{60} \dfrac{Rad}{min}$ and $\omega_{hr} = \dfrac{2\pi}{12 \times 60} \dfrac{Rad}{min}$

    $\therefore \dfrac{\omega_{min}}{\omega_{hr}} = \dfrac{2\pi/60}{2\pi/12 \times 60}$
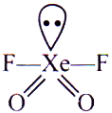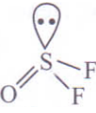
11. (b) $v = 72\, km/hour = 20\, m/sec$

    $\theta = \tan^{-1}\left(\dfrac{v^2}{rg}\right) = \tan^{-1}\left(\dfrac{20 \times 20}{20 \times 10}\right) = \tan^{-1}(2)$

12. (d) $120\, rev/\min = 120 \times \dfrac{2\pi}{60}\, rad/sec = 4\pi\, rad/sec$

13.   (d) Maximum tension $= m\omega^2 r = m \times 4\pi^2 \times n^2 \times r$

        By substituting the values we get $T_{max} = 87.64\ N$

14.   (d) $\dfrac{v^2}{rg} = \dfrac{h}{l} \Rightarrow v = \sqrt{\dfrac{rgh}{l}} = \sqrt{\dfrac{50 \times 1.5 \times 9.8}{10}} = 8.57\,m/s$

15.   (b) $a = \omega^2 r = 4\pi^2 n^2 r = 4\pi^2 \times 1^2 \times 20 \times 10^3$

        $\therefore$ a $= 8 \times 10^5\ m/sec^2$

[CHEMISTRY]

16.

17. $CH_2{=}CH{-}CH_2{-}C{\equiv}CH$ has 10σ-bonds are 3π-bonds

18. SiF_4 is tetrahedral and SF_4 is see-saw shaped.

19. $BrO_3^{\ominus}$ and XeO_3 both have sp^3-hybridisation and pyramidal shape.

20. $\overset{\otimes}{N}O_2$ is $O = \overset{\otimes}{N} = O$ linear ion.

21. BF_3 and NO_2^- have sp^2-hybridised central atom while NH_2^- and H_2O have sp^3 hybridised central atom.

22. sp^2-hybridisation

23.

24.

26.   Bond orders of O_2^{2-}, O_2^-, O_2 and O_2^+ are 1, 1.5, 2 and 2.5 respectively. (Please, refer to the text article no. 5.25)

28.   NO has 15 electrons : KK $(\sigma_{1s})^2\ (\pi^*_{1s})\ (\pi_{2p_x})^2 (\pi_{2p_y})^2 (\sigma_{2p_z})^2 (\pi^*_{2p_x})^1$ with bond order 2.5, paramagnetic nature.

    NO^+ has 14 electrons, where $(\pi^*_{2p_z})^1$ electron is lost. The bond order increases to 3 and diamagnetic nature is attained.