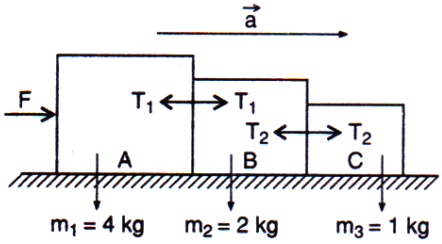
WEEKLY TEST TYJ-02 TEST -9 RAJPUR ROAD
SOLUTION Date 22-09-2019

[PHYSICS]

1. According to free body diagram of block A,



$F - T_1 = m_1a$ .....(i)
$T_1 - T_2 = m_2a$ .....(ii)
$T_2 = m_3a$ .....(iii)
Addding all the three eqns., we get

$F = (m_1 + m_2 + m_3)a$ or $a = \frac{F}{m_1 + m_2 + m_2}$

$= \frac{14}{4+2+1}$

Putting in eqn. (i), contact force between A and B is
$T_1 = F - m_1a = 14 - 4 \times 2 = 6$ N
Hence, correct option is (a)

2. Time periof of a simple pendulum is given :

$T = 2\pi\sqrt{\frac{l}{g}}$ or $T \propto \sqrt{\frac{l}{g}}$

When the elevator is accelerating downwards, then net gravitational acceleration is (g – a). So, the time period when elevator is accelerating downwards, is greatest.

3. As per Newton's third law of motion, when a horse pulls a wagon, the force that causes the horse to move forward is the force the ground exerts on it.

4. $F = \frac{d}{dt}(Mv) = v\frac{dM}{dt} + M\frac{dv}{dt}$

As v is a constant, $F = v\frac{dM}{dt}$

But $\frac{dM}{dt} = M$ kg/s

∴ To keep the conveyer belt moving at v m/s,
Force needed = vM newton

5.

6. $F - Mg = Ma$
$8000 = 2000\ a$
∴ Acceleration is 4 ms^{-2} upwards

7. Considering free-body diagrams of the masses, we have
$T - 3g = 3a$ and $5g - T = 5a$
Solving for T, we have
$T = (15/4)g$
$\therefore$ F = Force on the pulley

$$= 2T = 2 \times \frac{15}{4} = 7.5 \text{ kg f}$$

8. Change in momentum in one sec, i.e.,
F = change in momentum per bullet × no. of bullets fired per second
= mv × n = mnv

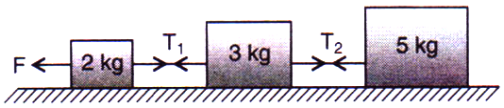
9. $$T_2 = \frac{6}{6+6+6}F = \frac{F}{3}$$

10. For a body to the equilibrium, it should exist both in translational equilibrium.
For translational equilibruim, $\Sigma F = 0$
and for rotational equilibrium, $\Sigma \tau = 0$

11. Acceleration of the mass m_3 = common acceleration of the system $= \frac{F}{\text{total mass}} = \frac{F}{m_1 + m_2 + m_2}$

12. One of the weights given a reading and the other prevents the acceleration of the styem. Therefore, the reading is not zero but 10 N.

13. Equations of motion are :
$F - T_1 = 2a$ .....(i)
$T_1 - T_2 = 3a$ ....(ii)
$T_2 = 5a$ ....(iii)
Adding all above equations, we get;
$F = 10a = 10 \times 1 = 10$ N



14. The tension in the string between P and Q accelerates double the mass as compared to that between A and R. Hence, tension between P and Q = 2 × tension between Q and R

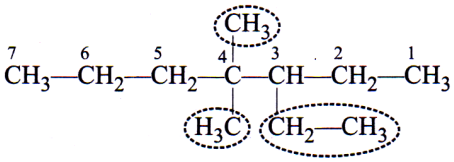
15. $T\cos\theta = T_1 = 10 \times g$
$T\sin\theta = 98$

$\therefore$ $\tan\theta = \frac{98}{10 \times 9.8} = 1$ or $\theta = 45^\circ$

[CHEMISTRY]

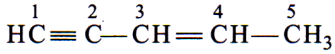
16.

17.



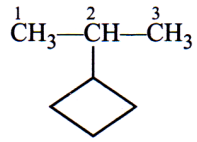
3-Ethyl-4, 4-dimethylheptane

18.



Pent-3-en-1-yne

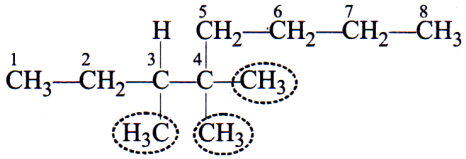
19.



(2-Propyl) cyclobutane

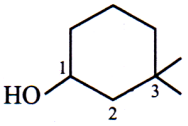
20.

The compound can be expanded as



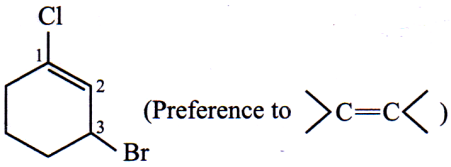
IUPAC name is **3, 4, 4-trimethyloctane.**

21.



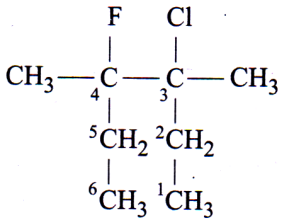
3, 3-Dimethyl cyclohexan-1-ol is the proper IUPAC name as per 1993 rules. The given answer is as per the old IUPAC rules, still prevalent.

22.



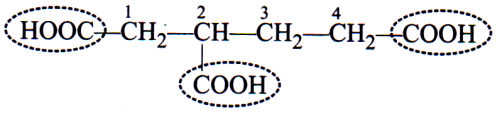
3-Bromo-1-chlorocyclohexene

23.



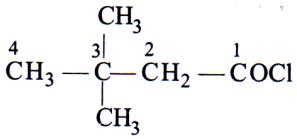
3-Chloro-4-fluoro-3, 4-dimethylhexane

24.



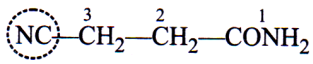
Butane-1,2, 4-tricarboxylic acid

25.



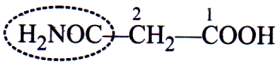
3,3-Dimethylbutanoyl chloride

26.



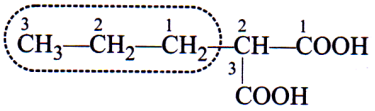
3-Cyanopropanamide

27.



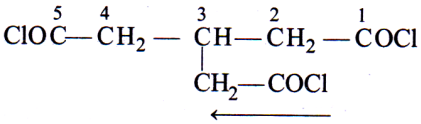
2-Carbamoylethanoic acid

28.



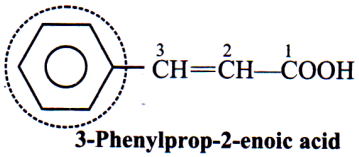
2-(Prop-1-yl) propane-1, 3-dioic acid

29.



3 - (Chloroformylmethyl) pentane-1, 5-dioyl chloride

30.



3-Phenylprop-2-enoic acid

Its trivial name is cinnamic acid.