1. **A car travels a distance *S* on a straight road in two hours and then returns to the starting point in the next three hours. Its average velocity is**

(a) ** (b)  (c) (d) None of the above

1. **A thief is running away on a straight road in jeep moving with a speed of 9 A police man chases him on a motor cycle moving at a speed of 10If the instantaneous separation of the jeep from the motorcycle is 100 *m*, how long will it take for the police to catch the thief**

(a) 1 *s* (b) 19 (c) 90 *s* (d) 100 *s*

1. **A car *A* is travelling on a straight level road with a uniform speed of 60It is followed by another car *B* which is moving with a speed of 70 When the distance between them is 2.5 *km*, the car *B* is given a deceleration of 20After how much time will *B* catch up with *A***

(a) 1 *hr* (b) 1/2 *hr* (c) 1/4 *hr* (d) 1/8 *hr*

1. **A particle is moving in a straight line and passes through a point with a velocity of The particle moves with a constant retardation of for 4 *s* and there after moves with constant velocity. How long after leaving does the particle return to **

(a)  (b)  (c) Never (d) 

1. **A balloon rises from rest with a constant acceleration . A stone is released from it when it has risen to height *h.* The time taken by the stone to reach the ground is**

(a) (b) **** (c) (d) 

1. **Two bodies are thrown simultaneously from a tower with same initial velocity one vertically upwards, the other vertically downwards. The distance between the two bodies after time *t* is**

(a) (b) **** (c) (d) 

1. **A body falls freely from the top of a tower. It covers 36% of the total height in the last second before striking the ground level. The height of the tower is**

(a) 50 *m* (b) 75 *m* (c) 100 *m* (d) 125 *m*

1. **Four marbles are dropped from the top of a tower one after the other with an interval of one second. The first one reaches the ground after 4 *seconds*. When the first one reaches the ground the distances between the first and second, the second and third and the third and forth will be respectively**

(a) 35, 25 and 15 *m* (b) 30, 20 and 10 *m* (c) 20, 10 and 5 *m* (d) 40, 30 and 20 *m*

1. **A small body of mass  slides down from the top of a hemisphere of radius . The surface of block and hemisphere are frictionless. The height at which the body lose contact with the surface of the sphere is**

*h*

*r*

(a)  (b) 

(c)  (d) 

1. **A body of mass  kg is rotating in a vertical circle at the end of a string of length  metre. The difference in the kinetic energy at the top and the bottom of the circle is**

(a)  (b)  (c)  (d) 

1. **A car is travelling with linear velocity  on a circular road of radius . If it is increasing its speed at the rate of  , then the resultant acceleration will be**

(a)  (b)  (c)  (d) 

1. **A ball of mass 0.1 *kg* is suspended by a string. It is displaced through an angle of  and left. When the ball passes through the mean position, the tension in the string is**

(a) 19.6 *N* (b) 1.96 *N* (c) 9.8 *N* (d) Zero

1. **A cannon on a level plane is aimed at an angle  above the horizontal and a shell is fired with a muzzle velocity  towards a vertical cliff a distance *D* away. Then the height from the bottom at which the shell strikes the side walls of the cliff is**

(a)  (b)  (c)  (d) 

1. **A stone is projected from the ground with velocity 50 *m/s* at an angle of . It crosses a wall after 3 *sec*. How far beyond the wall the stone will strike the ground **

(a) 90.2 *m* (b) 89.6 *m* (c) 86.6 *m* (d) 70.2 *m*

1. **A body of mass  is projected at an angle of  with the horizontal. If air resistance is negligible, then total change in momentum when it strikes the ground is**

(a)  (b) (c)  (d) 

1. **A ball of mass  is thrown vertically upwards. Another ball of mass  is thrown at an angle  with the vertical. Both of them stay in air for same period of time. The heights attained by the two balls are in the ratio of**

(a) 2 : 1 (b)  (c) 1 : 1 (d) 

1. **A particle is projected with a velocity *v* such that its range on the horizontal plane is twice the greatest height attained by it. The range of the projectile is (where  is acceleration due to gravity)**

(a)  (b)  (c)  (d) 

1. **A nucleus *ZXA* emits 9*α*-particles and 5*p* particle. The ratio of total protons and neutrons in the final nucleus is**

(a)  (b)  (c)  (d) 

1. **If *t*1/2 is the half life of a substance then *t*3/4 is the time in which substance**

(a) Decays  (b) Remains  (c) Decays  (d) Remains 

1. **At a given instant there are 25% undecayed radioactive nuclei in a same. After 10 *sec* the number of undecayed nuclei reduces to 6.25%, the mean life of the nuclei is**

(a) 14.43 *sec* (b) 7.21 *sec* (c)5 *sec* (d) 10 *sec*

1. **Highly energetic electrons are bombarded on a target of an element containing 30 neutrons. The ratio of radii of nucleus to that of Helium nucleus is . The atomic number of nucleus will be**

(a) 25 (b) 26 (c)56 (d) 30

1. **Which sample contains greater number of nuclei :**

**a 5.00- *μCi* sample of 240*Pu* (half-life 6560*y*) or a 4.45-*μCi* sample of 243*Am* (half-life 7370 *y*)**

(a) 240*Pu* (b) 243*Am* (c)Equal in both (d) None of these

1. **The fission of 235*U* can be triggered by the absorption of a slow neutrons by a nucleus. Similarly a slow proton can also be used. This statement is**

(a) Correct (b) Wrong(c) Information is insufficient (d) None of these

1. **The radioactivity of a given sample of whisky due to tritium (half life 12.3 years) was found to be only 3% of that measured in a recently purchased bottle marked "7 years old". The sample must have been prepared about**

(a) 220 years back (b) 300 years back (c) 400 years back (d) 70 years back

1. **In the following circuit *I*1 and *I*2 are respectively**

12*k*Ω

10 *V*

*i*1

14*k*Ω

2*k*Ω

*i*2

(a) 0, 0

(b) 5 *mA*, 5 *mA*

(c) 5 *mA*, 0

(d) 0, 5 *mA*

1. **In space charge limited region, the plate current in a diode is 10 *mA* for plate voltage 150 *V*. If the plate voltage is increased to 600 *V*, then the plate current will be**

(a) 10 *mA* (b) 40 *mA* (c) 80 *mA* (d) 160 *mA*

1. **A triode has a plate resistance of 10 *k*Ω and amplification factor 24. If the input signal voltage is 0.4 *V* (*r.m.s.*), and the load resistance is 10 *k* *ohm*, then, the output voltage (*r.m.s.*) is**

(a) 4.8 *V* (b) 9.6 *V* (c) 12.0 *V* (d) None of these

1. **Pure sodium (*Na*) is a good conductor of electricity because the 3*s* and 3*p* atomic bands overlap to form a partially filled conduction band. By contrast the ionic sodium chloride (*NaCl*) crystal is**

(a) Insulator (b) Conductor (c) Semiconductor (d) None of these

1. **Would there be any advantage to adding *n*-type or *p*-type impurities to copper**

(a) Yes (b) No (c) May be (d) Information is insufficient

1. **In the following common emitter circuit if *β* = 100, *VCE* = 7*V*, *VBE* = Negligible *RC* = 2 *k*Ω then *IB* = ?**

(a) 0.01 *mA*

15 *V*

*R­B*

*iB*

*iC*

*B*

*C*

*E*

*R­C*

(b) 0.04 *mA*

(c) 0.02 *mA*

(d) 0.03 *mA*