

INTENSIVE REVISION QUESTIONS (ERQ)
SET 20-MOTION ALONG THE STRAIGHT LINE

Name :

Form :

Teacher:

1. A particle moves along a straight line and passes through a fixed point O . Its displacement, s m, from point O is given by $s = 3t + 2t^2 - 10t^3$, where t is the time, in seconds, after passing through point O . Find the acceleration function of the particle. [5 marks]
2. A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by $v = 41 + 4t - t^2$, where t is the time, in seconds, after passing through point O . Find
 - (a) the initial acceleration of the particle,
 - (b) the acceleration of the particle at
 - (i) $t = 2$,
 - (ii) $t = 3$,
 - (iii) $t = 4$.[8 marks]
3. A particle moves along a straight line through a fixed point O . Its displacement, s m is given by $s = 18t^2 - 6t^3$, where t is the time in seconds after passing through O . Find
 - (a) the time when the particle returns to O again,
 - (b) the velocity of the particle when this occur,
 - (c) the maximum velocity of the particle.[10 marks]
4. A particle moves along a straight line and passes through a fixed point O with a velocity of 14 ms^{-1} . Its acceleration, $a \text{ ms}^{-2}$, t s after passing through point O is given by $a = 15 - 2t$. Find the velocity function of the particle. [5 marks]
5. A particle moves along a straight line from a fixed point O , with a velocity $v \text{ ms}^{-1}$, which is given by $v = 4 - 2t$, where t is the time in seconds after passing through O . Find
 - (a) the initial velocity of the particle,
 - (b) the displacement of the particle when it stops momentarily,
 - (c) the acceleration of the particle.[10 marks]
6. A particle moves along a straight line and passes through a fixed point O . Its displacement, s m, from point O is given by $s = 3t + 2t^2 - 3t^3$, where t is the time, in seconds, after passing through point O . Find the acceleration function of the particle. [5 marks]
7. A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by $v = 24 - 43t - t^2$, where t is the time, in seconds, after passing

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- through point O . Find the acceleration of the particle at $t = 5$. [5 marks]
8. A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by $v = 7t^2 - 6t + 46$, where t is the time, in seconds, after passing through point O . Find
 (a) the velocity of the particle when its acceleration is zero,
 (b) the range of values of t for which the acceleration of the particle is negative. [6 marks]
9. A particle moves along a straight line and passes through a fixed point O . Its displacement, $s \text{ m}$, from point O is given by $s = 2t + 4t^2 - 8t^3$, where t is the time, in seconds, after passing through point O . Find the acceleration function of the particle. [5 marks]
10. A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by $v = 26 - 13t - t^2$, where t is the time, in seconds, after passing through point O . Find the acceleration of the particle at $t = 5$. [5 marks]
11. A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by $v = 9 - 35t - t^2$, where t is the time, in seconds, after passing through point O . Find the acceleration of the particle at $t = 5$. [5 marks]
12. A particle moves along a straight line passing through a fixed point O . Its velocity, $v \text{ m s}^{-1}$ is given by $v = 4 - 4t$, where t is the time in seconds after passing through O . The initial displacement of the particle is 16 m to the right of O . Find
 (a) the range of t for which the velocity is positive,
 (b) the time where the particle is 16 m to the right of O again,
 (c) the velocity of the particle when it returns to O again. [10 marks]
13. A particle moves along a straight line and passes through a fixed point O with a velocity of 36 ms^{-1} . Its acceleration, $a \text{ ms}^{-2}$, $t \text{ s}$ after passing through point O is given by $a = 50 - 2t$. Find the velocity function of the particle. [5 marks]
14. A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by $v = 5 - 2t - t^2$, where t is the time, in seconds, after passing through point O . Find the acceleration of the particle at $t = 5$. [5 marks]
15. A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by $v = 7t^2 - 8t + 39$, where t is the time, in seconds, after passing through point O . Find
 (a) the velocity of the particle when its acceleration is zero,
 (b) the range of values of t for which the acceleration of the particle is negative. [6 marks]
16. A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by $v = 27 - 14t - t^2$, where t is the time, in seconds, after passing

- through point O . Find the acceleration of the particle at $t = 5$. [5 marks]
17. A particle moves along a straight line and passes through a fixed point O . Its displacement, s m, from point O is given by $s = 2t + 4t^2 - 9t^3$, where t is the time, in seconds, after passing through point O . Find the acceleration function of the particle. [5 marks]
18. A particle moves along a straight line and passes through a fixed point O . Its displacement, s m, from point O is given by $s = 2t + 2t^2 - 6t^3$, where t is the time, in seconds, after passing through point O . Find the acceleration function of the particle. [5 marks]
19. Two particles, A and B , moving along a straight line and passes through a fixed point O . The displacement of A and B are $s_A = 2t^2 + t$ and $s_B = 12 + 3t$ respectively, where t is the time in seconds after passes through O . Find
 (a) the time when particle A overtakes particle B ,
 (b) the velocity of particle A and particle B when this occur,
 (c) their displacements when this occurs. [10 marks]
20. A particle moves along a straight line and passes through a fixed point O . Its velocity, v ms^{-1} , is given by $v = 16 + 46t - t^2$, where t is the time, in seconds, after passing through point O . Find
 (a) the initial acceleration of the particle,
 (b) the acceleration of the particle at
 (i) $t = 2$,
 (ii) $t = 3$,
 (iii) $t = 4$. [8 marks]

Answers:

1. $a = 4 - 60t$
2. (a) 4 ms^{-2}
 (b)(i) 0 ms^{-2}
 (ii) -2 ms^{-2}
 (iii) -4 ms^{-2}
3. (a) $t = 3$
 (b) -54 m s^{-1}
 (c) 18 m s^{-1}
4. $v = 15t - t^2 + 14$
5. (a) 4 m s^{-1}
 (b) 4 m
 (c) -2 m s^{-2}
6. $a = 4 - 18t$
7. -53 ms^{-2}
8. (a) 44.71 ms^{-1}
 (b) $0 \leq t < 0.43$

9. $a = 8 - 48t$
10. -23 ms^{-2}
11. -45 ms^{-2}
12. (a) $t < 1$
(b) $t = 2$
(c) -12 m s^{-1}
13. $v = 50t - t^2 + 36$
14. -12 ms^{-2}
15. (a) 36.71 ms^{-1}
(b) $0 \leq t < 0.57$
16. -24 ms^{-2}
17. $a = 8 - 54t$
18. $a = 4 - 36t$
19. (a) $t = 3$
(b) velocity of particle $A = 13 \text{ m s}^{-1}$, velocity of particle $B = 3 \text{ m s}^{-1}$
(c) 21 m
20. (a) 46 ms^{-2}
(b)(i) 42 ms^{-2}
(ii) 40 ms^{-2}
(iii) 38 ms^{-2}