

ANSWERS TO THE FINAL TEST REVIEW

MULTIPLE CHOICE:

- | | | | |
|-------|-------|-------|--------|
| 1. c | 29. c | 57. b | 85. a |
| 2. d | 30. e | 58. b | 86. c |
| 3. a | 31. e | 59. b | 87. c |
| 4. c | 32. c | 60. a | 88. b |
| 5. e | 33. d | 61. b | 89. c |
| 6. b | 34. d | 62. c | 90. b |
| 7. c | 35. e | 63. e | 91. b |
| 8. b | 36. b | 64. b | 92. e |
| 9. d | 37. c | 65. b | 93. b |
| 10. a | 38. a | 66. c | 94. d |
| 11. c | 39. a | 67. b | 95. d |
| 12. d | 40. e | 68. a | 96. d |
| 13. b | 41. d | 69. d | 97. a |
| 14. c | 42. a | 70. b | 98. d |
| 15. c | 43. d | 71. b | 99. e |
| 16. a | 44. d | 72. c | 100. d |
| 17. d | 45. b | 73. b | 101. d |
| 18. a | 46. c | 74. b | 102. a |
| 19. a | 47. d | 75. e | 103. c |
| 20. a | 48. a | 76. c | 104. c |
| 21. a | 49. b | 77. e | 105. e |
| 22. c | 50. e | 78. e | 106. d |
| 23. b | 51. c | 79. e | 107. a |
| 24. d | 52. d | 80. d | 107. c |
| 25. d | 53. b | 81. c | |
| 26. d | 54. d | 82. c | |
| 27. e | 55. b | 83. c | |
| 28. c | 56. b | 84. d | |

FREE RESPONSE:

- 1a. F_g (straight down), Tension (up incline), F_{fric} (up incline), F_N (perp. to incline)
- b. $\mu = \frac{f}{m_1 g \cos \theta}$
- c. $M = \sin \theta (m_1 + m_2) - 3f/g$
- d. $a = g \sin \theta - \frac{f}{m_1}$
- 2a. 2.13m
- b. 426.7m/s
- c. 66.7Hz
- d. 200Hz
- e. 1.72m

- 3a. $t=4\text{s}$ and $t=18\text{s}$
 b. from $t=4$ to 9s and from $t=18$ to 20s
 c. 1.1m
 d. -graph to right
 ei. 0.286s
 ii. 0.229m

4. Tension = 46.54N $x = 85.8\text{cm}$

- 5a. 0.915m/s^2
 b. 416.7kg/m^3

- 6a. $v = \sqrt{gR}$
 b. $v_{\text{max}} = \sqrt{\frac{T_{\text{max}}R}{M} - gR}$
 c. It will continue straight upward, behaving as a vertically-launched free-fall object.

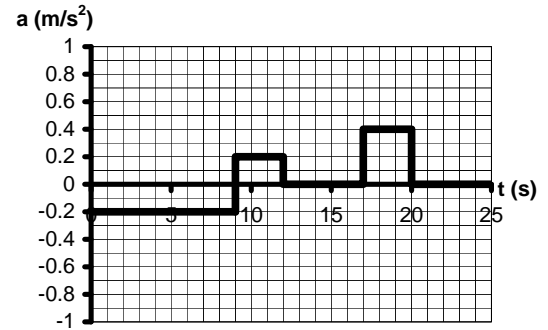
- 7a. 0.5m/s to right
 b. 3.33kg
 c. -0.667m/s^2
 d. 5.25m
 e. Ramp goes up. Max elevation = 10.2cm above initial height

- 8a. 412 atm
 b. 4143m
 c. $417,130\text{N}$
 d. 0.33m/s^2
 e. 150m
 f. 429.3s

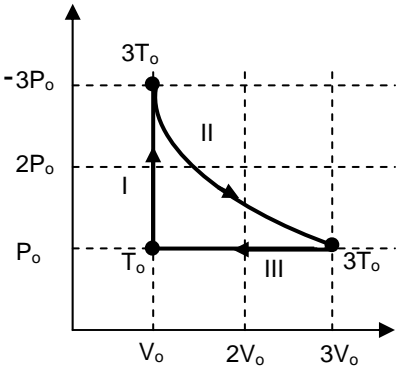
- 9a. Point P needs to be at the lowest position at which the cart will ever be.
 b. 42m/s
 c. $F_g = 6860\text{N}$ and $F_N = 20,580\text{N}$
 d. $274,400\text{J}$

- 10a. 0.114s
 b. 9.68m/s
 c. 8.53m

- 11a. 50s
 b. $7.2 \times 10^6\text{ N}$
 c. $9.0 \times 10^5\text{ Pa}$
 d. $1.6 \times 10^5\text{ N}$



- 12a. - graph to right
 b. $-3.3P_0V_0$
 c. $+2P_0V_0$
 d. $\Delta U = 0$
 e. 20.6%
- 13a. Tension, F_g
 b. 957m
 c. 12.5°
 d. The plane's mass.



- 14a. 1.0m
 b. 343Hz
 c. 4.34m
 d. 1.25m
 e. Too low. Since the calculated speed was too low, the calculated frequency was also too low.

15. $T = 2400.5\text{N}$ $F_{Hx} = 2339\text{N}$
 $F_{Hy} = 260\text{N}$

- 16a. 721K
 b. 565J
 c. $+150\text{J}$
 d.i. Heat is added during process, because ΔU is +, but W is -.
 ii. $+715\text{J}$
 e. Same as before, because it's a cyclic process.

- 17a. 0.077m
 b. $1.15 \times 10^4\text{ N}$, upward
 c. A maximum of 8 people can be on the raft.