

## ANSWERS

### Module 1 – Introduction To Flight

#### Answers

#### Reference Page

#### Why Aerospace Education

- |  |    |
|--|----|
| 1. general education, knowledge skills attitudes, impact | vi |
| 2. July 1, 1946  | vi |
| 3. United States   | vi |

#### Chapter 1 – Flight

- |  |     |
|--|-----|
| 4. Aircraft  | 1   |
| 5. Airplane  | 1   |
| 6. Aeronautics and space   | 1   |
| 7. Nitrogen  | 1   |
| 8. Subsonic, transonic, supersonic   | 1   |
| 9. Yes   | 1   |
| 10. Drag   | 1   |
| 11. Dynamic  | 1   |
| 12. Yes  | 4   |
| 13. Relative wind  | 1   |
| 14. Chord  | 1   |
| 15. a & b  | 2   |
| 16. d  | 3   |
| 17. Chinese  | 2   |
| 18. Flying   | 4   |
| 19. Balloon, Montgolfier brothers  | 3   |
| 20. Language   | 1   |
| 21. Propeller  | 4   |
| 22. Tail feathers and wing feathers  | 4   |
| 23. Third  | 6   |
| 24. Bernoulli  | 5   |
| 25. Pressure Bernoulli's   | 5   |
| 26. It decreases or drops  | 5   |
| 27. Newton's   | 6   |
| 28. Chord  | 7   |
| 29. Camber   | 7   |
| 30. Gravity and drag   | 8   |
| 31. Thrust and lift  | 8   |
| 32. 8  | 8   |
| 33. drag   | 8   |
| 34. thrust, drag, wing, air, drop, camber, decreased, increased, lift,<br>Relative wind, Newton's, for every action, there is an equal and<br>opposite reaction. | 7,8 |
| 35. elevons  | 18  |
| 36. a. increase speed  | 9   |
| b. increase camber   |     |
| c. increase area   |     |

d. increase angle of attack	
37. angle of attack, stall	9
38. critical angle of attack	9
39. stall	9
40. longitudinal	11
41. vertical	11
42. lateral	11
43. roll	11
44. yaw	11
45. pitch	11
46. center of gravity	11
47. d	11
48. pitch	12
49. roll	12
50. rudder	12
51. stabilator	12
52. moves upward	12
53. forward	14
54. angle of incidence (or attack)	14
55. speed	14
56. blade	14

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57. convection	23
58. aspect	23
59. glide ratio	23
60. thermal	24
61. Sun	24
62. 41.5	24
63. 15 degrees C	24
64. 20 to 1	25
65. 4.3 feet	25
66. loss, lift	26
67. center, gravity	26

## **Chapter 3 – Balloon – They Create Their Own Thermals**

68. burner	33
69. propane	33
70. envelope	33
71. buoyancy	33
72. 17-20, 1164.5 – 1370.0	34
73. Balloon with envelope, propane, burner-600 lbs	34
At 68,500 ft <sup>3</sup> , it will lift 1164.5 lbs (17lbs/1000ft <sup>3</sup> )	
68,500 ft <sup>3</sup> , it will lift 1370.0 lbs (20lbs/1000ft <sup>3</sup> )	
17 565lbs will be the payload	
20 700lbs will be the payload	
4 humans weigh 680	
3 humans weigh 510	

2 humans weigh 340

Based on the low 17 lbs lift, the balloon can carry 3 humans and 55 lbs of equipment

Based on the high 20 lbs lift, the balloon can carry 4 with 20 lbs of equipment

74. parachute 35

75. wind direction 34