AP Physics C Unit 8: Gravitation

**Friday, Feb 10:** Unit 7 Challenge, Lect: Law of Gravity **HW: PS1**

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| --- | --- | --- | --- | --- |
| 13-Feb | 14-Feb | 15-Feb | 16-Feb | 17-Feb |
| Due: PS1 | Due: PS2 | Due: PS3 | Due: --- | Due: Conc Qs I |
| Grade Challenge | Return Exam | *Lect: Inside Sphere* | Create flip book | Discuss Conc Qs |
| *Lect: Satellite Motion* | *Lect: Kepler's Laws* | Solve AP #1 | Start AP #2 & #3 | **15 pt Quiz** |
| *Binary Star Ex #2* |  |  |  |  |
| HW: PS2 | HW: PS3 | HW: Conc Qs I | HW: Quiz tomorrow | HW: AP #2, #3 |
|  20-Feb |  21-Feb | 22-Feb | 23-Feb | 24-Feb |
|  | Due: ----- | Due: AP Probs 1-3 | Due: Planet Z | Due: AP4, PS4, H&S |
| No School | *Lect: Grav PE,* | Return Quiz | Discuss PS4, H&S | **Challenge Problem** |
| Presidents Day | *Orbital Energy* | *Planet H & S WS* | AP#4, Discuss #1-3 | *In-Class: Review* |
|  | HW: *Planet Z* | HW: PS4 | HW: Conc Qs II | HW: --- |
| 27-Feb | 28-Feb | 1-Mar | 2-Mar | 3-Mar |
| Due: Conc Qs II |  |  |  |  |
| Discuss HW | **Unit 8 Exam** |  |  |  |
| Grade Challenge |  |  |  |  |
| HW: Study |  |  |  |  |

PS1

1. 9.11 x 10-31 kg
2. 0.19 m/s2, 15.9 N
3. 0.37 kg, 0.75 kg
4. 0.61 m/s2
5. 6.0 m
6. 106 N

PS2

1. 1023 m/s, 2.7 x 10-3 m/s2
2. 5.6 x 1026 kg
3. 1.27 x 1032 kg
4. 1440 m/s, 9.7 days

PS3

1. 7770 m/s
2. 119 min, 1630 m/s
3. 4.22 x 107 m, 0.285 s
4. 2.64 x 106 m
5. 22.6 years

AP Problems

1c. CR2/2, 1d. (CR2/M)1/2

2c. T2 and r3, 2f. 5.64 x 1026 kg

3a. 4π2ra/T2, 3b. 4π2ra(ra + rb)2/GT2,

 3c. 4π2rb(ra + rb)2/GT2

4a. (GMe/2Re)1/2, 4b. v0/2,

 4c. -7GmMe/4Re

Planet Z

1. 67 N 2. 1220 m/s 3. 1.7 x 105 s

4. 1.1 x 109 J 5. -2.2 x 109 J 6. -1.1 x 109 J

Planet H & S

1. 130 N, 0 N
2. 3.41 x 107 m, 2180 m/s
3. -2.85 x 109 J, 2.40 x 1010 J, -2.68 x 1010 J; -2.85 x 109 J, 2.85 x 109 J,

-5.7 x 109 J

1. 3.85 x 1020 m (40,700 light-years)
2. 4.57 s
3. 2.56 m/s2

PS4

1. -4.76 x 109 J, 568 N, 568 N
2. 1.84 x 109 kg/m3, 3.27 x 106 m/s2, -1.04 x 1014 J
3. 2.55 x 107 m
4. -1.45 x 1010 J, 1.0 x 109 J, -3.13 x 1010 J, 1.58 x 1010 J
5. 1.66 x 104 m/s

Solar System Data

G: 6.67 x 10-11 Nm2/kg2

Earth mass: 5.97 x 1024 kg

Earth radius: 6.37 x 106 m

Earth-Sun distance: 1.47 x 1011 m

Earth-Moon distance: 3.84 x 108 m

Moon mass: 7.36 x 1022 kg

Moon radius: 1.74 x 106 m

Jupiter mass: 1.90 x 1027 kg

Jupiter radius: 6.99 x 107 m

Sun mass: 1.99 x 1030 kg

7. -8.9 x 109 J 8. 7.8 x 109 J 9.3450 m/s

10. 9.2 x 106 m