

Tes Kemampuan Akademik

MATA UJIAN

: MATEMATIKA - FISIKA - KIMIA - BIOLOGI

MATEMATIKA

1. B
2. D
3. C
4. A
5. E
6. A
7. D
8. E
9. B
10. B
11. C
12. E
13. B
14. A
15. C
16. B
17. C
18. D
19. E
20. D

KIMIA

41. E
42. D
43. E
44. D
45. C
46. D
47. E
48. D
49. E
50. D
51. E
52. E
53. A
54. B
55. E
56. D
57. C
58. B
59. C
60. D

FISIKA

21. A
22. B
23. E
24. C
25. A
26. E
27. E
28. D
29. D
30. A
31. E
32. E
33. C
34. E
35. D
36. B
37. C
38. E
39. A
40. B

BIOLOGI

61. C
62. A
63. C
64. E
65. B
66. B
67. D
68. E
69. D
70. A
71. E
72. A
73. D
74. B
75. B
76. A
77. A
78. B
79. A
80. D

PEMBAHASAN FISIKA

1. Jawab : A

$$dy/dx = \sqrt{3} - 1/10 x = 0$$

$$x = 10 \sqrt{3} \text{ m}$$

$$y = \sqrt{3} x - \frac{1}{20} x^2$$

$$Y(\text{maks}) = \sqrt{3} \cdot 10 \sqrt{3} - 1/20 \cdot (10\sqrt{3})^2 = 15 \text{ m}$$

$$\tan \alpha = dy/dx = \sqrt{3} - 1/10 x \text{ dengan } x=0$$

$$\tan \alpha = \sqrt{3} \rightarrow \alpha = 60^\circ$$

2. Jawab : B

$$a = \Sigma F/m = F - fk/m = 7 - 1/1 = 6 \text{ m/s}^2$$

$$v^2 = 2 a S$$

$$= 2 \cdot 6 \cdot 3$$

$$v = 6 \text{ m/s (kecepatan di bibir atap)}$$

$$S = (v_0 + v)/2 \cdot t$$

$$3 = (0 + 6)/2 \cdot t \rightarrow t = 1 \text{ s}$$

Sisa waktu 1 detik, benda bergerak parabola turun dari gedung.

$$S(y) = \frac{1}{2} g t^2 = 5 \cdot 1^2 = 5 \text{ m}$$

$$S(x) = v t = 6 \cdot 1 = 6 \text{ m}$$

$$\text{Perpindahan} = \sqrt{(9^2 + 5^2)} = \sqrt{(106)} = 10,3 \text{ m}$$

3. Jawab : E

$$S_A + S_B = h$$

$$(V_0 t + \frac{1}{2} g t^2)_A + (V_0 t - \frac{1}{2} g t^2)_B = h$$

$$2 v_0 t = h$$

$$2 \cdot 200 \cdot t = h$$

$$t = h/400$$

$$t < 2t_p$$

$$h/400 < 2 \cdot 200/10$$

$$h < 16 \text{ km}$$

4. Jawab : C

$$a(\text{maks}) = \omega^2 A$$

$$g = \omega^2 R$$

$$T = 2\pi \sqrt{\frac{R}{g}}$$

$$t = \frac{1}{4} T = 400\pi \text{ s}$$

5. Jawab : A

$$v = \frac{v_1 + v_2}{1 + \frac{v_1 v_2}{c^2}} = \frac{0,8c + 0,5c}{1 + \frac{0,8c \cdot 0,5c}{c^2}} = \frac{13}{14} c$$

6. Jawab : E

$$I_A R_A = I_S R_S$$

$$0,5 \cdot 2 = I_S \cdot 10$$

$$I_S = 0,1 \text{ A}$$

$$I = 0,5 + 0,1 = 0,6 \text{ A}$$

7. Jawab : E

$$E_p \text{ listrik} = E_k$$

$$qV = \frac{1}{2} m v^2$$

$$R = mv/Bq$$

$$R = \sqrt{(2mqV)/Bq}$$

$$= 1/B \cdot [\sqrt{(2mV/q)}]$$

$$0,1 = 1/B \cdot [\sqrt{(2 \cdot 1,67 \times 10^{-27} \cdot 5 \times 10^3 \cdot 1,6 \times 10^{-19})}]$$

$$B = 0,1 \text{ T} = 100 \text{ mT}$$

8. Jawab : D

$$1/f = 1/S + 1/S'$$

$$1/12 = 1/x + 1/(24-x)$$

$$x^2 - 24x + 288 = 0$$

9. Jawab : D

$$f_{p1} = \frac{v}{v + v_s} f_s = \frac{x}{x + y} z$$

$$f_d = \frac{v}{v - v_p} f_s = \frac{x}{x - y} z$$

$$f_{p2} = f_d$$

$$f_{lay} = f_{p2} - f_{p1}$$

$$= \frac{xz}{x - y} - \frac{xz}{x + y} = \frac{2xyz}{x^2 - y^2}$$

10. Jawab : A

$$V_t = V_0 (1 + \gamma \Delta t)$$

Kaca : $(V_t)_{KACA} = V_0 (1 + \gamma_{KACA} \Delta t)$

Raksa : $(V_t)_{RAKSA} = V_0 (1 + \gamma_{RAKSA} \Delta t)$

Raksa yang tumpah :

$$\Delta V = (V_t)_{RAKSA} - (V_t)_{KACA}$$

$$= V_0 (1 + \gamma_{RAKSA} \Delta t) - V_0 (1 + \gamma_{KACA} \Delta t)$$

$$= V_0 (\gamma_{RAKSA} - \gamma_{KACA}) \Delta t$$

$$= V_0 (\gamma_{RAKSA} - 3 \alpha_{KACA}) \Delta t$$

$$= 1000 (54 \times 10^{-5} - 3 \cdot 3 \times 10^{-5}) (50 - 30)$$

$$= 9 \text{ cc}$$

11. Jawab : E

Posisi (1) dan (2) :

$$P_1 V_1 = P_2 V_2$$

$$(P_0 + 15) \cdot A \cdot 20 = P_0 \cdot A \cdot 24 \rightarrow P_0 = 75 \text{ cmHg}$$

Posisi (2) dan (3) :

$$P_2 V_2 = P_3 V_3$$

$$P_0 \cdot A \cdot 24 = (P_0 - 15) \cdot A \cdot h$$

$$h = 30 \text{ cm}$$

12. Jawab : E

$$B = \frac{\Delta p}{\Delta V} V_0 = \frac{(3 - 2)}{(1000 - 990)} 1000 = 100 \text{ MPa}$$

13. Jawab : C

$$v = ds/dt = t + t^2$$

$$a_T = dv/dt = 1 + 2t$$

Pada $t = 2$ sekon, $v = 6 \text{ m/s}$

$$a_T = 1 + 2 \cdot 2 = 5 \text{ m/s}^2$$

$$a_S = v^2/r = 6^2/3 = 12 \text{ m/s}^2$$

$$a_{\text{tot}} = \sqrt{(a_S^2 + a_T^2)} = 13 \text{ m/s}^2$$

14. Jawab : E

$$P = F v$$

$$dE/dt = F v$$

$$d(mE)/dt = F p$$

$$8t + 2 = F p$$

$$8 \cdot 2 + 2 = 3 p$$

$$p = 6 \text{ kg m/s}$$

15. Jawab : D

Karena $a(\text{lift}) > g$, maka bandul tidak mengayun

16. Jawab : B

$$P = V^2/R = 18^2/18 = 18 \text{ W}$$

17. Jawab : C

Hukum utama Hidrostatika :

$$P(\text{silinder}) = P(\text{oli}) + P(\text{pada piston})$$

$$w/A_1 = \rho g h + F/A_2$$

$$45000/(3 \times 10^{-1}) = 800 \cdot 10 \cdot 4 + F/(3 \times 10^{-1})$$

3)

$$F = 354 \text{ N}$$

18. Jawab : E

Gaya listrik yang bekerja pada partikel bermuatan listrik, hanya bergantung pada muatan dan kuat medan listriknya

19. Jawab : A

$$(2) I = W = e \sigma T^4$$

$$(3) P = W A = e \sigma T^4 A$$

$$(4) \lambda = C/T, C = \text{konstanta Wien}$$

$$(5) E = hf$$

20. Jawab : B

$$\epsilon_{\text{maks}} = N B A \omega = NBA 2\pi/T$$

SONY SUGEMA COLLEGE