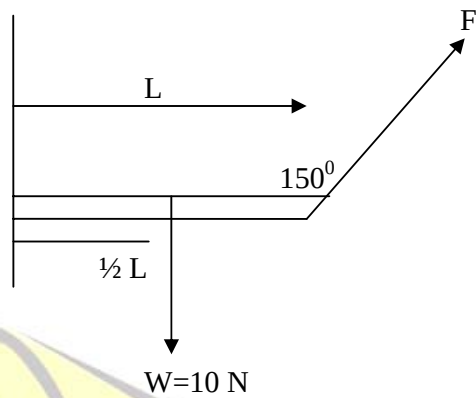


SPMB 2007

31. Dari gambar:



Syarat setimbang:

$$\sum \tau_x = 0$$

$$F \sin(150^\circ) \cdot L + W \cdot \frac{1}{2}L = 0$$

$$F \frac{1}{2} = 10 \frac{1}{2}$$

$$F = 10 \text{ N}$$

Jawaban B

32. $V = IR$

$$V = I\rho \frac{L}{A}$$

$$V = I\rho \frac{L}{\frac{1}{4}\pi d^2}$$

$$V = \frac{(8)(1,6 \times 10^{-8})(2,5 \times 10^2)}{\frac{1}{4}(3,14)(2 \times 10^{-3})^2}$$

$$V = 10^{-3} \text{ V}$$

Jawaban A

33. $d \sin \theta = m\lambda$

d dan λ tetap, maka orde tetap yaitu orde 1

Jawaban A

34. Arus yang keluar dari sumber adalah:

$$V_{xy} = V_1 + V_2$$

$$I_x = \frac{2}{15} \quad \text{dan} \quad I_y = \frac{2}{15}$$

$$V_1 = I_y(5 + 5) = \frac{2}{15}(10) = \frac{4}{3}$$

$$V_2 = I_x(5) = \frac{2}{15}(5) = \frac{2}{3} \text{ (arus berlawanan)}$$

$$V_{xy} = V_1 + V_2 = \frac{4}{3} - \frac{2}{3} = \frac{2}{3} V$$

Jawaban A

35. Penyelesaian:

$$E_A = E_B$$

$$e\sigma T_A^4 t A_A = e\sigma T_B^4 t B_B$$

$$T_A^4 4\pi r^2 = T_B^4 4\pi r_B^2$$

$$T_A^4 r^2 = T_B^4 r_B^2$$

$$T_A^4 r^2 = T_B^4 (2r)^2$$

$$T_A^4 r^2 = T_B^4 4r$$

$$T_B = T_A \sqrt[4]{\frac{1}{4}} = T_A \frac{1}{\sqrt{2}} = 0,7 T_A$$

Jawaban C

36. Periode ayunan bandul: $T = 2\pi \sqrt{\frac{l}{g}}$

$$\frac{T_b}{T_p} = \sqrt{\frac{g_p}{g_b}} = \sqrt{\frac{\frac{1}{4}g}{g}}$$

$$\frac{T_b}{2} = \frac{1}{2}$$

$$T_b = 1 \text{ jam}$$

Jawaban C

37. Dengan kaidah tangan kanan, arah lintasan berlawanan dengan arah jarum jam

Jawaban E

$$38. I' = I_0 \cos^2 \theta$$

$$\frac{1}{4} I_0 = I_0 \cos^2 \theta$$

$$\cos^2 \theta = \frac{1}{4}$$

$$\cos \theta = \frac{1}{2}$$

$$\theta = 60^\circ$$

Jawaban D

$$39. \alpha = \frac{\Delta \omega}{\Delta t} = \frac{19 - 11}{4 - 2} = \frac{8}{2} = 4 \text{ rad / s}$$

Jawaban B

$$40. I = \frac{\varepsilon}{R}$$

$$I = \frac{A \frac{\Delta B}{\Delta t}}{R} = \frac{(0,02)(2)10^{-4}}{(0,1)}$$

$$I = 4 \times 10^{-5} \text{ A}$$

Dengan aturan tangan kanan dapat ditentukan arah searah dengan putaran jarum jam

Jawaban D

$$41. 2d \sin \theta = m\lambda$$

$$2d \sin 30 = (1)(1,5)$$

$$2d \frac{1}{2} = 1,5$$

$$d = 1,5 \text{ } ^0\text{A}$$

Jawaban B

42. Perhatikan gambar pada soal!

$$\text{Persamaan grafiknya adalah } F = 4 - \frac{4}{40} t$$

$$\text{Untuk } t = 4\text{s, didapat } F = 4 - \frac{4}{40} (4) = 3,6$$

$$\text{Luas} = m \Delta v$$

$$\frac{4+3,6}{2}(4) = 2 \Delta v$$

$$\Delta v = 7,6$$

Jawaban E

$$43. v = 0,6c \rightarrow \sqrt{1 - \frac{v^2}{c^2}} = 0,8$$

$$1. s = \frac{c \Delta v}{2} = (3 \times 10^8) \frac{2 \times 10^{-8}}{2} = 3m$$

$$2. s' = s \sqrt{1 - \frac{v^2}{c^2}} = (3)(0,8) = 2,4m$$

$$3. \Delta t' = \frac{\Delta t_0}{\sqrt{1 - \frac{v^2}{c^2}}} = \frac{2 \times 10^{-8}}{0,8} = 2,5 \times 10^{-8} s$$

4. Dari postulat Einsten, kecepatan cahaya tidak dipengaruhi oleh kerangka acuan

Jawaban A

44. Penyelesaian:

$$1. \omega = 2\pi f = 2(3,14)(5) = 31,4 \text{ rad / s}$$

$$2. \lambda = \frac{v}{f} = \frac{20}{5} = 4m$$

$$3. y = A \sin 2\pi \left(\frac{x}{4} - ft \right) = 0,12 \sin 2\pi \left(\frac{x}{4} - 5t \right)$$

$$4. k = \frac{2\pi}{\lambda} = \frac{2(3,14)}{4} = 1,57$$

Pernyataan yang benar no 1, 3 dan 4

45. Diberikan efesiensi:

$$\eta = \frac{W}{Q_1} = \frac{Q_1 - Q_2}{Q_1} = \frac{T_1 - T_2}{T_1} = \frac{40}{100} - \frac{2}{5}$$

Q1 kalor yang masuk (tinggi)

Q2 kalor yang keluar (rendah)

T1 suhu pada masukan (tinggi)

T2 suhu pada keluaran (rendah)

$$1. \frac{T_1 - T_2}{T_1} = \frac{5 - 3}{5} = \frac{2}{5}$$

Untuk perbandingan saja kita dapat asumsikan $Q_1 = 5$ maka $W = Q_1 - Q_2 = 2$, sehingga $Q_2 = 3$ maka:

$$2. \frac{Q_2}{Q_1} = \frac{3}{5}$$

$$3. \frac{W}{Q_1} = \frac{2}{5}$$

$$4. \frac{W}{Q_2} = \frac{2}{3}$$

