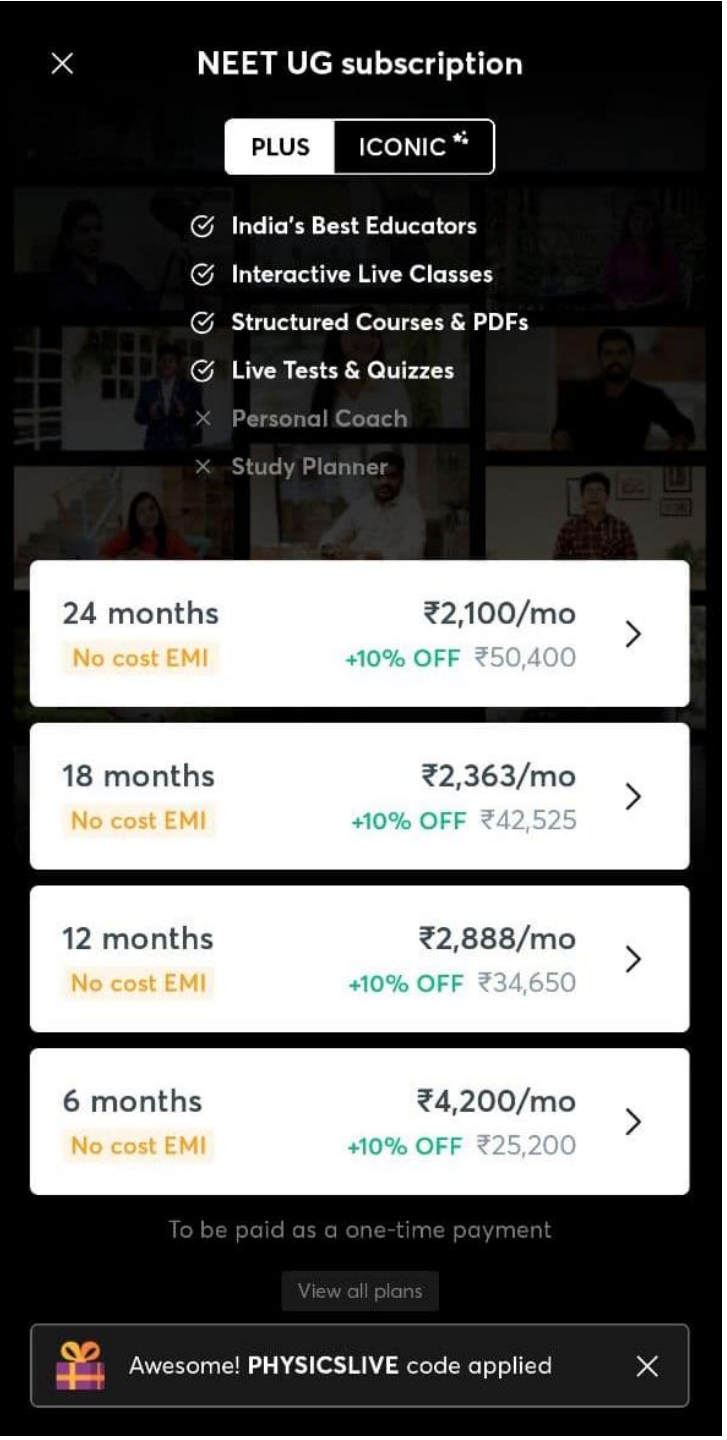
SIR PRATEEK JAIN

. Founder @Physicsaholics
. Top Physics Faculty on Unacademy (IIT JEE & NEET)
. 8+ years of teaching experience in top institutes like FIITJEE (Delhi, Indore) , CP (KOTA) etc.
. Produced multiple Top ranks.
. Research work with HC Verma sir at IIT Kanpur
. Interviewed by International media.



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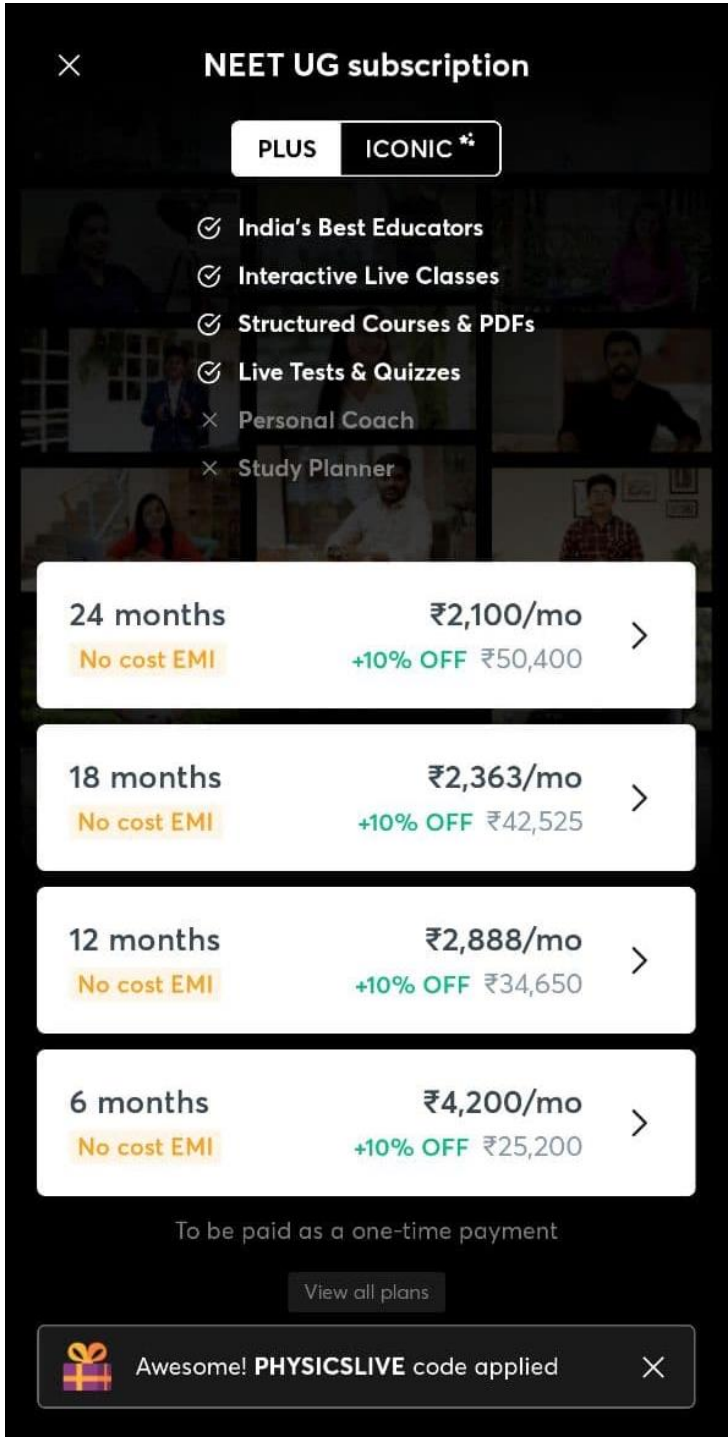

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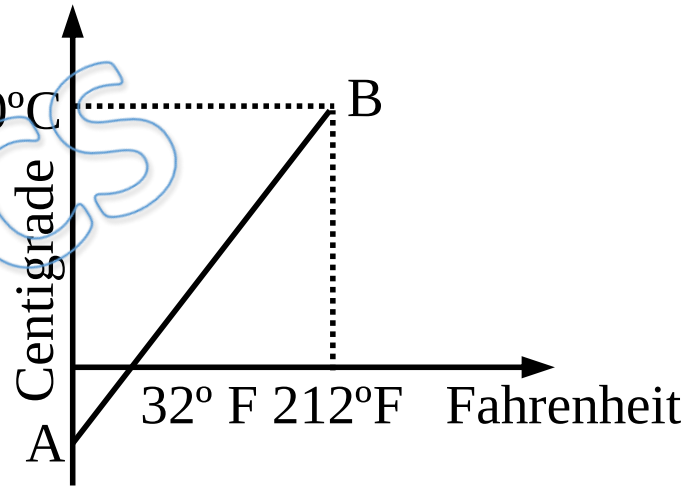
NEET & JEE Main

Physics DPP

DPP- Thermometry

By Physicsaholics Team

Q) The graph AB shown in figure is a plot of temperature of a body in degree Celsius and degree Fahrenheit. Then -



(A) Slope of line AB is 9/5

(B) Slope of line AB is 5/9

(C) Slope of line AB is 1/9

(D) Slope of line AB is 3/9

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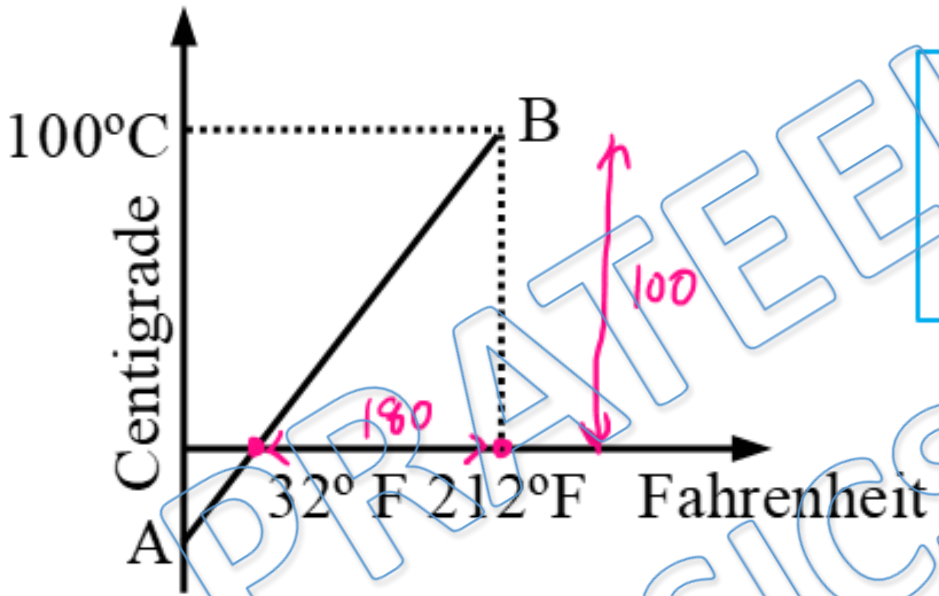
Ans. b



$\tan\theta = \text{slope} = \frac{100}{180} = 5/9$

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Q) Oxygen boils at – 183°C. This temperature on Fahrenheit scale is –

(A) – 215°
(B) – 261°
(C) – 297°
(D) – 329°

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Ans. c

$$\frac{C-0}{100-0} = \frac{F-32}{212-32}$$

$$\frac{-183}{100} = \frac{F-32}{180}$$

$$F = -9/5 \times 183 + 32 = 297.4$$

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Q) The temperature of a body on Kelvin scale is found to be x K. When it is measured by Fahrenheit thermometer, it is found to be x°F, then the value of x is-

(A) 40

(B) 313

(C) 574.25

(D) 301.25

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Ans. c

$$\frac{K-273}{373-273} = \frac{F-32}{212-32}$$

$$\frac{x-273}{100} = \frac{x-32}{180}$$

$$9(x-273) = 5(x-32)$$

$$9x - 2457 = 5x - 160$$

$$4x = 2297$$

$$x = \frac{2297}{4} = 574.25$$

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Q) Ice point and steam point on a particular scale reads 10º and 80º respectively. The temperature on ºF scale when temperature on new scale is 45º is -

(A) 50º F (B) 112ºF

(C) 122ºF (D) 138ºF

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Ans. c

$$\frac{X-10}{80-10} = \frac{F-32}{212-32}$$

$$\frac{45-10}{80-10} = \frac{F-32}{180}$$

$$\frac{35}{70} = \frac{F-32}{180}$$

$$90+32 = F$$

$$\boxed{F = 122}$$ **

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Q) The steam point and ice point of a mercury thermometer are marked as 80º and 10º. At what temperature on centigrade scale the reading of this thermometer will be 59º ?

(A) 70º C (B) 60º C

(C) 80º C (D) None of these

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Ans. a

$$\frac{T'-10}{80-10} = \frac{T_C}{100} \quad \{T' = 59^\circ\}$$

$$\frac{59-10}{70} = \frac{T_C}{100} \Rightarrow \frac{49}{70} \times 100 = T_C$$

$$\Rightarrow \boxed{T_C = 70^\circ C}$$

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Q) A difference of temperature of 25ºC is equivalent to a difference of :-

(A) 45ºF (B) 72ºF

(C) 32ºF (D) 25ºF

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Ans. a

$$\Delta C = \frac{5}{9}\Delta F$$

$$25 \times \frac{9}{5} = \Delta F \Rightarrow \Delta F = 45^{\circ}C$$

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Q) At what temperature, the Fahrenheit and Celsius scales will give numerically equal (but opposite in sign) values : -

(A) – 40ºF and 40ºC

(B) 11.43º F and – 11.43ºC

(C)–11.43ºF and + 11.43ºC

(D) + 40ºF and – 40ºC

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Ans. b

$$C = \frac{5}{9}(F - 32) \Rightarrow C = \frac{5}{9}(-C - 32)$$

$$\Rightarrow \quad C = -5C - 160 \quad \Rightarrow 14C = -160$$

$$\Rightarrow \quad C = -11.43°C$$

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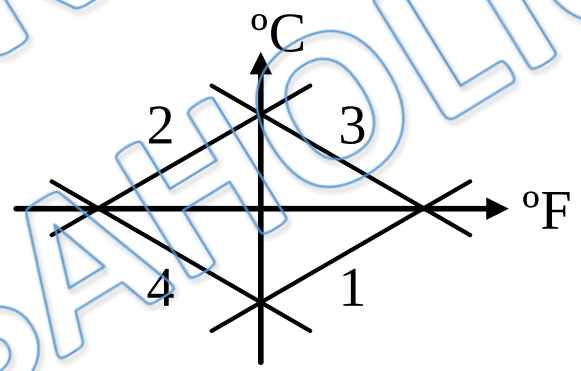
Q) Which of the curves in figure represents the relation between Celsius and Fahrenheit temperature-

(A)1 (B) 2

(C) 3 (D) 4



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Ans. a

Sol. [A] $\frac{C}{5}=\frac{F-32}{9} \Rightarrow C=\left(\frac{5}{9}\right)F-\frac{20}{3}$. Hence graph between °C and °F will be a straight line with positive slope and negative intercept.

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Q) Two thermometers X and Y have ice point marked at 15º and 25º and steam points marked as 75º and 125º respectively. When thermometer X measures the temperature of a bath as 60º on it, what would thermometer Y read when it is used to measure the temperature of the same bath ?

(A)60º (B) 75º

(C) 100º (D) 90º

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Ans. c

Sol.[C] $\frac{60-15}{75-15}=\frac{Y-25}{125-25}$

$$\frac{45}{60}=\frac{Y-25}{100}\Rightarrow Y=\frac{100}{60}\times 45+25=100^{o}$$

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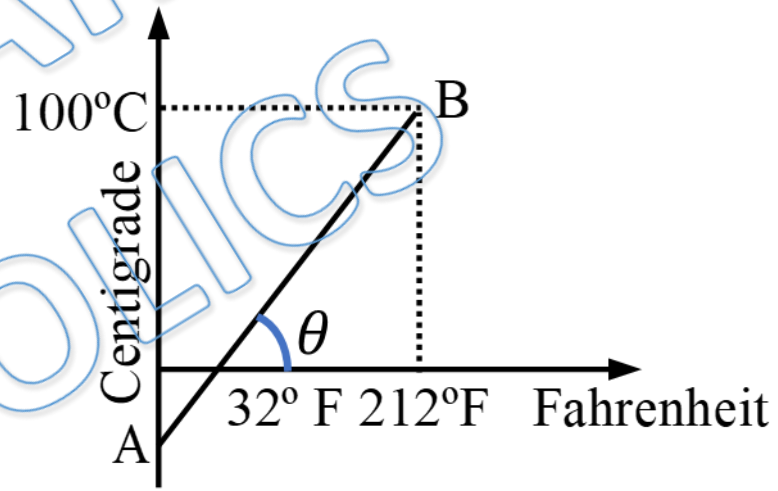
Q) The graph shown in the figure is a plot of the temperature of a body in °C and °F. The value of sin Θ =



(a) $\frac{5}{\sqrt{106}}$ (b) $\frac{10}{\sqrt{106}}$

(c) $\frac{15}{\sqrt{106}}$ (d) $\frac{20}{\sqrt{106}}$

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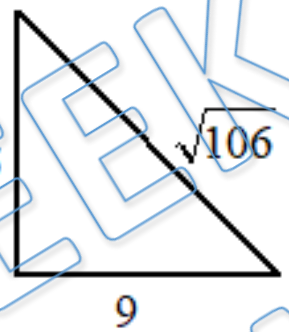
Ans. a

$$\frac{C}{100} = \frac{F-32}{180} \Rightarrow C = \frac{5F}{9} - 32 \times \frac{5}{9}$$



$$y = mx \pm c, \quad \tan\theta = m = \frac{5}{9}$$

$$\sin\theta = \frac{5}{\sqrt{106}}$$

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