EdLoop

EdLoop JEE

PHYSICS · JEE MAIN

Elasticity

Previous Year Questions with answers

120 questions · **104** papers · **2003–2026** · newest paper first

Step-by-step solutions for every question: free in the EdLoop JEE app (Google Play) · pyq.edloop.in

What is in this PDF: every Elasticity question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

Step-by-step solutions for every question are free in the EdLoop JEE app (Google Play) and on app.edloop.in. More chapters: pyq.edloop.in/free-pdfs/

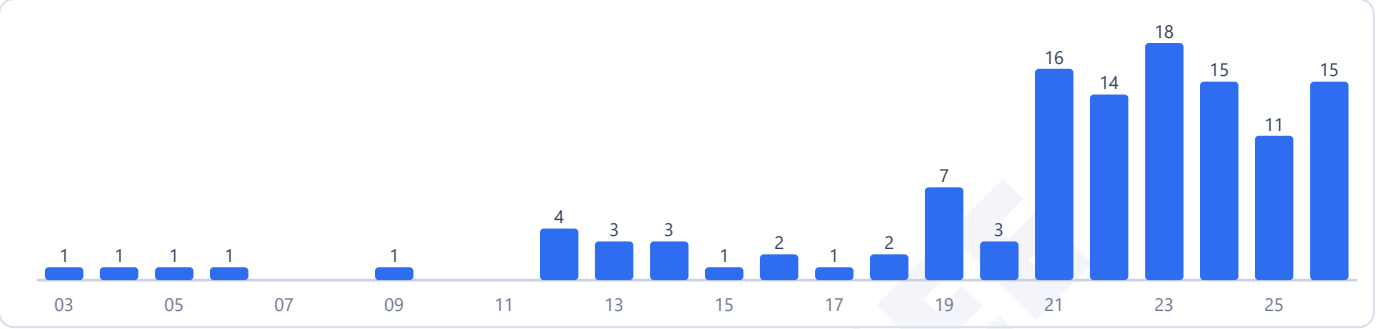
EdLoop

Chapter at a glance

2.2%	120	84 of 162	78 / 42
of Physics questions, 2019–2026	questions, 2003–2026	papers asked it, 2019–2026	MCQ / numerical, 2003–2026

Trend. Rising: 0.7 questions per paper in 2024–2026 against 0.6 in 2019–2023.

Questions per year



Counts are the questions we hold: 120 in 104 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2003–2026)

Stress, Strain & Moduli	92
Elastic Energy & Applications	28

How often it comes up

Elasticity is a concise and highly practical chapter that offers consistent returns in JEE Main Physics. Across the papers we hold from 2019 to 2026, it supplied **99 questions in 162 papers**, which corresponds to **0.6 questions per paper**, and was present in 84 of those 162 papers. Over that period, it ranks **25th of 29 Physics chapters**, representing 2.2% of all Physics questions.

The chapter has grown in recent exam cycles compared to historical levels. In the AIEEE and early JEE Main years (2002 to 2018), it accounted for 1.6% of Physics; over the recent 2024 to 2026 testing window, it rose to 2.6%, contributing 41 questions across 58 papers. The highest question counts in our set occurred in 2021 (20 questions in 26 papers), followed by 2024 (15 questions in 20 papers) and 2026 (15 questions in 19 papers). Since 2019 there has been no year without it, appearing in 84 of the 162 papers we hold.

Classified under Unit 7: Properties of Solids and Liquids in NTA's Class 11 syllabus, the chapter focuses on material deformation under mechanical and thermal stresses.

Most-asked topics

Between 2019 and 2026, the questions divided into two clear topics:

- **Stress, Strain & Moduli**: 77 questions. Tensile stress, longitudinal strain, Young's modulus, shear modulus, bulk modulus, and stress-strain curve interpretation.
- **Elastic Energy & Applications**: 22 questions. Strain energy density in stretched wires, spring systems, thermal stress in clamped rods, and stress distribution along heavy suspended ropes.

Both areas appeared in 2026 question sets, and their concise scope makes thorough coverage manageable within a short revision window.

What the questions look like

Modulus questions primarily focus on wire stretching and comparative ratios. A common problem compares two metal wires made of different materials, with given ratios of original length and cross-sectional area, subjected to identical stretching forces or experiencing identical elongations. Students equate tensile stress to Young's modulus multiplied by longitudinal strain to solve for unknown dimensional or material ratios. Other questions evaluate volumetric compression in liquids, where you calculate percentage volume decrease using bulk modulus and applied pressure.

Stress-strain curve problems test qualitative and quantitative understanding of material behavior. Given graphs of strain plotted against stress for multiple substances, you must identify the material possessing the highest Young's modulus by examining reciprocal slopes, or distinguish brittle materials from ductile metals based on their plastic deformation ranges.

Elastic energy problems calculate the work stored inside deformed materials. Standard setups evaluate elastic potential energy stored in a wire under load, or compute the temperature drop required to induce a specified thermal tension in a clamped rod whose thermal contraction is restrained. Another regular problem type evaluates tensile stress at intermediate cross-sections along a heavy suspended rope bearing its own self-weight plus an external load.

Numerical-response problems form an unusually heavy slice of this chapter: 42 of the 99 questions from 2019 to 2026 had no answer choices, making meticulous unit tracking essential.

How to practise it

Start by mastering the three primary elastic moduli: Young's modulus for longitudinal stretch, shear modulus for shape distortion at constant volume, and bulk modulus for volumetric compression. Write out each definition clearly, ensuring you recognize that strain is a dimensionless ratio while stress and moduli carry units of pressure (N/m^2 or Pa).

Pay special attention to axes when reading graphical data. Standard physics textbooks place stress on the vertical axis and strain on the horizontal axis, where slope directly yields Young's modulus. However, JEE Main frequently inverts the axes by plotting strain on the vertical axis and stress on the horizontal axis; in such cases, the steepest curve corresponds to the smallest Young's modulus rather than the largest.

For elastic potential energy, practice deriving both total stored energy (half of force times elongation) and energy density (half of stress times strain). When solving thermal stress questions, recognize that prevented thermal contraction equals mechanical elongation, so thermal stress simply equals Young's modulus times the linear expansion coefficient times temperature change.

EdLoop JEE

Q1 JEE Main 2026 · 6 Apr · Shift 1 MCQ

A lift of mass 1600 kg is supported by thick iron wire. If the maximum stress which the wire can withstand is 4×10^8 N/m^2 and its radius is 4 mm, then maximum acceleration the lift can take is _____ m/s^2.
(take g = 10 m/s^2 and $\pi = 3.14$)

(A) 2.56
(B) 3.89
(C) 4.32
(D) 5.16

Answer: (A) 2.56 · Official NTA final key

Q2 JEE Main 2026 · 6 Apr · Shift 1 MCQ

The two wires A and B of equal cross-section but of different materials are joined together. The ratio of Young's modulus of wire A and wire B is 20/11. When the joined wire is kept under certain tension the elongations in the wires A and B are equal. If the length of wire A is 2.2 m, then the length of wire B is _____ m.

(A) 1.1
(B) 2.22
(C) 1.21
(D) 4.44

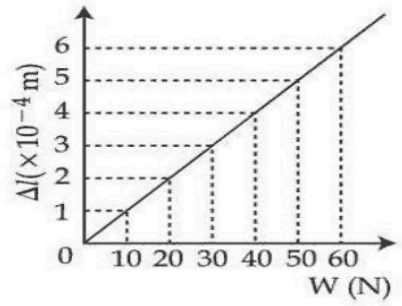
Answer: (C) 1.21 · Official NTA final key

Q3 JEE Main 2026 · 6 Apr · Shift 2 MCQ

Figure represents the extension (Δl) of a wire of length 1 meter, suspended from the ceiling of the room at one end with a load W connected to the other end. If the cross-sectional area of the wire is 10^{-5} m^2 then the Young's modulus of the wire is _____ N/m^2.

(see the figure above)

Figure represents the extension (Δl) of a wire of length 1 meter, suspended from the ceiling of the room at one end with a load W connected to the other end. If the cross-sectional area of the wire is 10^{-5} m^2 then the Young's modulus of the wire is _____ N/m^2.



Options :

6911214194. 1.0×10^{11}

6911214195. 2.0×10^{10}

6911214196. 1.0×10^{10}

6911214197. 2.0×10^{11}

(A) 1.0×10^{11}

(B) 2.0×10^{10}

(C) 1.0×10^{10}

(D) 2.0×10^{11}

Answer: (C) 1.0×10^{10} · Official NTA final key

Q4 JEE Main 2026 · 5 Apr · Shift 1 MCQ

The Young's modulus of steel wire of radius r and length L is Y.

If the radius r and length L of the wire are doubled then the value of Y

(A) increases by two times

(B) reduces by half

(C) remains unchanged

(D) becomes one fourth

Answer: (C) remains unchanged · Official NTA final key

Q5 JEE Main 2026 · 5 Apr · Shift 1 MCQ

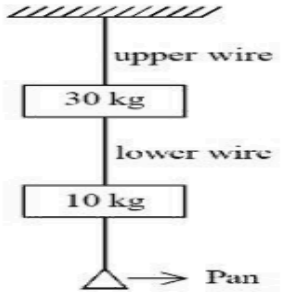
Two wires as shown in the figure below, made of steel and have breaking stress of 12×10^8 N/m^2. Area of cross-section of upper wire is 0.008 cm^2 and of lower wire is 0.004 cm^2. The maximum mass that can be added to pan without breaking any wire is _____ kg.

(take $g = 10$ m/s^2)

(see the figure above)

Two wires as shown in the figure below, made of steel and have breaking stress of 12×10^8 N/m^2. Area of cross-section of upper wire is 0.008 cm^2 and of lower wire is 0.004 cm^2. The maximum mass that can be added to pan without breaking any wire is _____ kg.

(take $g = 10$ m/s^2)



Options :

6952781174. 56

6952781175. 38

6952781176. 96

6952781177. 5.6

(A) 56

(B) 38

(C) 96

(D) 5.6

Answer: (B) 38 · Official NTA final key

Q6 JEE Main 2026 · 5 Apr · Shift 1 · Numerical

A cube has side length 5 cm and modulus of rigidity 10^5 N/m^2. The displacement produced by a force of 10 N in the upper face of cube is _____ mm.

Numerical value type: the answer is a number.

Answer: 2. · Official NTA final key

Q7 JEE Main 2026 · 5 Apr · Shift 2 · Numerical

A copper wire of length 3 m is stretched by 3 mm by applying an external force. The volume of the wire is 600×10^{-6} m^3. The elastic potential energy stored in the wire in stretched condition would be _____ J.

(Given Young modulus of copper = 1.1×10^{11} N/m^2)

Numerical value type: the answer is a number.

Answer: 33. · Official NTA final key

Q8 JEE Main 2026 · 4 Apr · Shift 1 · MCQ

The increase in the pressure required to decrease the volume (ΔV) of water is 6.3×10^7 N/m^2. The percentage decrease in the volume is _____.

(Bulk modulus of water $= 2.1 \times 10^9$ N/m^2.)

(A) 2 %
(B) 3 %
(C) 6 %
(D) 4 %

Answer: (B) 3 % · Official NTA final key

Q9 JEE Main 2026 · 4 Apr · Shift 1 MCQ

A string A of length 0.314 m and Young's modulus 2×10^{10} N/m^2 is connected to another string B of length and Young's modulus both twice of those of A. This series combination of strings is then suspended from a rigid support and its free end is fixed to a load of mass 0.8 kg. The net change in length of the combination is _____ mm.
(radius of both the strings is 0.2 mm and acceleration due to gravity $= 10$ m/s^2)
(Mass of both strings is to be neglected as compared to the mass of load)

(A) 3
(B) 2
(C) 1.9
(D) 1

Answer: (B) 2 · Official NTA final key

Q10 JEE Main 2026 · 4 Apr · Shift 2 MCQ

A metal string A is suspended from a rigid support and its free end is attached to a block of mass M. Second block having mass $2M$ is suspended at the bottom of the first block using a string B. The area of cross sections of strings A and B are same. The ratio of lengths of strings of A to B is 2 and the ratio of their Young's moduli (Y_A/Y_B) is 0.5. The ratio of elongations in A to B is _____.

(A) 1
(B) 4
(C) 8
(D) 6

Answer: (D) 6 · Official NTA final key

Q11 JEE Main 2026 · 2 Apr · Shift 1 Numerical

A uniform wire of length l of weight w is suspended from the roof with a weight of W at the other end. The stress in the wire at $\frac{l}{3}$ distance from the top is $\left(\frac{W}{A} + \frac{2}{\gamma}\frac{w}{A}\right)$, where, A is the cross sectional area of the wire. The value of γ is _____.

Numerical value type: the answer is a number.

Answer: 3. · Official NTA final key

EdLoop JEE

Q12 JEE Main 2026 · 28 Jan · Shift 1 MCQ

Two wires A and B made of different materials of lengths 6.0 cm and 5.4 cm, respectively and area of cross sections 3.0×10^{-5} m^2 and 4.5×10^{-5} m^2, respectively are stretched by the same magnitude under a given load. The ratio of the Young's modulus of A to that of B is $x : 3$. The value of x is _____.

(A) 5
(B) 4
(C) 2
(D) 1

Answer: (A) 5 · Official NTA final key

Q13 JEE Main 2026 · 24 Jan · Shift 1 MCQ

A brass wire of length 2 m and radius 1 mm at 27 °C is held taut between two rigid supports. Initially it was cooled to a temperature of -43 °C creating a tension T in the wire. The temperature to which the wire has to be cooled in order to increase the tension in it to $1.4T$, is _____ °C.

(A) -71
(B) -65
(C) -80
(D) -86

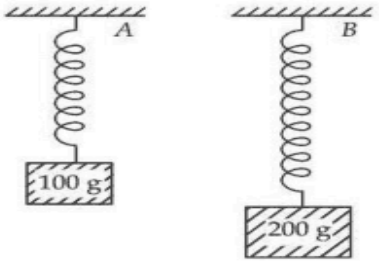
Answer: (A) -71 · Official NTA final key

Q14 JEE Main 2026 · 23 Jan · Shift 1 MCQ

Two blocks with masses 100 g and 200 g are attached to the ends of springs A and B as shown in figure. The energy stored in A is E. The energy stored in B, when spring constants k_A, k_B of A and B, respectively satisfy the relation $4k_A = 3k_B$, is :

(see the figure above)

Q.26 Two blocks with masses 100 g and 200 g are attached to the ends of springs A and B as shown in figure. The energy stored in A is E. The energy stored in B, when spring constants k_A, k_B of A and B, respectively satisfy the relation $4k_A = 3k_B$, is :



Options

1. $3E$
2. $\frac{4}{3}E$
3. $4E$
4. $2E$

(A) $3E$
(B) $\frac{4}{3}E$
(C) $4E$
(D) $2E$

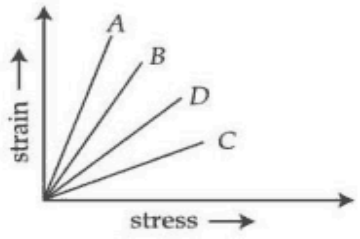
Answer: (A) $3E$ · Official NTA final key

Q15 JEE Main 2026 · 23 Jan · Shift 1 MCQ

The strain-stress plot for materials A, B, C and D is shown in the figure. Which material has the largest Young's modulus ?

(see the figure above)

Q.27 The strain-stress plot for materials A, B, C and D is shown in the figure. Which material has the largest Young's modulus ?



Options

1. A
2. C
3. B
4. D

(A) A
(B) C
(C) B
(D) D

Answer: (B) C · Official NTA final key

Q16 JEE Main 2025 · 8 Apr · Shift 2 MCQ

A 3 m long wire of radius 3 mm shows an extension of 0.1 mm when loaded vertically by a mass of 50 kg in an experiment to determine Young's modulus. The value of Young's modulus of the wire as per this experiment is $P \times 10^{11}\ Nm^{-2}$, where the value of P is:(Take $g = 3\pi\ m/s^2$)

(A) 10
(B) 25
(C) 2.5
(D) 5

Answer: (D) 5 · Key from source paper

Q17 JEE Main 2025 · 8 Apr · Shift 2 Numerical

A sample of a liquid is kept at 1 atm. It is compressed to 5 atm which leads to change of volume of 0.8 cm^3. If the bulk modulus of the liquid is 2 GPa, the initial volume of the liquid was _____ litre. (Take 1atm = 10^5 Pa)

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q18 JEE Main 2025 · 7 Apr · Shift 1 MCQ

Two wires A and B are made of same material having ratio of lengths $\frac{L_A}{L_B} = \frac{1}{3}$ and their diameters ratio $\frac{d_A}{d_B} = 2$. If both the wires are stretched using same force, what would be the ratio of their respective elongations ?

(A) 1 : 12
(B) 3 : 4
(C) 1 : 3
(D) 1 : 6

Answer: (A) 1 : 12 · Key from source paper

Q19 JEE Main 2025 · 4 Apr · Shift 1 Numerical

Two slabs with square cross section of different materials $(1, 2)$ with equal sides (l) and thickness d_1 and d_2 such that $d_2 = 2d_1$ and $l > d_2$. Considering lower edges of these slabs are fixed to the floor, we apply equal shearing force on the narrow faces. The angle of deformation is $\theta_2 = 2\theta_1$. If the shear moduli of material 1 is $4 \times 10^9 N/m^2$, then shear moduli of material 2 is $x \times 10^9 N/m^2$, where value of x is _____ .

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q20 JEE Main 2025 · 4 Apr · Shift 2 MCQ

A cylindrical rod of length 1 m and radius 4 cm is mounted vertically. It is subjected to a shear force of 10^5 N at the top. Considering infinitesimally small displacement in the upper edge, the angular displacement θ of the rod axis from its original position would be: (shear moduli, $G = 10^{10} N/m^2$)

(A) $1/4\pi$
(B) $1/40\pi$
(C) $1/2\pi$
(D) $1/160\pi$

Answer: (D) $1/160\pi$ · Key from source paper

Q21 JEE Main 2025 · 2 Apr · Shift 1 Numerical

A steel wire of length 2 m and Young's modulus $2.0 \times 10^{11} Nm^{-2}$ is stretched by a force. If Poisson ratio and transverse strain for the wire are 0.2 and 10^{-3} respectively, then the elastic potential energy density of the wire is _____ $\times 10^5$ (in SI units).

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q22 JEE Main 2025 · 2 Apr · Shift 2 Numerical

The length of a light string is 1.4 m when the tension on it is 5 N. If the tension increases to 7 N, the length of the string is 1.56 m. The original length of the string is _____ m.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q23 JEE Main 2025 · 29 Jan · Shift 1 MCQ

The fractional compression $\left(\frac{\Delta V}{V}\right)$ of water at the depth of 2.5 km below the sea level is _____ %. Given, the Bulk modulus of water = $2 \times 10^9\ \mathrm{N\,m^{-2}}$, density of water = $10^3\ \mathrm{kgm^{-3}}$, acceleration due to gravity = g = $10\ \mathrm{m\,s^{-2}}$.

(A) 1.25
(B) 1.0
(C) 1.75
(D) 1.5

Answer: (A) 1.25 · Key from source paper

Q24 JEE Main 2025 · 28 Jan · Shift 2 Numerical

The volume contraction of a solid copper cube of edge length 10 cm , when subjected to a hydraulic pressure of 7×10^6 Pa, would be _____ $\mathrm{mm^3}$. (Given bulk modulus of copper = $1.4 \times 10^{11}\ \mathrm{N\,m^{-2}}$)

Numerical value type: the answer is a number.

Answer: 50. · Key from source paper

Q25 JEE Main 2025 · 24 Jan · Shift 2 Numerical

The increase in pressure required to decrease the volume of a water sample by 0.2% is $\mathrm{P} \times 10^5 \mathrm{Nm^{-2}}$. Bulk modulus of water is $2.15 \times 10^9 \mathrm{Nm^{-2}}$. The value of P is _____

Numerical value type: the answer is a number.

Answer: 43. · Key from source paper

Q26 JEE Main 2025 · 23 Jan · Shift 2 MCQ

A massless spring gets elongated by amount x_1 under a tension of 5 N . Its elongation is x_2 under the tension of 7 N . For the elongation of $(5x_1 - 2x_2)$, the tension in the spring will be,

(A) 39 N
(B) 15 N
(C) 11 N
(D) 20 N

Answer: (C) 11 N · Key from source paper

Q27 JEE Main 2024 · 9 Apr · Shift 1 Numerical

Two persons pull a wire towards themselves. Each person exerts a force of 200 N on the wire. Young's modulus of the material of wire is 1×10^{11} N m^{-2}. Original length of the wire is 2 m and the area of cross section is 2 cm^2. The wire will extend in length by _____ μm.

Numerical value type: the answer is a number.

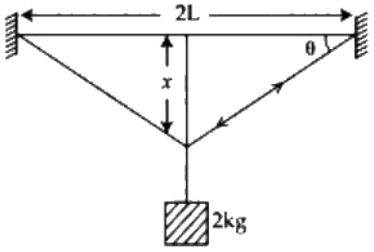
Answer: 20. · Key from source paper

Q28 JEE Main 2024 · 6 Apr · Shift 2 Numerical

A wire of cross sectional area A, modulus of elasticity $2 \times 10^{11}\text{Nm}^{-2}$ and length 2 m is stretched between two vertical rigid supports. When a mass of 2 kg is suspended at the middle it sags lower from its original position making angle $\theta = \frac{1}{100}$ radian on the points of support. The value of A is _____ $\times 10^{-4}$ m^2 (consider $x \ll L$). (given : g = 10 m/s^2)

(see the figure above)

Q23. A wire of cross sectional area A, modulus of elasticity $2 \times 10^{11}\text{Nm}^{-2}$ and length 2 m is stretched between two vertical rigid supports. When a mass of 2 kg is suspended at the middle it sags lower from its original position making angle $\theta = \frac{1}{100}$ radian on the points of support. The value of A is _____ $\times 10^{-4}$ m^2 (consider



$x << \text{L}$). (given : g = 10 m/s^2)

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q29 JEE Main 2024 · 5 Apr · Shift 1 Numerical

The density and breaking stress of a wire are 6×10^4 kg/m^3 and 1.2×10^8 N/m^2 respectively. The wire is suspended from a rigid support on a planet where acceleration due to gravity is $\frac{1}{3}^{rd}$ of the value on the surface of earth. The maximum length of the wire with breaking is _____ m (take, g = 10 m/s^2).

Numerical value type: the answer is a number.

Answer: 600. · Key from source paper

Q30 JEE Main 2024 · 5 Apr · Shift 2 MCQ

Match List-I with List-II :

List-I	List-II
(A) A force that restores an elastic body of unit area to its original state	(I) Bulk modulus

(B)	Two equal and opposite forces parallel to opposite faces	(II)	Young's modulus
(C)	Forces perpendicular everywhere to the surface per unit area same everywhere	(III)	Stress
(D)	Two equal and opposite forces perpendicular to opposite faces	(IV)	Shear modulus

Choose the correct answer from the options given below :

(A) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)

(B) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(C) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)

(D) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)

Answer: (B) (A)-(III), (B)-(IV), (C)-(I), (D)-(II) · Key from source paper

---

Q31 JEE Main 2024 · 4 Apr · Shift 1 · Numerical

An elastic spring under tension of 3 N has a length a. Its length is b under tension 2 N. For its length $(3a - 2b)$, the value of tension will be _____ N.

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q32 JEE Main 2024 · 1 Feb · Shift 1 · MCQ

With rise in temperature, the Young's modulus of elasticity

(A) changes erratically

(B) decreases

(C) increases

(D) remains unchanged

Answer: (B) decreases · Key from source paper

Q33 JEE Main 2024 · 1 Feb · Shift 2 · Numerical

One end of a metal wire is fixed to a ceiling and a load of 2 kg hangs from the other end. A similar wire is attached to the bottom of the load and another load of 1 kg hangs from this lower wire. Then the ratio of longitudinal strain of upper wire to that of the lower wire will be

[Area of cross section of wire = 0.005 cm^2, $Y = 2 \times 10^{11}\ \mathrm{N\,m^{-2}}$ and $g = 10\ \mathrm{m\,s^{-2}}$]

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q34 JEE Main 2024 · 31 Jan · Shift 1 · Numerical

The depth below the surface of sea to which a rubber ball be taken so as to decrease its volume by 0.02% is _____ m.

(Take density of sea water = 10^3 kg m^{-3}, Bulk modulus of rubber = 9×10^8 N m^{-2}, and $g = 10$ m s^{-2})

Numerical value type: the answer is a number.

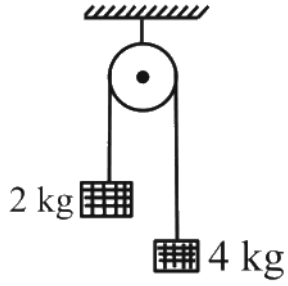
Answer: 18. · Key from source paper

Q35 JEE Main 2024 · 31 Jan · Shift 2 Numerical

Two blocks of mass 2 kg and 4 kg are connected by a metal wire going over a smooth pulley as shown in figure. The radius of wire is 4.0×10^{-5} m and Young's modulus of the metal is 2.0×10^{11} N m^{-2}. The longitudinal strain developed in the wire is $\frac{1}{\alpha\pi}$. The value of α is _____. [Use $g = 10$ m s^{-2}]

(see the figure above)

Q23. Two blocks of mass 2 kg and 4 kg are connected by a metal wire going over a smooth pulley as shown in figure. The radius of wire is 4.0×10^{-5} m and Young's modulus of the metal is 2.0×10^{11} N m^{-2}. The longitudinal strain developed in the wire is $\frac{1}{\alpha\pi}$. The value of α is _____. [Use $g = 10$ m s^{-2})



Numerical value type: the answer is a number.

Answer: 12. · Key from source paper

Q36 JEE Main 2024 · 30 Jan · Shift 1 MCQ

Young's modules of material of a wire of length L and cross-sectional area A is Y. If the length of the wire is doubled and cross-sectional area is halved then Young's modules will be:

(A) $\frac{Y}{4}$

(B) $4Y$

(C) Y

(D) $2Y$

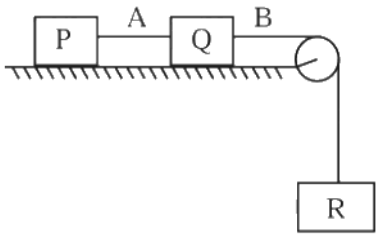
Answer: (C) Y · Key from source paper

Q37 JEE Main 2024 · 30 Jan · Shift 1 Numerical

Each of three blocks P, Q and R shown in figure has a mass of 3 kg. Each of the wire A and B has cross-sectional area 0. 005 cm^2 and Young's modulus 2×10^{11} N m^{-2}. Neglecting friction, the longitudinal strain on wire B is _____ $\times 10^{-4}$. (Take $g = 10$ m s^{-2}).

(see the figure above)

Q23. Each of three blocks P, Q and R shown in figure has a mass of 3 kg. Each of the wire A and B has cross-sectional area $0.005\ \text{cm}^2$ and Young's modulus $2 \times 10^{11}\ \text{N m}^{-2}$. Neglecting friction, the longitudinal strain on wire B is _____ $\times 10^{-4}$. (Take $g = 10\ \text{m s}^{-2}$)



Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q38 JEE Main 2024 · 29 Jan · Shift 2 MCQ

A wire of length L and radius r is clamped at one end. If its other end is pulled by a force F, its length increases by l. If the radius of the wire and the applied force both are reduced to half of their original values keeping original length constant, the increase in length will become:

(A) 3 times
(B) $\frac{3}{2}$ times
(C) 4 times
(D) 2 times

Answer: (D) 2 times · Key from source paper

Q39 JEE Main 2024 · 29 Jan · Shift 2 Numerical

Two metallic wires P and Q have same volume and are made up of same material. If their area of cross sections are in the ratio 4 : 1 and force F_1 is applied to P, an extension of Δl is produced. The force which is required to produce same extension in Q is F_2. The value of $\frac{F_1}{F_2}$ is _____.

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q40 JEE Main 2024 · 27 Jan · Shift 1 Numerical

If average depth of an ocean is 4000 m and the bulk modulus of water is $2 \times 10^9\ \text{N m}^{-2}$, then fractional compression $\frac{\Delta V}{V}$ of water at the bottom of ocean is $\alpha \times 10^{-2}$. The value of α is _____.
(Given, g = 10 m s^{-2}, ρ = 1000 kg m^{-3})

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q41 JEE Main 2024 · 27 Jan · Shift 2 MCQ

Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R)

Assertion (A) : The property of body, by virtue of which it tends to regain its original shape when the external force is removed, is Elasticity.

Reason (R) : The restoring force depends upon the bonded inter atomic and inter molecular force of solid.

In the light of the above statements, choose the correct answer from the options given below :

(A) (A) is false but (R) is true
(B) (A) is true but (R) is false
(C) Both (A) and (R) are true and (R) is the correct explanation (A)
(D) Both (A) and (R) are true but (R) is not the correct explanation of (A)

Answer: (C) Both (A) and (R) are true and (R) is the correct explanation (A) · Key from source paper

Q42 JEE Main 2023 · 15 Apr · Shift 1 MCQ

A wire of length L and radius r is clamped rigidly at one end. When the other end of the wire is pulled by a force f, its length increases by l. Another wire of same material of length $2L$ and radius $2r$ is pulled by a force $2f$. Then the increase in its length will be:

(A) $4l$
(B) $\frac{l}{2}$
(C) $2l$
(D) l

Answer: (D) l · Key from source paper

Q43 JEE Main 2023 · 13 Apr · Shift 1 MCQ

Under isothermal condition, the pressure of a gas is given by $P = aV^{-3}$, where a is a constant and V is the volume of the gas. The bulk modulus at constant temperature is equal to

(A) $3P$
(B) P
(C) $2P$
(D) $\frac{P}{2}$

Answer: (A) $3P$ · Key from source paper

Q44 JEE Main 2023 · 13 Apr · Shift 1 Numerical

The elastic potential energy stored in a steel wire of length 20 m stretched through 2 cm is 80 J. The cross sectional area of the wire is _____ mm^2. (Given, $Y = 2.0 \times 10^{11}$ N m^{-2})

Numerical value type: the answer is a number.

Answer: 40. · Key from source paper

Q45 JEE Main 2023 · 11 Apr · Shift 1 Numerical

The length of a wire becomes l_1 and l_2 when 100 N and 120 N tension are applied respectively. If $10l_2 = 11l_1$, then the natural length of wire will be $\frac{1}{x}l_1$. Here the value of x is

Numerical value type: the answer is a number.

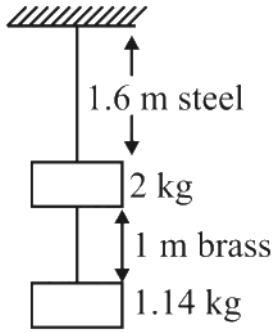
Answer: 2. · Key from source paper

Q46 JEE Main 2023 · 10 Apr · Shift 1 Numerical

Two wires each of radius 0.2 cm and negligible mass, one made of steel and the other made of brass are loaded as shown in the figure. The elongation of the steel wire is _____ 10^{-6} m. [Young's modulus for steel $= 2 \times 10^{11}\ \mathrm{N\,m^{-2}}$ and $g = 10\ \mathrm{m\,s^{-2}}$]

(see the figure above)

Q23. Two wires each of radius 0.2 cm and negligible mass, one made of steel and the other made of brass are loaded as shown in the figure. The elongation of the steel wire is _____ 10^{-6} m. [Young's modulus for steel $= 2 \times 10^{11}$ N m^{-2} and $g = 10$ m s^{-2}]



Numerical value type: the answer is a number.

Answer: 20. · Key from source paper

Q47 JEE Main 2023 · 10 Apr · Shift 2 MCQ

Young's moduli of the material of wires A and B are in the ratio of $1 : 4$, while its area of cross sections are in the ratio of $1 : 3$. If the same amount of load is applied to both the wires, the amount of elongation produced in the wires A and B will be in the ratio of [Assume length of wires A and B are same]

(A) $12 : 1$
(B) $1 : 36$
(C) $36 : 1$
(D) $1 : 12$

Answer: (A) $12 : 1$ · Key from source paper

Q48 JEE Main 2023 · 8 Apr · Shift 1 MCQ

An aluminium rod with Young's modulus $\mathrm{Y} = 7.0 \times 10^{10}\ \mathrm{N\,m^{-2}}$ undergoes elastic strain of 0.04%. The energy per unit volume stored in the rod in SI unit

(A) 2800
(B) 11200
(C) 5600
(D) 8400

Answer: (C) 5600 · Key from source paper

Q49 JEE Main 2023 · 6 Apr · Shift 1 Numerical

A steel rod has a radius of $20\ \mathrm{mm}$ and a length of $2.0\ \mathrm{m}$. A force of $62.8\ \mathrm{kN}$ stretches it along its length. Young's modulus of steel is $2.0 \times 10^{11}\ \mathrm{N\,m^{-2}}$. The longitudinal strain produced in the wire is _____ $\times 10^{-5}$.

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q50 JEE Main 2023 · 6 Apr · Shift 2 Numerical

A metal block of mass m is suspended from a rigid support through a metal wire of diameter $14\ \mathrm{mm}$. The tensile stress developed in the wire under equilibrium state is $7 \times 10^5\ \mathrm{N\,m^{-2}}$. The value of mass m is _____ kg.
(Take $g = 9.8\ \mathrm{m\,s^{-2}}$ and $\pi = \frac{22}{7}$)

Numerical value type: the answer is a number.

Answer: 11. · Key from source paper

Q51 JEE Main 2023 · 1 Feb · Shift 1 Numerical

A certain pressure 'P' is applied to 1 litre of water and 2 litre of a liquid separately. Water gets compressed to 0.01% whereas the liquid gets compressed to 0.03%. The ratio of Bulk modulus of water to that of the liquid is $\frac{3}{x}$. The value of x is _____.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q52 JEE Main 2023 · 1 Feb · Shift 2 MCQ

The Young's modulus of a steel wire of length 6 m and cross-sectional area 3 mm^2, is $2 \times 11^{11}\ \mathrm{N/m}^2$ (sic). The wire is suspended from its support on a given planet. A block of mass 4 kg is attached to the free end of the wire. The acceleration due to gravity on the planet is $\frac{1}{4}$ of its value on the earth. The elongation of wire is (Take g on the earth = 10 $\mathrm{m/s}^2$):

(A) 1 cm

(B) 1 mm

(C) 0.1 mm

(D) 0.1 cm

Answer: (C) 0.1 mm · Key from source paper

Q53 JEE Main 2023 · 31 Jan · Shift 1 Numerical

A thin rod having a length of 1 m and area of cross-section $3 \times 10^{-6}\ \mathrm{m}^2$ is suspended vertically from one end. The rod is cooled from $210^{\circ}\mathrm{C}$ to $160^{\circ}\mathrm{C}$. After cooling, a mass M is attached at the lower end of the rod such that the length of rod again becomes 1 m. Young's modulus and coefficient of linear expansion of rod are $2 \times 10^{11}\ \mathrm{N\ m^{-2}}$ and $2 \times 10^{-5}\ \mathrm{K^{-1}}$, respectively. The value of M is _____ kg. (Take g = 10 $\mathrm{m\ s^{-2}}$)

Numerical value type: the answer is a number.

Answer: 60. · Key from source paper

Q54 JEE Main 2023 · 31 Jan · Shift 2 MCQ

Under the same load, wire A having length 5.0 m and cross section 2.5×10^{-5} m^2 stretches uniformly by the same amount as another wire B of length 6.0 m and a cross section of 3.0×10^{-5} m^2 stretches. The ratio of the Young's modulus of wire A to that of wire B will be:

(A) 1 : 4

(B) 1 : 1

(C) 1 : 10

(D) 1 : 2

Answer: (B) 1 : 1 · Key from source paper

Q55 JEE Main 2023 · 30 Jan · Shift 1 MCQ

Choose the correct relationship between Poisson ratio σ, bulk modulus (K) and modulus of rigidity η of a given solid object:

(A) $\sigma = \frac{3K-2\eta}{6K+2\eta}$
(B) $\sigma = \frac{6K+2\eta}{3K-2\eta}$
(C) $\sigma = \frac{3K+2\eta}{6K+2\eta}$
(D) $\sigma = \frac{6K-2\eta}{3K-2\eta}$

Answer: (A) $\sigma = \frac{3K-2\eta}{6K+2\eta}$ · Key from source paper

Q56 JEE Main 2023 · 30 Jan · Shift 2 MCQ

A force is applied to a steel wire A, rigidly clamped at one end. As a result elongation in the wire is 0.2 mm. If same force is applied to another steel wire B of double the length and a diameter 2.4 times that of the wire A, the elongation in the wire B will be (wires having uniform circular cross sections)

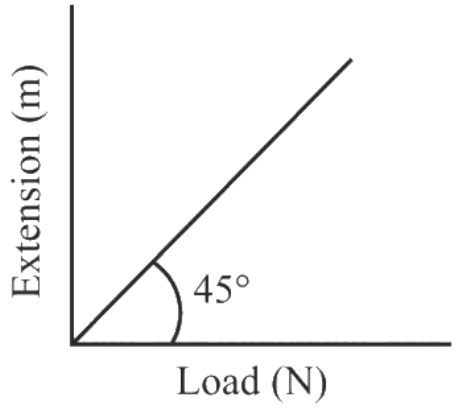
(A) 6.06×10^{-2} mm
(B) 2.77×10^{-2} mm
(C) 3.0×10^{-2} mm
(D) 6.9×10^{-2} mm

Answer: (D) 6.9×10^{-2} mm · Key from source paper

Q57 JEE Main 2023 · 25 Jan · Shift 1 Numerical

As shown in the figure, in an experiment to determine Young's modulus of a wire, the extension-load curve is plotted. The curve is a straight line passing through the origin and makes an angle of 45° with the load axis. The length of wire is $62.8\ \text{cm}$ and its diameter is $4\ \text{mm}$. The Young's modulus is found to be $\text{x} \times 10^4\ \text{N m}^{-2}$. The value of x is _____.
(see the figure above)

Q10. As shown in the figure, in an experiment to determine Young's modulus of a wire, the extension-load curve is plotted. The curve is a straight line passing through the origin and makes an angle of 45° with the load axis. The length of wire is $62.8\ \text{cm}$ and its diameter is $4\ \text{mm}$. The Young's modulus is found to be $\text{x} \times 10^4\ \text{N m}^{-2}$ The value of x is _____.



Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q58 JEE Main 2023 · 24 Jan · Shift 1 MCQ

A 100 m long wire having cross-sectional area $6.25 \times 10^{-4}\ \mathrm{m}^2$ and Young's modulus is $10^{10}\ \mathrm{N\,m^{-2}}$ is subjected to a load of 250 N, then the elongation in the wire will be :

(A) 6.25×10^{-3} m
(B) 4×10^{-4} m
(C) 6.25×10^{-6} m
(D) 4×10^{-3} m

Answer: (D) 4×10^{-3} **m** · Key from source paper

Q59 JEE Main 2023 · 24 Jan · Shift 2 MCQ

Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**

Assertion (A) : Steel is used in the construction of buildings and bridges.

Reason (R) : Steel is more elastic and its elastic limit is high.

In the light of above statements, choose the most appropriate answer from the options given below

(A) Both A and R are correct and R is the correct explanation of A
(B) Both A and R are correct but R is NOT the correct explanation of A
(C) A is correct but R is not correct
(D) A is not correct but R is correct

Answer: (A) Both A and R are correct and R is the correct explanation of A · Key from source paper

Q60 JEE Main 2022 · 29 Jul · Shift 1 MCQ

If the length of a wire is made double and radius is halved of its respective values. Then, the Young's modulus of the material of the wire will :

(A) Remain same
(B) Become 8 times its initial value
(C) Become $\frac{1^{th}}{4}$ of its initial value
(D) Become 4 times its initial value

Answer: (A) Remain same · Key from source paper

Q61 JEE Main 2022 · 29 Jul · Shift 2 Numerical

A metal wire of length 0.5 m and cross-sectional area $10^{-4}\ \mathrm{m}^2$ has breaking stress $5 \times 10^{8}\ \mathrm{N\,m^{-2}}$. A block of 10 kg is attached at one end of the string and is rotating in a horizontal circle. The maximum linear velocity of block will be _____ $\mathrm{m\,s^{-1}}$.

Numerical value type: the answer is a number.

Answer: 50. · Key from source paper

Q62 JEE Main 2022 · 28 Jul · Shift 1 MCQ

The force required to stretch a wire of cross-section $1\ \mathrm{cm}^2$ to double its length will be :
(Given Yong's modulus of the wire $= 2 \times 10^{11}\ \mathrm{N\ m^{-2}}$)

(A) $1 \times 10^7\ \mathrm{N}$
(B) $1.5 \times 10^7\ \mathrm{N}$
(C) $2 \times 10^7\ \mathrm{N}$
(D) $2.5 \times 10^7\ \mathrm{N}$

Answer: (C) $2 \times 10^7\ \mathrm{N}$ · Key from source paper

---

Q63 JEE Main 2022 · 28 Jul · Shift 2 Numerical

A string of area of cross-section $4\ \mathrm{mm}^2$ and length 0.5 is connected with a rigid body of mass $2\ \mathrm{kg}$. The body is rotated in a vertical circular path of radius $0.5\ \mathrm{m}$. The body acquires a speed of $5\ \mathrm{m\,s^{-1}}$ at the bottom of the circular path. Strain produced in the string when the body is at the bottom of the circle is _____ $\times 10^{-5}$. (Use Young's modulus $10^{11}\ \mathrm{N\,m^{-2}}$ and $g = 10\ \mathrm{m\,s^{-2}}$)

Numerical value type: the answer is a number.

Answer: 30. · Key from source paper

Q64 JEE Main 2022 · 27 Jul · Shift 1 Numerical

A square aluminium (shear modulus is $25 \times 10^9\ \mathrm{Nm^{-2}}$) slab of side 60 cm and thickness 15 cm is subjected to a shearing force (on its narrow face) of 18.0×10^4 N. The lower edge is riveted to the floor. The displacement of the upper edge is _____ μm.

Numerical value type: the answer is a number.

Answer: 48. · Key from source paper

Q65 JEE Main 2022 · 27 Jul · Shift 2 MCQ

A steel wire of length 3.2 m ($Y_S = 2.0 \times 10^{11}\ \mathrm{N\ m^{-2}}$) and a copper wire of length 4.4 m ($Y_C = 1.1 \times 10^{11}\ \mathrm{N\ m^{-2}}$), both of radius 1.4 mm are connected end to end. When stretched by a load, the net elongation is found to be 1.4 mm. The load applied, in Newton, will be: (Given $\pi = \frac{22}{7}$)

(A) 360
(B) 180
(C) 1080
(D) 154

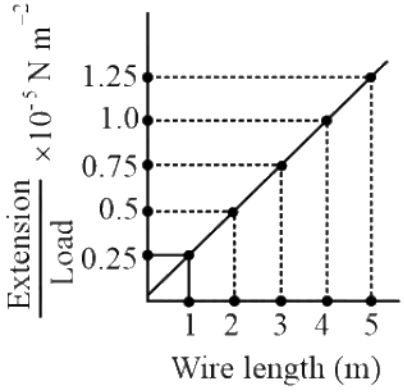
Answer: (D) 154 · Key from source paper

Q66 JEE Main 2022 · 27 Jul · Shift 2 Numerical

In an experiment to determine the Young's modulus, steel wires of five different lengths (1, 2, 3, 4 and 5) but of same cross-section ($2\ \mathrm{mm}^2$) were taken and curves between extension and load were obtained. The slope (extension/load) of the curves were plotted with the wire length and the following graph is obtained. If the Young's modulus of given steel wires is x $\times 10^{11}\mathrm{N\ m}^{-2}$, then the value of x is _____ .

(see the figure above)

Q23. In an experiment to determine the Young's modulus, steel wires of five different lengths $(1, 2, 3, 4$ and $5)$ but of same cross-section $(2\ \mathrm{mm}^2)$ were taken and curves between extension and load were obtained. The slope (extension/load) of the curves were plotted with the wire length and the following graph is obtained. If the Young's modulus of given steel wires is $\mathrm{x} \times 10^{11}\mathrm{N\ m}^{-2}$, then the value of x is _____ .



Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q67 JEE Main 2022 · 26 Jul · Shift 2 MCQ

The area of cross section of the rope used to lift a load by a crane is $2.5 \times 10^{-4}\ \mathrm{m}^2$. The maximum lifting capacity of the crane is 10 metric tons. To increase the lifting capacity of the crane to 25 metric tons, the required area of cross section of the rope should be
(take g = $10\ \mathrm{ms}^{-2}$)

(A) $6.25 \times 10^{-4}\ \mathrm{m}^2$
(B) $10 \times 10^{-4}\ \mathrm{m}^2$
(C) $1 \times 10^{-4}\ \mathrm{m}^2$
(D) $1.67 \times 10^{-4}\ \mathrm{m}^2$

Answer: (A) $6.25 \times 10^{-4}\ \mathrm{m}^2$ · Key from source paper

Q68 JEE Main 2022 · 26 Jul · Shift 2 Numerical

A uniform heavy rod of mass $20\ \mathrm{kg}$. Cross sectional area $0.4\ \mathrm{m}^2$ and length $20\ \mathrm{m}$ is hanging from a fixed support. Neglecting the lateral contraction, the elongation in the rod due to its own weight is

$x \times 10^{-9}$ m. The value of x is _____ .
(Given. Young's modulus $Y = 2 \times 10^{11}\ \mathrm{Nm}^{-2}$ and $g = 10\ \mathrm{m\ s}^{-2}$)

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q69 JEE Main 2022 · 25 Jul · Shift 1 Numerical

A wire of length L and radius r is clamped rigidly at one end. When the other end of the wire is pulled by a force F, its length increases by 5 cm. Another wire of the same material of length $4\ L$ and radius $4r$ is pulled by a force $4\ F$ under same conditions. The increase in length of this wire is _____ cm.

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q70 JEE Main 2022 · 29 Jun · Shift 1 MCQ

A wire of length L is hanging from a fixed support. The length changes to L_1 and L_2 when masses $1\ \mathrm{kg}$ and $2\ \mathrm{kg}$ are suspended respectively from its free end. Then the value of L is equal to

(A) $\sqrt{L_1 L_2}$
(B) $\dfrac{L_1 + L_2}{2}$
(C) $2L_1 - L_2$
(D) $3L_1 - L_2$

Answer: (C) $2L_1 - L_2$ · Key from source paper

Q71 JEE Main 2022 · 26 Jun · Shift 1 Numerical

The elongation of a wire on the surface of the earth is $10^{-4}\ \mathrm{m}$. The same wire of same dimensions is elongated by $6 \times 10^{-5}\ \mathrm{m}$ on another planet. The acceleration due to gravity on the planet will be _____ $\mathrm{m\ s}^{-2}$. (Take acceleration due to gravity on the surface of earth $= 10\ \mathrm{m\ s}^{-2}$)

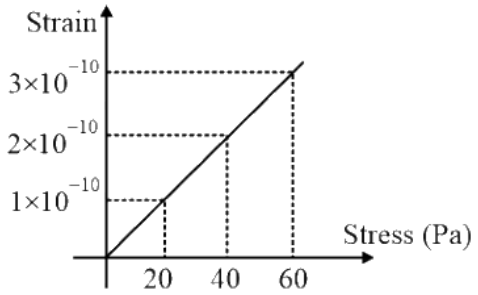
Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q72 JEE Main 2022 · 26 Jun · Shift 1 Numerical

The elastic behaviour of material for linear stress and linear strain, is shown in the figure. The energy density for a linear strain of 5×10^{-4} is _____ $\mathrm{kJ\ m}^{-3}$. Assume that material is elastic upto the linear strain of 5×10^{-4},
(see the figure above)

Q24. The elastic behaviour of material for linear stress and linear strain, is shown in the figure. The energy density for a linear strain of 5×10^{-4} is _____ kJ m^{-3}. Assume that material is elastic upto the linear strain of 5×10^{-4},



Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q73 JEE Main 2022 · 24 Jun · Shift 1 MCQ

The bulk modulus of a liquid is 3×10^{10} Nm^{-2}. The pressure required to reduce the volume of liquid by 2% is :

(A) 3×10^8 N m^{-2}
(B) 6×10^8 N m^{-2}
(C) 9×10^8 N m^{-2}
(D) 12×10^8 N m^{-2}

Answer: (B) 6×10^8 N m^{-2} · Key from source paper

Q74 JEE Main 2021 · 31 Aug · Shift 1 MCQ

A uniform heavy rod of weight 10 kg m s^{-2}, cross-sectional area 100 cm^2 and length 20 cm is hanging from a fixed support. Young modulus of the material of the rod is 2×10^{11} N m^{-2}. Neglecting the lateral contraction, find the elongation of rod due to its own weight:

(A) 5×10^{-10} m
(B) 4×10^{-8} m
(C) 5×10^{-8} m
(D) 2×10^{-9} m

Answer: (A) 5×10^{-10} m · Key from source paper

Q75 JEE Main 2021 · 31 Aug · Shift 1 Numerical

When a rubber ball is taken to a depth of _____ m in deep sea, its volume decreases by 0.5%
(The bulk modulus of rubber $= 9.8 \times 10^8$ N m^{-2} Density of sea water $= 10^3$ kg m^{-3},g $= 9.8$ m s^{-2})

Numerical value type: the answer is a number.

Answer: 500. · Key from source paper

EdLoop JEE

Q76 JEE Main 2021 · 31 Aug · Shift 2 MCQ

Four identical hollow cylindrical columns of mild steel support a big structure of mass 50×10^3 kg. The inner and outer radii of each column are 50 cm and 100 cm respectively. Assuming uniform local distribution, calculate the compression strain of each column. [use $Y = 2.0 \times 10^{11}$ Pa, $g = 9.8$ m s^{-2}]

(A) 1.87×10^{-3}
(B) 2.60×10^{-7}
(C) 3.60×10^{-8}
(D) 7.07×10^{-4}

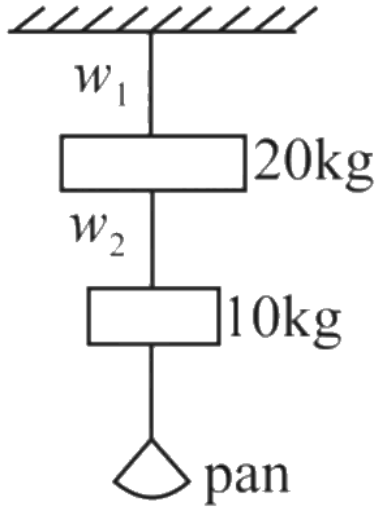
Answer: (B) 2.60×10^{-7} · Key from source paper

Q77 JEE Main 2021 · 27 Aug · Shift 2 Numerical

Wires W_1 and W_2 are made of same material having the breaking stress of 1.25×10^9 N m^{-2}. W_1 and W_2 have cross-sectional area of 8×10^{-7} m^2 and 4×10^{-7} m^2, respectively. Masses of 20 kg and 10 kg hang from them as shown in the figure. The maximum mass that can be placed in the pan without breaking the wires is ____kg (Use g $= 10$ m s^{-2})

(see the figure above)

Q22. Wires W_1 and W_2 are made of same material having the breaking stress of 1.25×10^9 N m^{-2}. W_1 and W_2 have cross-sectional area of 8×10^{-7} m^2 and 4×10^{-7} m^2, respectively. Masses of 20 kg and 10 kg hang from them as shown in the figure. The maximum mass that can be placed in the pan without breaking the wires is _____kg (Use g $= 10$ m s^{-2})



Numerical value type: the answer is a number.

Answer: 40. · Key from source paper

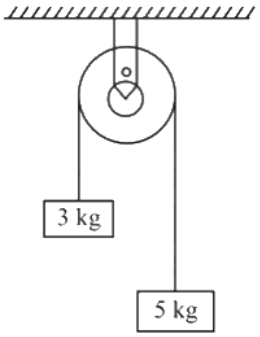
Q78 JEE Main 2021 · 26 Aug · Shift 2 MCQ

Two blocks of masses 3 kg and 5 kg are connected by a metal wire going over a smooth pulley. The breaking stress of the metal is $\frac{24}{\pi} \times 10^2$ N m^{-2}. What is the minimum radius of the wire ?

(take $g = 10\ \mathrm{m\ s^{-2}}$)

(see the figure above)

Q7. Two blocks of masses $3\ \mathrm{kg}$ and $5\ \mathrm{kg}$ are connected by a metal wire going over a smooth pulley. The breaking stress of the metal is $\frac{24}{\pi} \times 10^2\ \mathrm{N\ m^{-2}}$. What is the minimum radius of the wire ?
(take $g = 10\ \mathrm{m\ s^{-2}}$)



(1) $1250\ \mathrm{cm}$
(2) $1.25\ \mathrm{cm}$
(3) $125\ \mathrm{cm}$
(4) $12.5\ \mathrm{cm}$

(A) $1250\ \mathrm{cm}$
(B) $1.25\ \mathrm{cm}$
(C) $125\ \mathrm{cm}$
(D) $12.5\ \mathrm{cm}$

Answer: (D) $12.5\ \mathrm{cm}$ · Key from source paper

Q79 JEE Main 2021 · 27 Jul · Shift 1 Numerical

A stone of mass $20\ \mathrm{g}$ is projected from a rubber catapult of length $0.1\ \mathrm{m}$ and area of cross section $10^{-6}\ \mathrm{m^2}$ stretched by an amount $0.04\ \mathrm{m}$. The velocity of the projected stone is $\mathrm{m\ s^{-1}}$. (Young's modulus of rubber $= 0.5 \times 10^9\ \mathrm{N\ m^{-2}}$)

Numerical value type: the answer is a number.

Answer: 20. · Key from source paper

Q80 JEE Main 2021 · 25 Jul · Shift 1 MCQ

Two wires of same length and radius are joined end to end and loaded. The Young's moduli of the materials of the two wires are Y_1 and Y_2. The combination behaves as a single wire then its Young's modulus is:

(A) $Y = \frac{2Y_1Y_2}{3Y_1+Y_2}$
(B) $Y = \frac{2Y_1Y_2}{Y_1+Y_2}$
(C) $Y = \frac{Y_1Y_2}{2Y_1+Y_2}$
(D) $Y = \frac{Y_1Y_2}{Y_1+Y_2}$

Answer: (B) $Y = \frac{2Y_1Y_2}{Y_1+Y_2}$ · Key from source paper

Q81 JEE Main 2021 · 22 Jul · Shift 1 · Numerical

The area of cross-section of a railway track is $0.01\ \mathrm{m}^2$. The temperature variation is $10\ ^\circ\mathrm{C}$. Coefficient of linear expansion of material of track is $10^{-5}\ ^\circ\mathrm{C}^{-1}$. The energy stored per meter in the track is $\mathrm{J\ m}^{-1}$. (Young's modulus of material of track is $10^{11}\ \mathrm{N\ m}^{-2}$)

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q82 JEE Main 2021 · 20 Jul · Shift 1 · MCQ

The value of tension in a long thin metal wire has been changed from T_1 to T_2. The lengths of the metal wire at two different values of tension T_1 and T_2 are ℓ_1 and ℓ_2, respectively. The actual length of the metal wire is:

(A) $\frac{T_1\ell_2 - T_2\ell_1}{T_1 - T_2}$
(B) $\frac{T_1\ell_1 - T_2\ell_2}{T_1 - T_2}$
(C) $\frac{\ell_1 + \ell_2}{2}$
(D) $\sqrt{T_1 T_2 \ell_1 \ell_2}$

Answer: (A) $\frac{T_1\ell_2 - T_2\ell_1}{T_1 - T_2}$ · Key from source paper

Q83 JEE Main 2021 · 20 Jul · Shift 2 · MCQ

The length of a metal wire is ℓ_1, when the tension in it is T_1 and is ℓ_2 when the tension is T_2. The natural length of the wire is:

(A) $\sqrt{\ell_1 \ell_2}$
(B) $\frac{\ell_1\, T_2 - \ell_2\, T_1}{T_2 - T_1}$
(C) $\frac{\ell_1\, T_2 + \ell_2\, T_1}{T_2 + T_1}$
(D) $\frac{\ell_1 + \ell_2}{2}$

Answer: (B) $\frac{\ell_1\, T_2 - \ell_2\, T_1}{T_2 - T_1}$ · Key from source paper

Q84 JEE Main 2021 · 18 Mar · Shift 1 · Numerical

Two separate wires A and B are stretched by $2\ \mathrm{mm}$ and $4\ \mathrm{mm}$ respectively, when they are subjected to a force of $2\ \mathrm{N}$. Assume that both the wires are made up of same material and the radius of wire B is 4 times that of the radius of wire A. The length of the wires A and B are in the ratio of $a : b$. Then $\frac{a}{b}$ can be expressed as $\frac{1}{x}$, where x is _____ .

Numerical value type: the answer is a number.

Answer: 32. · Key from source paper

Q85 JEE Main 2021 · 17 Mar · Shift 2 MCQ

An object is located at $2\ \text{km}$ beneath the surface of the water. If the fractional compression $\frac{\Delta V}{V}$ is 1.36%, the ratio of hydraulic stress to the corresponding hydraulic strain will be _____ [Given: density of water is $1000\ \text{kg m}^{-3}$ and $g = 9.8\ \text{m s}^{-2}$).

(A) $1.96 \times 10^{7}\ \text{N m}^{-2}$
(B) $1.44 \times 10^{7}\ \text{N m}^{-2}$
(C) $2.26 \times 10^{9}\ \text{N m}^{-2}$
(D) $1.44 \times 10^{9}\ \text{N m}^{-2}$

Answer: (D) $1.44 \times 10^{9}\ \text{N m}^{-2}$ · Key from source paper

Q86 JEE Main 2021 · 26 Feb · Shift 1 MCQ

The normal density of a material is ρ and its bulk modulus of elasticity is K. The magnitude of increase in density of material, when a pressure P is applied uniformly on all sides, will be :

(A) $\frac{PK}{\rho}$
(B) $\frac{\rho P}{K}$
(C) $\frac{\rho K}{P}$
(D) $\frac{K}{\rho P}$

Answer: (B) $\frac{\rho P}{K}$ · Key from source paper

Q87 JEE Main 2021 · 26 Feb · Shift 2 MCQ

The length of metallic wire is l_1 when tension in it is T_1. It is l_2 when the tension is T_2. The original length of the wire will be :

(A) $\frac{T_2 l_1 + T_1 l_2}{T_1 + T_2}$
(B) $\frac{l_1 + l_2}{2}$
(C) $\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}$
(D) $\frac{T_1 l_1 - T_2 l_2}{T_2 - T_1}$

Answer: (C) $\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}$ · Key from source paper

Q88 JEE Main 2021 · 24 Feb · Shift 1 MCQ

If Y, K and η are the values of Young's modulus, bulk modulus and modulus of rigidity of any material respectively. Choose the correct relation for these parameters.

EdLoop JEE

(A) $Y = \frac{9K\eta}{3K-\eta}\ \mathrm{N\,m^{-2}}$
(B) $\eta = \frac{3YK}{9K+Y}\ \mathrm{N\,m^{-2}}$
(C) $K = \frac{Y\eta}{9\eta-3Y}\ \mathrm{N\,m^{-2}}$
(D) $Y = \frac{9K\eta}{2\eta+3K}\ \mathrm{N\,m^{-2}}$

Answer: (C) $K = \frac{Y\eta}{9\eta-3Y}\ \mathrm{N\,m^{-2}}$ · Key from source paper

---

Q89 JEE Main 2021 · 24 Feb · Shift 2 Numerical

A uniform metallic wire is elongated by $0.04\ \mathrm{m}$ when subjected to a linear force F. The elongation, if its length and diameter is doubled and subjected to the same force will be _____ cm.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q90 JEE Main 2020 · 4 Sep · Shift 2 MCQ

A cube of metal is subjected to a hydrostatic pressure $4\ GPa$. The percentage change in the length of the side of the cube is close to : (Given bulk modulus of metal, $B = 8 \times 10^{10}\ Pa$)

(A) 5
(B) 0.6
(C) 20
(D) 1.67

Answer: (D) 1.67 · Key from source paper

Q91 JEE Main 2020 · 9 Jan · Shift 1 Numerical

A body of mass m $= 10$ kg is attached to one end of a wire of length 0.3 m. What is the maximum angular speed (in rad $\mathrm{s^{-1}}$) with which it can be rotated about its other end in a space station without breaking the wire? [Breaking stress of wire $(\sigma) = 4.8 \times 10^7\ \mathrm{N\,m^{-2}}$ and area of cross-section of the wire= $10^{-2}\ \mathrm{cm^2}$]

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q92 JEE Main 2020 · 9 Jan · Shift 2 MCQ

Two steel wires having same length are suspended from a ceiling under the same load. If the ratio of their energy stored per unit volume is $1 : 4$, the ratio of their diameters is:

(A) $\sqrt{2} : 1$
(B) $1 : 2$
(C) $2 : 1$
(D) $1 : \sqrt{2}$

Answer: (A) $\sqrt{2} : 1$ · Key from source paper

Q93 JEE Main 2019 · 12 Apr · Shift 1 MCQ

At $40^{\circ}\mathrm{C}$, a brass wire of 1 mm radius is hung from the ceiling. A small mass, M is hung from the free end of the wire. When the wire is cooled down from $40^{\circ}\mathrm{C}$ to $20^{\circ}\mathrm{C}$ it regains its original length of $0.2\ \mathrm{m}$. The value of M is close to:
(Coefficient of linear expansion and Young's modulus of brass are $10^{-5}\ /^{\circ}\mathrm{C}$ and $10^{11}\ \mathrm{N}\ /\ \mathrm{m}^2$, respectively; $\mathrm{g} = 10\ \mathrm{m\ s}^{-2}$)

(A) 0.9 kg
(B) 0.5 kg
(C) 1.5 kg
(D) 9 kg

Answer: (D) 9 kg · Key from source paper

Q94 JEE Main 2019 · 10 Apr · Shift 2 MCQ

The elastic limit of brass is $379\ \mathrm{MPa}$. The minimum diameter of a brass rod if it is to support a $400\ \mathrm{N}$ load without exceeding its elastic limit will be

(A) $1.00\ \mathrm{mm}$
(B) $1.36\ \mathrm{mm}$
(C) $1.16\ \mathrm{mm}$
(D) $0.90\ \mathrm{mm}$

Answer: (C) $1.16\ \mathrm{mm}$ · Key from source paper

Q95 JEE Main 2019 · 10 Apr · Shift 2 MCQ

In an experiment, brass and steel wires of length $1\ \mathrm{m}$ each with areas of cross section $1\ \mathrm{mm}^2$ are used. The wires are connected in series and one end of the combined wire is connected to a rigid support and other end is subjected to elongation. The stress required to produce a net elongation of $0.2\ \mathrm{mm}$ is,
[Given, the Young's Modulus for steel and brass are, respectively, $120 \times 10^9\ \mathrm{N}\ /\ \mathrm{m}^2$ and $60 \times 10^9\ \mathrm{N}\ /\ \mathrm{m}^2$]

(A) $8.0 \times 10^6\ \mathrm{N/m^2}$
(B) $1.2 \times 10^6\ \mathrm{N/m^2}$
(C) $0.2 \times 10^6\ \mathrm{N/m^2}$
(D) $1.8 \times 10^6\ \mathrm{N/m^2}$

Answer: (A) $8.0 \times 10^6\ \mathrm{N/m^2}$ · Key from source paper

---

Q96 JEE Main 2019 · 8 Apr · Shift 1 MCQ

A boy's catapult is made of rubber cord which is 42 cm long, with 6 mm diameter of cross-section and of negligible mass. The boy keeps a stone weighing 0.02 kg on it and stretches the cord by 20 cm by applying a constant force. When released, the stone flies off with a velocity of 20 $\mathrm{ms^{-1}}$. Neglect the change in the area of cross-section of the cord while stretched. The Young's modulus of rubber is closest to:

(A) $10^6\ \mathrm{N\,m^{-2}}$
(B) $10^4\ \mathrm{N\,m^{-2}}$
(C) $10^8\ \mathrm{N\,m^{-2}}$
(D) $10^3\ \mathrm{N\,m^{-2}}$

Answer: (A) $10^6\ \mathrm{N\,m^{-2}}$ · Key from source paper

---

Q97 JEE Main 2019 · 8 Apr · Shift 1 MCQ

A steel wire having a radius of 2.0 mm, carrying a load of 4 kg, is hanging from a ceiling. Given that $g = 3.1\pi\ \mathrm{m\,s^{-2}}$, what will be the tensile stress that would be developed in the wire?

(A) $5.2 \times 10^6\ \mathrm{N\,m^{-2}}$
(B) $6.2 \times 10^6\ \mathrm{N\,m^{-2}}$
(C) $4.8 \times 10^6\ \mathrm{N\,m^{-2}}$
(D) $3.1 \times 10^6\ \mathrm{N\,m^{-2}}$

Answer: (D) $3.1 \times 10^6\ \mathrm{N\,m^{-2}}$ · Key from source paper

---

Q98 JEE Main 2019 · 8 Apr · Shift 2 MCQ

Young's moduli of two wires A and B are in the ratio 7 : 4 . Wire A is 2 m long and has radius R. Wire B is 1.5 m long and has radius 2 mm . If the two wires stretch by the same length for a given load, the value of R is close to:

(A) 1.3 mm
(B) 1.9 mm
(C) 1.5 mm
(D) 1.7 mm

Answer: (D) 1.7 mm · Key from source paper

Q99 JEE Main 2019 · 12 Jan · Shift 2 MCQ

A load of mass $M\ kg$ is suspended from a steel wire of length $2m$ and radius 1.0 mm in Searle's apparatus experiment. The increase in length produced in the wire is 4.0 mm. Now the load is fully immersed in a liquid of relative density 2. The relative density of the material of load is 8. The new value of increase in length of the steel wire is:

(A) $4.0\ mm$
(B) Zero
(C) $5.0mm$
(D) $3.0mm$

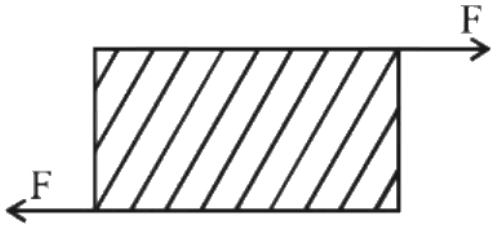
Answer: (D) $3.0mm$ · Key from source paper

Q100 JEE Main 2018 · 15 Apr · Shift 2 MCQ

As shown in the figure, forces of 10^5 N each are applied in opposite directions, on the upper and lower faces of a cube of side 10 cm, shifting the upper face parallel to itself by 0.5 cm. If the side of another cube of the same material is, 20 cm then under similar conditions as above, the displacement will be:

(see the figure above)

Q4. As shown in the figure, forces of 10^5 N each are applied in opposite directions, on the upper and lower faces of a cube of side 10 cm, shifting the upper face parallel to itself by 0.5 cm. If the side of another cube of the same material is, 20 cm then under similar conditions as above, the displacement will be:



(1) 1.00 cm
(2) 0.25 cm
(3) 0.37 cm
(4) 0.75 cm

(A) 1.00 cm
(B) 0.25 cm
(C) 0.37 cm
(D) 0.75 cm

Answer: (B) 0.25 cm · Key from source paper

Q101 JEE Main 2018 · 8 Apr · Offline MCQ

A solid sphere of radius r made of a soft material of bulk modulus K is surrounded by a liquid in a cylindrical container. A massless piston of area a floats on the surface of the liquid, covering entire

cross-section of cylindrical container. When a mass m is placed on the surface of the piston to compress the liquid, the fractional decrement in the radius of the sphere $\left(\frac{dr}{r}\right)$, is:

(A) $\frac{mg}{Ka}$
(B) $\frac{Ka}{mg}$
(C) $\frac{Ka}{3mg}$
(D) $\frac{mg}{3Ka}$

Answer: (D) $\frac{mg}{3Ka}$ · Key from source paper

Q102 JEE Main 2017 · 2 Apr · Offline MCQ

A man grows into a giant such that his linear dimensions increase by a factor of 9. Assuming that his density remains same, the stress in the leg will change by a factor of:

(A) $\frac{1}{81}$
(B) 9
(C) $\frac{1}{9}$
(D) 81

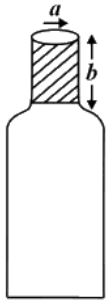
Answer: (B) 9 · Key from source paper

Q103 JEE Main 2016 · 10 Apr · Online MCQ

A bottle has an opening of radius a and length b. A cork of length b and radius $(a + \Delta a)$ where $(\Delta a \ll a)$, is compressed to fit into the opening completely (see figure). If the bulk modulus of cork is B and the coefficient of friction between the bottle and cork is μ, then the force needed to push the cork into the bottle is

(see the figure above)

Q9. A bottle has an opening of radius a and length b. A cork of length b and radius $(a + \Delta a)$ where $(\Delta a \ll a)$, is compressed to fit into the opening completely (see figure). If the bulk modulus of cork is B and the coefficient of friction between the bottle and cork is μ, then the force needed to push the cork into the bottle is



(1) $(\pi\mu Bb)a$
(2) $(2\pi\mu Bb)\,\Delta\,a$
(3) $(\pi\mu Bb)\,\Delta\,a$
(4) $(4\pi\mu Bb)\,\Delta\,a$

(A) $(\pi\mu Bb)a$
(B) $(2\pi\mu Bb)\,\Delta a$
(C) $(\pi\mu Bb)\,\Delta a$
(D) $(4\pi\mu Bb)\,\Delta a$

Answer: (D) $(4\pi\mu Bb)\,\Delta a$ · Key from source paper

Q104 JEE Main 2016 · 9 Apr · Online MCQ

A uniformly tapering conical wire is made from a material of Young's modulus Y and has a normal, unextended length L. The radii, at the upper and lower ends of this conical wire, have values R and $3R$, respectively. The upper end of the wire is fixed to a rigid support and a mass M is suspended from its lower end. The equilibrium extended length, of this wire, would equal:

(A) $\mathrm{L}\left(1+\frac{2}{9}\frac{\mathrm{Mg}}{\pi \mathrm{YR}^2}\right)$
(B) $\mathrm{L}\left(1+\frac{1}{9}\frac{\mathrm{Mg}}{\pi \mathrm{YR}^2}\right)$
(C) $\mathrm{L}\left(1+\frac{1}{3}\frac{\mathrm{Mg}}{\pi \mathrm{YR}^2}\right)$
(D) $\mathrm{L}\left(1+\frac{2}{3}\frac{\mathrm{Mg}}{\pi \mathrm{YR}^2}\right)$

Answer: (C) $\mathrm{L}\left(1+\frac{1}{3}\frac{\mathrm{Mg}}{\pi \mathrm{YR}^2}\right)$ · Key from source paper

Q105 JEE Main 2015 · 4 Apr · Offline MCQ

A pendulum made of a uniform wire of cross sectional area A has time period T. When an additional mass M is added to its bob, the time period changes to T_M. If the Young's modulus of the material of the wire is Y, then $\frac{1}{Y}$ is equal to:
(g =gravitational acceleration)

(A) $\left[1-\left(\frac{T}{T_M}\right)^2\right]\frac{A}{Mg}$
(B) $\left[\left(\frac{T_M}{T}\right)^2-1\right]\frac{A}{Mg}$
(C) $\left[\left(\frac{T_M}{T}\right)^2-1\right]\frac{Mg}{A}$
(D) $\left[1-\left(\frac{T_M}{T}\right)^2\right]\frac{A}{Mg}$

Answer: (B) $\left[\left(\frac{T_M}{T}\right)^2-1\right]\frac{A}{Mg}$ · Key from source paper

Q106 JEE Main 2014 · 12 Apr · Online MCQ

Steel ruptures when a shear of $3.5\times10^8\ \mathrm{N\,m^{-2}}$ is applied. The force needed to punch a $1\ \mathrm{cm}$ diameter hole in a steel sheet $0.3\ \mathrm{cm}$ thick is nearly:

(A) 1.4×10^4 N
(B) 2.7×10^4 N
(C) 3.3×10^4 N
(D) 1.1×10^4 N

Answer: (C) 3.3×10^4 N · Key from source paper

Q107 JEE Main 2014 · 11 Apr · Online MCQ

The bulk moduli of ethanol, mercury and water are given as $0.9, 25$ and 2.2 respectively in units of $10^9 \mathrm{Nm}^{-2}$. For a given value of pressure, the fractional compression in volume is $\frac{\Delta V}{V}$. Which of the following statements about $\frac{\Delta V}{V}$ for these three liquids is correct ?

(A) Ethanol > Water > Mercury
(B) Water > Ethanol > Mercury
(C) Mercury > Ethanol > Water
(D) Ethanol > Mercury > Water

Answer: (A) Ethanol > Water > Mercury · Key from source paper

Q108 JEE Main 2014 · 9 Apr · Online MCQ

In materials like aluminium and copper, the correct order of magnitude of various elastic modulii is :

(A) Young's modulii < shear modulii < bulk modulii
(B) Bulk modulii < shear modulii < Young's modulii
(C) Shear modulii < Young's modulii < bulk modulii
(D) Bulk modulii < Young's modulii < shear modulii

Answer: (C) Shear modulii < Young's modulii < bulk modulii · Key from source paper

Q109 JEE Main 2013 · 23 Apr · Online MCQ

A copper wire of length 1.0 m and a steel wire of length 0.5 m having equal cross-sectional areas are joined end to end. The composite wire is stretched by a certain load which stretches the copper wire by 1 mm. If the Young's modulii of copper and steel are respectively $1.0 \times 10^{11}\ \mathrm{Nm}^{-2}$ and $2.0 \times 10^{11} \mathrm{Nm}^{-2}$, the total extension of the composite wire is :

(A) 1.75 mm
(B) 2.0 mm
(C) 1.50 mm
(D) 1.25 mm

Answer: (D) 1.25 mm · Key from source paper

Q110 JEE Main 2013 · 22 Apr · Online MCQ

A uniform wire (Young's modulus $2 \times 10^{11}\ \mathrm{Nm}^{-2}$) is subjected to longitudinal tensile stress of $5 \times 10^{7}\ \mathrm{Nm}^{-2}$. If the overall volume of the wire is 0.02%, the fractional decrease in the radius of the wire is close to:

(A) 1.0×10^{-4}
(B) 1.5×10^{-4}
(C) 0.25×10^{-4}
(D) 5×10^{-4}

Answer: (C) 0.25×10^{-4} · Key from source paper

Q111 JEE Main 2013 · 9 Apr · Online MCQ

If the ratio of lengths, radii and Young's moduli of steel and brass wires in the figure are a, b and c respectively, then the corresponding ratio of increase in their lengths is :

(A) $\frac{3c}{2ab^2}$
(B) $\frac{2a^2c}{b}$
(C) $\frac{3a}{2b^2c}$
(D) $\frac{2ac}{b^2}$

Answer: (C) $\frac{3a}{2b^2c}$ · Key from source paper

Q112 AIEEE 2012 · 19 May · Online MCQ

A steel wire can sustain $100\ \mathrm{kg}$ weight without breaking. If the wire is cut into two equal parts, each part can sustain a weight of

(A) $50\ \mathrm{kg}$
(B) $400\ \mathrm{kg}$
(C) $100\ \mathrm{kg}$
(D) $200\ \mathrm{kg}$

Answer: (C) $100\ \mathrm{kg}$ · Key from source paper

Q113 AIEEE 2012 · 7 May · Online MCQ

A structural steel rod has a radius of 10 mm and length of 1.0 m. A 100kN force stretches it along its length. Young's modulus of structural steel is $2 \times 10^{11}\mathrm{Nm}^{-2}$. The percentage strain is about

EdLoop JEE

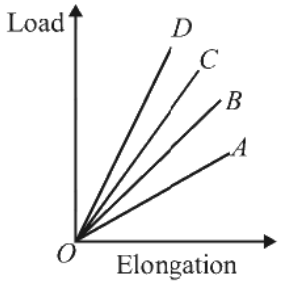
(A) 0.16%
(B) 0.32%
(C) 0.08%
(D) 0.24%

Answer: (A) 0.16% · Key from source paper

Q114 AIEEE 2012 · 7 May · Online MCQ

The load versus elongation graphs for four wires of same length and made of the same material are shown in the figure. The thinnest wire is represented by the line
(see the figure above)

Q10. The load versus elongation graphs for four wires of same length and made of the same material are shown in the figure. The thinnest wire is represented by the line



(1) OA (2) OC
(3) OD (4) OB

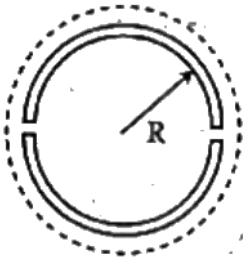
(A) OA
(B) OC
(C) OD
(D) OB

Answer: (A) OA · Key from source paper

Q115 AIEEE 2012 · Offline MCQ

A wooden wheel of radius R is made of two semicircular parts (see figure); The two parts are held together by a ring made of a metal strip of cross sectional area S and length L. L is slightly less than $2\pi\mathrm{R}$. To fit the ring on the wheel, it is heated so that its temperature rises by $\Delta\mathrm{T}$ and it just steps over the wheel. As it cools down to surrounding temperature, it presses the semicircular parts together. If the coefficient of linear expansion of the metal is α, and its Youngs' modulus is Y, the force that one part of the wheel applies on the other part is :
(see the figure above)

Q8. A wooden wheel of radius R is made of two semicircular parts (see figure); The two parts are held together by a ring made of a metal strip of cross sectional area S and length L. L is slightly less than $2\pi R$. To fit the ring on the wheel, it is heated so that its temperature rises by ΔT and it just steps over the wheel. As it cools down to surrounding temperature, it presses the semicircular parts together. If the coefficient of linear expansion of the metal is α, and its Youngs' modulus is Y, the force that one part of the wheel applies on the other part is :



(1) $2\pi SY\alpha\Delta T$
(2) $SY\alpha\Delta T$
(3) $\pi SY\alpha\Delta T$
(4) $2SY\alpha\Delta T$

(A) $2\pi SY\alpha\Delta T$
(B) $SY\alpha\Delta T$
(C) $\pi SY\alpha\Delta T$
(D) $2SY\alpha\Delta T$

Answer: (D) $2SY\alpha\Delta T$ · Key from source paper

Q116 AIEEE 2009 MCQ

Two wires are made of the same material and have the same volume. However wire 1 has crosssectional area A and wire-2 has cross-sectional area $3A$. If the length of wire 1 increases by Δx on applying force F, how much force is needed to stretch wire 2 by the same amount?

(A) F
(B) 4 F
(C) 6 F
(D) 9 F

Answer: (D) 9 F · Key from source paper

Q117 AIEEE 2006 MCQ

A wire elongates by ℓmm when a load W is hanged from it. If the wire goes over a pulley and two weights W each are hung at the two ends, the elongation of the wire will be (in mm)

(A) $\ell/2$
(B) ℓ
(C) 2ℓ
(D) zero

Answer: (B) ℓ · Key from source paper

Q118 AIEEE 2005 MCQ

If S is stress and Y is Young's modulus of material of a wire, the energy stored in the wire per unit volume is

(A) $2S^2Y$
(B) $S^2/2Y$
(C) $2Y/S^2$
(D) $S/2Y$

Answer: (B) $S^2/2Y$ · Key from source paper

Q119 AIEEE 2004 MCQ

A wire fixed at the upper end stretches by length by applying a force F. The work done in stretching is

(A) F/2
(B) $\mathrm{F}\ell$
(C) 2 $\mathrm{F}\ell$
(D) $\mathrm{F}\ell/2$

Answer: (D) $\mathrm{F}\ell/2$ · Key from source paper

Q120 AIEEE 2003 MCQ

A wire suspended vertically from one of its ends is stretched by attaching a weight of 200 N to the lower end. The weight stretches the wire by 1 mm. Then the elastic energy stored in the wire is

(A) 0.2 J
(B) 10 J
(C) 20 J
(D) 0.1 J

Answer: (D) 0.1 J · Key from source paper