

1. Spring stiffness is equal to
1. Load carrying capacity of spring
 2. Load per unit area of base
 3. Load per unit deflection
 4. None of these

Ans: 3

Note: The stiffness, k , of a body is a measure of the resistance offered by an elastic body to deformation. For an elastic body with a single degree of freedom (DOF) (for example, stretching or compression of a rod), the stiffness is defined as

Where

F is the force on the body is the displacement produced by the force along the same degree of freedom (for instance, the change in length of a stretched spring)

In the International System of Units, stiffness is typically measured in N/m.

2. India's first nuclear explosion test was conducted in the State of :

1. Rajasthan
2. Punjab
3. Tamilnadu
4. Gujarat

Ans: 1

Note: Smiling Buddha (MEA designation: Pokhran-I) was the assigned code name of India's first successful nuclear bomb test on 18 May 1974.

3. Rukmini Devi Arundale is associated with:

1. Kathakali
2. Kuchipudi
3. MohiniAttam
4. Bharathanatyam.

Ans: 4.

She started Kalakshetra, Adyar, Chennai. **Rukmini Devi Arundale** was an Indian theosophist, dancer and choreographer of the Indian classical dance form of Bharatanatyam, and an activist for animal rights and welfare

Founded: Kalakshetra Foundation

4. Which one of the following is not properly matched?

- | | |
|----------------------|----------------------|
| 1. Padma Subramanian | - Barathanatyam. |
| 2. Kamaraj | - Politics |
| 3. Parveen Sultana | - Instrumental Music |
| 4. Sachin Tendulkar | - Cricket |

Ans: 3

5. Which of the following States produce the largest share of petroleum?

1. Andhra Pradesh and Tamilnadu
2. Assam and Andhra Pradesh
3. **Assam and Gujarat**
4. Nagaland and Rajasthan

Ans: 3

6. Brindavan Express runs between:

1. Mumbai and Bangalore
2. Mysore and Bangalore
3. **Bangalore and Chennai**
4. Mysore and Chennai

Ans: 3

7. Who were the main proponents of Non-Aligned Movement in its early phase?

1. Nehru, Chou – en – Lai and Ho – chi – Minh
2. **Nehru, Nasser and Tito**
3. Nehru, Ayubkhan and Mandela
4. Indira Gandhi, Mandela and Fidel Castro

Ans: 2

Note: The **Non-Aligned Movement** was founded and held its **first** conference (the Belgrade Conference) in 1961 under the leadership of Josip Broz Tito of Yugoslavia, Gamal Abdel Nasser of Egypt, Jawaharlal Nehru of India, Kwame Nkrumah of Ghana, and Sukarno of Indonesia

8. Who founded “Servants of India Society”?

1. T. N. Sheshan
2. Vallabhbhai Patel
3. S. S. Bose
4. **Gopalkrishna Gokhale**

Ans:4

Note: The **Servants of India Society** (i.e., Government servants) was formed in Pune, Maharashtra, on June 12, 1905 by Gopal Krishna Gokhale, who left the Deccan Education Society to form this association

9. ‘Yercaud’ is:

1. **a hill station in Tamilnadu**
2. a beach-resort in Kerala
3. a musical instrument in North Karnataka
4. a vegetarian dish in Telengana region

Ans: 1

10. Davis Cup relates to:

1. **Tennis**
2. Cricket
3. Football
4. Hockey

Ans: 1

11. Typhoid is caused by:

1. air-borne bacteria
2. contagious germs

3. improper blood transfusion

Ans: 4

4. Water borne germs/bacteria

Typhoid fever is a life-threatening illness **caused** by Salmonella Typhi bacteria. It is usually spread through contaminated food or water.

KEY FACTS

- Symptoms include prolonged fever, fatigue, headache, nausea, abdominal pain, and constipation or diarrhoea. Some patients may have a rash. Severe cases may lead to serious complications or even death.
- Typhoid fever can be treated with antibiotics although increasing resistance to different types of antibiotics is making treatment more complicated.

12. Name the country which is not a member of “SAARC”:

1. Bangladesh

2. Maldives

3. Myanmar

4. Afghanistan

Ans: 3

Note: The members of the SAARC are; Afghanistan, Bangladesh, Bhutan, India, Nepal, the Maldives, Pakistan and Sri Lanka.

13. Who was the first recipient of *Bharat Ratna* ?

1. C. Rajagopalachari

2. S. Radhakrishnan

3. B.R. Ambedkar

4. Mother Teresa

Ans: 1

Note: The first recipients of the Bharat Ratna were: the last Governor-General of the Dominion of India – C. Rajagopalachari, second President and the first Vice President of India – Dr Sarvepalli Radhakrishnan, and Nobel Prize Laureate, Physicist C. V. Raman; who were honoured in 1954

14. Which of the location was producing traditional pearls?

1. Ratnagiri

2. Tuticorin

3. Kochi

4. Kakinada

Ans: 2

15. Telephone was invented by:

1. Ericson

2. Marconi (Radio)

3. Edison

4. Alexander Graham Bell

Ans: 4

16. Which of the following is the richest source of protein?

1. peas 2. Soya beans 3. Apple 4. Coconut

Ans: 2

17. Which one of the following is a Gallantry Award?

1. ParamaVashishtSeva Medal 2. Dronacharya Award
3. Arjuna Award 4. Kirti Chakra

Ans: 4

Note: Param Vir Chakra (Pvc) is the highest gallantry award of Indian army. Apart from this award there are 5 other gallantry awards in India i.e. MahaVir Chakra, Vir Chakra, Ashoka Chakra, Kirti Chakra and Shaurya Chakra. These gallantry awards were instituted by the Government of India on 26th January, 1950.

18. Which river flows mostly in Karnataka and Tamilnadu?

1. Vaigai 2. Krishna
3. Cauveri 4. Periyar

Ans: 3

19. In Tibet, the river Brahmaputra is called:

1. Hwang Ho 2. Teesta
3. Tsangpo 4. Yongtse

Ans: 3

20. Nickel when added to steel as an alloying element:

1. Softens steel 2. Improves toughness
3. Improves grain structure 4. none of these

Ans: 2

21. Which of the following place is associated with Tippu Sultan?

1. Secunderabad 2. Bijapur
3. Aurangabad 4. Srirangapatnam

Ans: 4

Note: Tipu Sultan (20 November 1750 – 4 May 1799), also known as the Tiger of Mysore, was the ruler of the Kingdom of Mysore from 1782 to 1799. He was also a scholar, soldier and poet. Hyder Ali is his father.

22. During oxyacetylene flame-cutting, the metal is cut due to?

1. Burning of metal
2. Intensive oxidation
3. Reduction
4. None of these

Ans: 2

Note: A heating flame is directed on the metal to be cut to raise it to bright red heat. Then a stream of high-pressure oxygen is directed on to the hot metal. The Steel and Iron is immediately oxidised to magnetic oxide of iron (Fe_3O_4).

23. Chromium when added to steel as an alloying element:

1. Softens steel
2. Improves corrosion resistance
4. Improves grain structure
4. none of these

Ans: 2

Note: Chromium - is a powerful **alloying element** in **steel**. It strongly increases the hardenability of **steel**, and markedly improves the corrosion resistance of **alloys** in oxidizing media. It increases hardenability and elevated temperature strength. In austenitic stainless steels it improves pitting corrosion resistance.

As an **alloying element**, **nickel** enhances its important properties such as formability, weldability and ductility, while increasing corrosion resistance in certain applications. ... It is the **addition** of **nickel** that enables stainless **steel** to become such a versatile alloy

24. In isothermal (iso means same) expansion of gases:

1. Temp is lowered
2. Temp increases
3. Temperature remains constant
4. Temp drops to zero

Ans: 3

25. The property of materials by which it can be rolled into sheets is called:

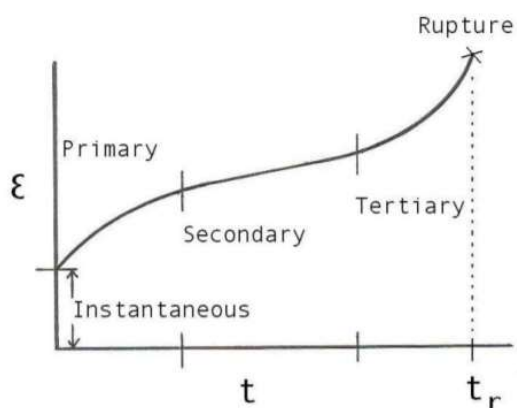
1. Plasticity
2. elasticity
3. Malleability
4. creep

Ans: 3

Creep

- It is a time- dependent deformation under a certain applied load.
- Generally occurs at high temperature (thermal creep), but can also happen at room temperature in certain materials (e.g. lead or glass), albeit much slower.
- As a result, the material undergoes a time dependent increase in length, which could be dangerous while in service.

- The rate of deformation is called the creep rate. It is the slope of the line in a Creep Strain vs. Time curve



26. The product from Cupola is:

1. Pig Iron
2. Steel
3. Cast Iron
4. Malleable Iron

Ans: 1

Note: Pig iron is the product of smelting iron ore (also ilmenite) with a high-carbon fuel and reductant such as coke, usually with limestone as a flux. Charcoal and anthracite are also used as fuel and reductant. Pig iron is produced by smelting iron ore in blast furnaces or by smelting ilmenite in electric furnaces.

A **cupola** or **cupola furnace** is a melting device used in foundries that can be used to melt cast iron, Ni-resist iron and some bronzes.

27. The process of Zinc Coating in Steel pipes is known as:

1. Pickling
2. Galvanising
3. Phosphating
4. Carburising

Ans: 2

28. One Bar pressure is equivalent to:

1. 735 mm Hg
2. 750 mm Hg
3. 100 mm Hg
4. 14.7 mm Hg

Ans: 2

Note: 1 bar is approximately equal to:

- 0.987 atm

- 14.5038 psi absolute
- 29.53 in Hg column
- 750.06 mm Hg column
- 750.06 Torr

1019.72 centimetre of water column

Millimeter Mercury (0°C) : Millimeter of mercury is a small pressure unit which represents the pressure pushing down due to gravity of any volume of liquid mercury which is 1mm high. It is widely used, and its value is approximately equal to a pressure of 1 torr.

Bar : The bar is a unit of measurement for pressure. It is widely used in the daily life particularly in European countries, though that is a non-SI unit. 1 bar is equal to 100,000 Pascals, which is close approximately to atmospheric pressure, so it is often used to represent atmospheric pressure rather than standard atmosphere (101325 Pascals).

<https://www.theunitconverter.com/millimeter-mercury-to-bar-conversion/735-millimeter-mercury-to-bar.html>

29. Efficiency of a machine in terms of mechanical advantage (M.A.) and velocity ratio (V.R.) is given by

1. $\frac{V.R.}{M.A.}$
2. $\frac{1}{(V.R.) \times (M.A.)}$
3. $\frac{M.A.}{V.R.}$
- (4) (V.R.) X

Ans: 3

30. If P is the effort required to lift a load W , then mechanical advantage is given by

1. P/W
2. $P \times W$
3. W/P
4. $\frac{1}{P \times W}$

Ans: 3

31. Co-efficient of friction is the ratio of:

1. force of friction to total weight of the two bodies
2. force of friction to normal reaction between two bodies
3. force of friction to reaction between two bodies
4. force of limiting friction to normal reaction between two bodies

Ans: 3

Note: Coefficient of friction (CoF) is a dimensionless number that is defined as the ratio between friction force and normal force acting on the surfaces

32. If D is the distance moved by the effort and d is the distance moved by the load, then velocity ration (V.R.) is given by

1. d/D 2. D/d 3. $d \cdot D$ 4. $\frac{1}{d \cdot D}$
Ans: 2

Note: Velocity ratio of simple machine is the ratio of distance travelled by the effort to the distance travelled by the load in the machine

33. One metric horse power is equal to

1. 746 watts 2. 736 watts 3. 550 watts 4. 75 watts
Ans: 2

34. One British horse power is equal to

1. 746 watts 2. 736 watts 3. 550 watts 4. 75 watts
Ans: 1

35. The mechanical efficiency of an I.C. engine is equal to

1. $\frac{I.H.P.}{B.H.P.}$ 2. $\frac{F.H.P.}{B.H.P.}$ 3. $\frac{B.H.P.}{F.H.P.}$ 4. $\frac{B.H.P.}{I.H.P.}$
Ans: 4

36. Fuel injector is used in a

1. Spark ignition engine 2. Steam engine
3. Compression ignition engine (DSL engine) 4. Gas engine
Ans: 3.(carburetor is used in petrol or SI engine)

37. When two dissimilar metals are heated at one end and cooled at the other end, an emf is developed which is proportional to

1. ratio of temperatures at the two ends
2. difference of temperatures at two ends
3. product of temperatures at two ends
4. length of the metals
Ans: 2

Note: The **thermoelectric effect** is the direct conversion of temperature differences to electric voltage and vice versa via a thermocouple. A thermoelectric device creates a voltage when there is a difference in temperature between the ends. Conversely, when a voltage is applied to it, heat is transferred from one side to the other, creating a temperature difference.

The term "thermoelectric effect" encompasses three separately identified effects: the **Seebeck effect**, **Peltier effect**, and **Thomson effect**. The Seebeck and Peltier effects are different manifestations of the same physical process.

The Thomson effect is an extension of the Peltier–Seebeck model and is credited to Lord Kelvin.

Joule heating, the heat that is generated whenever a current is passed through a conductive material, is not generally termed a thermoelectric effect. The Peltier–Seebeck and Thomson effects are thermodynamically reversible, whereas Joule heating is not.

Box: Modes of heat transfer

Heat transfer

Heat Transfer Modes Heat transfer processes are classified into three types. The first is conduction, which is defined as transfer of heat occurring through intervening matter without bulk motion of the matter

The second heat transfer process is convection, or heat transfer due to a flowing fluid. The fluid can be a gas or a liquid; both have applications in aerospace technology. In convection heat transfer, the heat is moved through bulk transfer of a non-uniform temperature fluid. The third process is radiation or transmission of energy through space without the necessary presence of matter. Radiation is the only method for heat transfer in space.

38. Useful isotope of uranium for a nuclear reactor is

1. U^{238}

2. U^{235}

3. U^{236}

4. U^{233}

Ans: 2

Note: The primary natural **isotopes of uranium** are **uranium-235** (0.7 percent), which is fissile, and **uranium-238** (99.3 percent), which is fissionable but not fissile.

Uranium-235 is important for both nuclear reactors and nuclear weapons because it is the only isotope existing in nature to any appreciable extent that is fissile in response to thermal neutrons.

Natural uranium as found in the Earth's crust is a mixture largely of two isotopes: uranium-238 (U-238), accounting for 99.3% and uranium-235 (U-235) about 0.7%.

The isotope U-235 is important because under certain conditions it can readily be split, yielding a lot of energy. It is therefore said to be 'fissile' and we use the expression 'nuclear fission'.

ENERGY FROM THE URANIUM ATOM

The nucleus of the U-235 atom comprises 92 protons and 143 neutrons ($92 + 143 = 235$). When the nucleus of a U-235 atom captures a moving neutron it splits in two (fissions) and releases some energy in the form of heat, also two or three additional neutrons are thrown off.

<https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/introduction/what-is-uranium-how-does-it-work.aspx>

39. The ratio of shear stress to shear strain is called

1. Poisson's ratio
2. Bulk modulus
3. Modulus of rigidity
4. Modulus of elasticity

Ans:3

40. The cross-sectional area of a rod is 10 cm^2 . A pull of 10 tonnes is maximum stress produced in the rod would be

1. 1 tonne/cm²
2. 0.5 tonne/cm²
3. 4 tonne/cm²
4. 2 tonne/cm²

Ans:1

41. The energy of a body by virtue of its position above earth is

1. Potential energy
2. Kinetic energy
3. Dynamic energy
4. Static energy

Ans: 1

42. Identify the type of motor recommended for locomotive drive

1. D.C. series motor
2. D.C. compound motor
3. D.C. shunt motor
4. Synchronous motor

Ans: 1

Note: Three types of motor are used in locomotives: DC motors, AC motors with variable frequency drives and AC permanent magnet motors.

Traditionally, these were series-wound brushed DC motors. The availability of high-powered semiconductors (thyristors and the IGBT) has now made practical the use of much simpler, higher-reliability AC induction motors known as asynchronous traction motors. Synchronous AC motors are also occasionally used, as in the French TGV.

43. The famous dancer Shanthale, belong to which dynasty?

1. Rastrakuta
2. Kadamba
3. Hoysala
4. None of these

Ans: 3

The Hoysala Dynasty was the prominent dynasty of the Kannadiga region (which is now Karnataka, India) who ruled between 10th to 14th centuries AD. Belur was their capital city which was later moved to Halebidu. The Hoysala era emerged as an important period in the development of art, architecture, and religion in South India. The empire is remembered today primarily for its temple architecture. Over a hundred surviving temples exist across

Karnataka, including the well known Chennakesava Temple at Belur, the Hoysaleswara Temple at Halebidu, and the Kesava Temple at Somanathapur

44. Which place is known as the 'Cherapunji of South'?

- | | |
|-------------|--------------|
| 1. Madikeri | 2. Agumbe |
| 3. Shimoga | 4. Mangalore |

Ans:2

Note: Karnataka receives the highest rainfall in **Southern** India. It is known as the "**Cherrapunji** of the South".

45. Where are "musical pillars" situated?

- | | |
|------------|-----------|
| 1. Bijapur | 2. Badami |
| 3. Belur | 4. Hampi |

Ans: 4

Note: "The **musical pillars** are a testimony of Hindu art. The Vijaya Vittala Temple in Hampi has 56 **Musical Pillars** also known as the SaRiGaMa Pillars. Sa, Ri, Ga, Ma, are the four of the seven musical notes. The pillars produce musical tones when struck with a thumb. Seven thin pillars circulate one thick post at the centre. Each of these emit sounds of different instruments. It is said that the British even cut one of the pillars to see what is there inside but they only saw empty pipe.

<https://www.nativeplanet.com/travel-guide/musical-pillars-in-south-india-002021.html>

Nellaiappar Temple is one of the most prominent temples located in Tirunelveli of Tamil Nadu. This large temple is known for its elegant and exotic carvings. The musical pillars are one of the most attractive parts of Nellaiappar Temple. The detailing of the musical pillars are just incredible and each of the pillar make different sounds.

<https://www.nativeplanet.com/travel-guide/musical-pillars-in-south-india-002021.html>

46. The energy of a body by virtue of its motion is

- | | |
|---------------------|-------------------|
| 1. Potential energy | 2. Kinetic energy |
| 4. Dynamic energy | 4. Static energy |

Ans:2

47. The first train in India was run between

- | | |
|----------------------|--------------------|
| 1. Delhi-Bombay | 2. Calcutta-Bombay |
| 3. Boribundar –Thane | 4. Bombay-Dadar |

Ans: 3

On 16th April 1853, **the first** passenger **train** ran **between** Bori Bunder (Bombay) and Thane, a distance of 34 km. It was operated by three locomotives, named Sahib, Sultan and Sindh, and had thirteen carriages.

48. One metre is equal to

- (1) 1.094 yards (2) 1125 yards (3) 1.212 yards (4) 1.0215 yards

Note: 1 m is equivalent to 1.0936 yards, or 39.370 inches.

49. The massacre of Jalianwalabaug was preceded by

- (1) congress-Muslim League Pact
(2) Home Rule Movement
(3) **Passage of Rowlatt Act**
(4) Minto-Morley Reforms

Ans. 3

50. The Supersonic jets tend to cause

- (1) destruction of ozone layer (2) Noise pollution
(3) nervous system breakdown of people residing nearby the landing and take-off stations
(4) **all the above**

A supersonic aircraft is an aircraft able to fly faster than the speed of sound (Mach number 1)

Sonic boom- Sonic boom is the sound associated with the shock waves created whenever an object travelling through the air travels faster than the speed of sound. Sonic booms generate significant amounts of sound energy, sounding similar to an explosion or a thunderclap to the human ear.

Sonic booms due to large supersonic aircraft can be particularly loud and startling, tend to awaken people, and may cause minor damage to some structures. They led to prohibition of routine supersonic flight over land. Although they cannot be completely prevented, research suggests that with careful shaping of the vehicle the nuisance due to them may be reduced to the point that overland supersonic flight may become a practical option. Sonic booms aren't just loud; they can also cause physical damage, breaking glass, cracking plaster, and shaking objects off shelves.

https://en.wikipedia.org/wiki/Supersonic_aircraft#:~:text=A%20sonic%20boom%20is%20the,than%20the%20speed%20of%20sound.&text=Sonic%20booms%20due%20to%20large,minor%20damage%20to%20some%20structures.

<https://daily.jstor.org/the-problems-with-supersonic-flight/>

Social Service Society for Education, Perambur