gradeup
Prep Smart. Score Better.

RRB JE 2019
Mechanical CBT 2

All India Free Live Mock
(8th-9th Aug) Questions & Solutions

www.gradeup.co

1. Which of the following Bird Sanctuary is located in Gujarat?
   A. Nal Sarovar Bird Sanctuary
   B. Harike Bird Sanctuary
   C. Kanjirankulam Bird Sanctuary
   D. Great Indian Bustard Sanctuary

Ans. A

Sol.
- **Nal Sarovar Bird Sanctuary is situated in Ahmedabad, Gujarat**.
- It is the largest wetland bird sanctuary in Gujarat, and one of the largest in India.
- Nalsarovar was declared as a Ramsar site on 24th September 2012.
- Since 2005 it is the only lake that has been declared as Ramsar site in India.

2. Sum of buffer stock, reserve stock and safety stock is equal to
   A. recorder point
   B. maximum inventory level
   C. EOQ
   D. None of these

Ans. A

Sol. Safety/Buffer stock is excess inventory that acts as a buffer between forecasted and actual demand levels. This inventory is maintained so that a company has sufficient units on hand to meet unexpected customer and production demand.
The safety stock formula is as follows:
(Maximum daily usage - Average daily usage) x Lead time = Safety stock

3. An orthogonal cutting operation is being carried out under the following conditions Cutting speed (V)=2m/s, depth of cut=0.5 mm, chip thickness=0.6 mm
   Then chip velocity is:
   A. 2 m/s B. 1.66 m/s
   C. 1 m/s D. None of these

Ans. B

Sol. Relation between cutting velocity and chip velocity
$V_C \times T_C = V \times T$
where V_c chip velocity
T_c chip thickness
V cutting velocity
T depth of cut
$V_c \times 0.6 = 2 \times 0.5$
$V_c = 1.66$ m/s

4. Why water drops come down spherical in shape?
   A. Due to Surface Tension
   B. Air Friction
   C. Continuous evaporation
   D. None of the above

Ans. A

Sol. •Spherical area has less water surface tension.
•The Surface tension pulls the surface of the drop equally at all points thus produces the spherical shape having the minimum surface area.

5. In inventory control, the economic order quantity is the
   A. optimum lot size
   B. highest level of inventory
   C. lot corresponding to break-even point
   D. capability of a plant to produce

Ans. A

Sol. In inventory management, economic order quantity (EOQ) is the order quantity that minimizes the total holding costs and ordering costs. It is one of the oldest classical production scheduling models.
EOQ means optimum lot size.

6. In a free expansion process for ideal gas
   A. Work done is zero
   B. heat transfer is zero
   C. Both A and B aboe
   D. None of these

Ans. C

Sol. Free expansion for ideal gas, Work done = zero because, free expansion is a irreversible adiabatic and isothermal process.
Due to isothermal, there is no temperature change and hence no internal energy change occurs.
Due to adiabatic, there is no heat flow between system and surrounding .i.e. dQ = 0

7. In an elastic collision
   A. The initial kinetic energy is equal to the final kinetic energy
   B. The final kinetic energy is less than the initial kinetic energy
   C. The kinetic energy remains constant
   D. The kinetic energy first increases then decreases

Ans. A

Sol. In an elastic collision the initial kinetic energy is equal to the final kinetic energy.

8. Second law efficiency for all reversible processes will be equal to
   A. Carnot efficiency
   B. 100 %
   C. 0 %
   D. Infinitely efficient

Ans. B

Sol. Secondary law efficiency $= \frac{\eta_{actual}}{\eta_{rev.}}$

For reversible energy, $\eta_{actual} = \eta_{rev.}$

Therefore, second law efficiency for all reversible processes will be 100%

9. Black colour is generally painted on
   A. oxygen cylinder
   B. acetylene cylinder
   C. hydrogen cylinder
   D. none of these

Ans. A

Sol. Oxygen cylinder is green in the US and in India colour of the body is black (lower part) and that of the shoulder (upper part) is white.

10. A hot wire Anemometer is used for the measurement of
    A. Velocity of gases
    B. Pressure of gases
    C. Viscosity of liquids
    D. Temperature of liquids

Ans. A

Sol. It is mainly used for the measurement of velocity of gases.

11. In a spreadsheet, a _____ is a number you will use in a calculation.
    A. label B. cell
    C. Field D. value

Ans. D

Sol. **Spreadsheets** are useful **at home** and in **business applications**. Spreadsheets make it easy to view and **exhibit data** in a number of manners. **Values** are one of the **primary types** of data used in **spreadsheets**.

12. The propulsive force drives the jet in the _____
    A. Backward direction
    B. Forward direction
    C. Perpendicular direction
    D. Parallel movement

Ans. B

Sol. Force exerted by a jet on a moving plate happens in three cases. The three cases are classified depending on their position. The propulsive force drives the jet in the forward direction. A good example is the aircraft or a boat.

13. The resultant upward pressure of a fluid on a floating body is equal to the weight of the fluid displaced by the body. This is known as:
    A. Pascal law
    B. Buoyancy force
    C. Specific gravity of liquid
    D. Viscosity of liquid

Ans. B

Sol. According to Archimedes Principal when a body is immersed in a fluid there is an upward force exerted by the fluid on the object that lifts the object and is equal to the weight of the displaced fluid.

14. Plug gauge is used to measure:
    A. Shaft size
    B. Hole size
    C. Wire thickness
    D. Depth of threads

Ans. B

Sol. Plug gauge are used only to measure internal diameter of the hole. Wire thickness is measured by micrometer. Depth of a thread is measured by Leitech gauge. Shaft size can be measured by vernier caliper or micrometer.

15. Who is selected for the prestigious 'Sangita Kalanidhi' award 2019?
    A. M.S. Sheela
    B. Rajkumar Bharathi
    C. S. Sowmya
    D. Seetha Narayanan

Ans. C

Sol.

- **Dr. S Sowmya** will be conferred the prestigious 'Sangita Kalanidhi' award during the 'Margazhi Music Festival' early next year (2020).
- She will preside over the **93rd annual** conference of The Music Academy to be held from **December 15th, 2019** to **January 1st, 2020**.
- She is known for her intellectual approach to music.
- She is also part of the Academic Council of the Tamil Nadu Music and Fine Arts University.
- Sangita Kalanidhi Award is an annual award presented by **Madras Music Academy** (MMA).
- It is considered as the highest accolade in field of **Carnatic music**.
- It comprises of **gold medal** and a **birudu patra** (citation).

16. What is the other name used for Terylene polyester fibre?
A. Dacron B. Teflon
C. Nylon D. Rayon

Ans. A

Sol.

* **Dacron** or **Terylene** is the best known example of polyesters.
* The fibre was first created in 1941 by chemist J R Whinfield.
* Dacron fibre is elastic in nature and crease resistant and is used in blending with cotton and wool fibre and also as glass reinforcing materials in safety helmets.

17. Which of these processes surely increases the COP of refrigerator?
A. Superheating
B. Subcooling
C. Increase in condenser pressure
D. Decrease in evaporator pressure

Ans. B

Sol. Subcooling is the only process that increases COP for sure whereas superheating conditionally increases COP

18. Transformer an electric device is based on which of the following law?
A. Faraday's law of induction
B. Law of thermodynamic
C. Gauss's law
D. Coulomb's law

Ans. A

Sol. A **transformer** is an electrical device that transfers electrical energy between two or more **circuits**through **electromagnetic induction**. A varying current in one coil of the transformer produces a varying magnetic field, which in turn induces a voltagein a second coil. Power can be transferred between the two coils through the magnetic field, without a metallic connection between the two circuits. **Faraday's law of induction** discovered in **1831** described this effect.

19. Maximum deflection in a cantilever beam due to pure bending moment M at its end is
A. $\frac{ML^2}{3EI}$ B. $\frac{ML^3}{3EI}$
C. $\frac{ML^2}{2EI}$ D. $\frac{ML^2}{4EI}$

Ans. C

Sol. Maximum deflection in a cantilever beam due to pure bending moment M at its end is $\frac{ML^2}{2EI}$.

20. How many states of India share border with Myanmar?
A. 5 B. 3
C. 2 D. 4

Ans. D

Sol.
- The **four** northeast Indian states share border with Myanmar.
- These states share **1,643 km** border with Myanmar.
- These 4 states are Arunachal Pradesh, Nagaland (215 Km), Mizoram (510 Km) and Manipur (398 Km).
- **Arunachal Pradesh** (520 Km) shares longest border with Myanmar.
- Myanmar shares its border with India, China, Bangladesh, Thailand and Laos.

21. In order to have interference fit, it is essential that the lower limit of the shaft should be:
A. Greater than upper limit of the hole
B. Lesser than upper limit of the hole
C. Greater than lower limit of the hole
D. Lesser than lower limit of the hole

Ans. A

Sol. In interference fit there is an overlapping zone that is provided by making lower limit of the shaft slightly greater than the upper limit of the hole. Interference fit also known as press fit or friction fit which is achieved by friction after the parts are pushed together. Used to mount wheels on an axle to make wheel set.

22. Who wrote "Mind without fear" ?
A. Ira Trivedi
B. Twinkle Khanna
C. Khuswant Singh
D. Rajat Gupta

Ans. D

Sol.
- **Rajat Kumar Gupta** is an Indian-American businessman who was the first foreign-born managing director (chief executive) of management consultancy firm McKinsey & Company from 1994 to 2003.
- Gupta's memoir, Mind Without Fear, was published by Juggernaut Books and released in March 2019.

23. Oracle is an example of _____ application software.

A. Database
B. word processing
C. project management
D. presentation graphics

Ans. A

Sol. A **database** is a collection of information that is organized so that it can easily be accessed, managed, and updated. Databases can be classified according to types of content,bibliographic, full-text, numeric and images.
Oracle Database is a multi-model database management system produced and marketed by Oracle Corporation.

24. In Centre less grinding, work piece is clamped in:
A. Bed B. Vice
C. Chuck D. None of these

Ans. D

Sol. In centerless grinding work piece is held between wheels, one wheel is rotating and other one is regulating wheel. Feed is given in three ways to the work. According to the question no option will be corrected.

25. The degree of constraint of a sphere in V- block is?
A. 2 B. 3
C. 1 D. 4

Ans. A

Sol. Degree of freedom is 4(3 rotational 1 translational) therefore degree of restraint is 6-4=2

26. Who among the following has invented Java?
A. James Gosling
B. Dannis Retchie
C. Bill Gates
D. Steve Jobs

Ans. A

Sol. **James Arthur Gosling** is a Canadian computer scientist best known as the father of the **Java programming** language.

27. Who has been appointed as the Governor of Chhattisgarh?
A. Anandiben Patel
B. Anusuiya Uikey
C. Raman Singh
D. Deepak Mishra

Ans. B

Sol. • Rajya Sabha member **Anusuiya Uikey** has been appointed as Governor of **Chhattisgarh**.
• She has replaced **Anandiben Patel**.
• She was previously holding the post of Minister of Women and Child Development in the Madhya Pradesh government.
• She is the **first tribal women** to hold the post of Governor of Chhattisgarh since the formation of state in **2000**.
• She was appointed as Governor of Chhattisgarh on **16th July 2019**.
• She is the **sixth** Governor of Chhattisgarh.

28. Which of the following is a copper free alloy?
A. German Silver
B. Muntz Metal
C. White metal
D. Gun metal

Ans. C

Sol. A white metal alloy may include antimony, tin, lead, cadmium, bismuth, and zinc (some of which are quite toxic)

29. Which of the following measuring device is used for measuring the rate of flow of a fluid flowing through a pipe:
A. Venturi meter
B. Orifice meter
C. Pitot tube
D. All of these

Ans. D

Sol. All of the above devices are used to measure rate of fluid flow in a pipe. In venturi meter and orifice meter rate is determined by measuring the deflection of manometric fluid in a manometer installed with devices while in pitot tube by measuring stagnation pressure head rate of flow is determined.

30. Which of the following is correct?
A. In steady flow, pathlines and streamlines are identical
B. In steady flow, pathlines and streaklines are identical
C. In steady flow, streaklines and streamlines are identical
D. In steady flow, pathline, streamlines and streaklines are all identical

Ans. D

Sol. In case of a steady flow, the velocity at a point remains constant with time.

Thus, there will be no geometrical distinction between the pathlines, streamlines and streaklines.

31. Generally least count of the commonly used vernier is:
A. 0.1 mm B. 0.01 mm
C. 0.02 mm D. 0.2 mm

Ans. C

Sol. Least count for any vernier = 1 M.S.D - 1V.S.D.
L.count = 1mm – 0.98
= 0.02mm

32. The working of a rocket is based on the principle of
A. Conservation of momentum
B. Conservation of mass
C. Conservation of energy
D. Conservation of angular momentum

Ans. A

Sol. • Rocket engines are reaction engines, obtaining thrust in accordance with **Newton's second law (Conservation of momentum)**.
• Rocket thrust results from the high speed ejection of material and does not require any "push against". Conservation of momentum dictates that if material is ejected backward, the forward momentum of the remaining rocket must increase since an isolated system cannot change its net momentum. The hot gases acquire momentum in the backward direction & the rocket acquires an equal amount of momentum in the forward direction.
• Hence option A is the right answer.

33. The total area under the stress-strain curve of a mildsteel specimen tested up to failure under tension is a measure of its:
A. Breaking strength
B. Toughness
C. Hardness
D. Stiffness

Ans. B

Sol. Area under stress strain diagram of any specimen tell us energy stored till failure. For a mild steel specimen upto elastic limit area is known as resilience while area under stress strain curve upto fracture is known as toughness.

34. Baron Jons Jacob Berzelius discovered which of following?
A. Catalysis B. Ions
C. Valency D. Oxidation

Ans. A

Sol. • **Catalysis** was discovered by **Baron Jöns Jacob Berzelius**.
• Berzelius himself discovered and isolated several newelements, including **cerium (1803)** and **thorium (1828)**.
• He developed classical analytical techniques, and investigated isomerism and catalysis, phenomena that owe their names to him.
• Catalysis is a term which used for the **reactions/ processes** which occur in the presence of certain substances that increase the rate of the reaction without being consumed.

35. The stress induced in a member when expansion and contraction due to temperature variation prevented is
A. Shear Stress
B. Tensile Stress
C. Compressive Stress
D. Thermal Stress

Ans. D

Sol. Thermal stress is induced when expansion and contraction due to temperature variation prevented.

36. Breaking stress is
A. Greater than ultimate stress
B. Less than ultimate stress
C. Equal to the ultimate stress
D. None of these

Ans. B

Sol. Breaking stress is less than ultimate stress.

37. India Africa Field Training Exercise (IAFTX)- 2019 was conducted in which state of India?
A. West Bengal
B. Goa
C. Maharashtra
D. Kerala

Ans. C

Sol. • **Indian Africa Field Training Exercise** (IAFTX) was held at **Aundh Military Station and College of Military Engineering, Pune, Maharashtra**.
• It was held from 18th March to 27th March 2019.
• The exercise was conducted with an aim to synergise United Nations peacekeeping operations.

38. If stream function (Ψ) satisfies the Laplace equation, it is a possible case of

A. a circular flow
B. a rotational flow
C. an irrotational flow
D. none of the above

Ans. C

Sol. If stream function (Ψ) satisfies the Laplace equation, it is a possible case of an irrotational flow

39. In an orthogonal cutting operation, the depth of cut is 0.30mm and the chip thickness is 0.75mm. If the cutting speed is 3m/s, calculate the chip velocity.
A. 1.2m/s B. 2m/s
C. 2.5m/s D. 3m/s

Ans. A

Sol. Chip thickness ratio, r = uncut chip thickness / chip thickness after cut
For orthogonal operation uncut chip thickness = depth of cut = 0.30mm
Therefore, r = 0.30/0.75 = 0.4
Chip velocity = r X Cutting velocity
Chip velocity = 0.4 X 3 = 1.2m/s

40. MRP indicates
A. Materials Reordering Point
B. Materials Reordering Planning
C. Materials Requirements Planning
D. Materials Requirements Point

Ans. C

Sol. Material requirements planning (MRP) is a production planning, scheduling, and inventory control system used to manage manufacturing processes. Most MRP systems are software-based, but it is possible to conduct MRP by hand as well.

41. Copyrighted software that can be used for free is _____.
A. Commercial software
B. freeware
C. groupware
D. e-mail

Ans. B

Sol. Freeware is copyrighted computer software which is made available for use free of charge, for an unlimited time.

42. To avoid cavitation in centrifugal pumps
A. delivery pressure should be high
B. delivery pressure should be low
C. suction pressure should be high
D. suction pressure should be low

Ans. C

Sol. To avoid cavitation, suction pressure should be above vapour pressure of liquid, so suction pressure should be high.

43. Which of the following is a point function?
A. Work B. Heat
C. Energy D. None of these

Ans. C

Sol. We know that, when a system changes from state 1 to state 2, the change in internal energy (ΔE) of the state 2 is same as that of the state 1. Therefore value of internal energy of the system is independent of the path followed by the system. It has a fixed value along the path, therefore energy is the point function.

44. Total amount of energy in the universe is
A. Increasing B. Decreasing
C. Constant D. None of these

Ans. C

Sol. The first law of thermodynamics states that the energy can neither be created nor be destroyed. It can only get transformed from one form to another form. The universe consists of the system as well as the surrounding together. Energy can only be transferred from system to surrounding or surrounding to system in various forms, but it can never be destroyed or created. Thus the total amount of energy in the universe is constant. We cannot produce a device which can supply mechanical work without consuming any energy.

45. Standard time represents
A. normal time + allowances
B. normal time + idle time + allowances
C. normal time + idle time
D. none of the above

Ans. A

Sol. Standard time =normal time +allowance Where; normal time =avg time *rating factor. (take rating factor between 1.1 and 1.2)

46. The open circuit voltage and short circuit current for a welding operation are given as 70V and 200A . For the condition of max power what should be the setting of voltage and current
A. 70V 200A
B. 70V 100A
C. 35V 100A
D. 35V 200A

Ans. C

Sol. We know that maximum arc power occurs at half the value of open circuit voltage and short circuit current.

Therefore, voltage = 35V and current = 100A

47. Which of the following is responsible for Stress-concentration in a body?
A. extensive stress
B. non-uniform stress
C. reverse stress
D. fluctuating stress

Ans. B

Sol. Stress concentration is the accumulation of stress in a body due to sudden change in its geometry. When there is a sudden change in the geometry of the body due to cracks sharp corners, holes and decrease in the cross section area, then there is an increase in the localised stress near these cracks, sharp corners, holes, and decreased cross section area. The body tends to fail from these places where the stress concentration is more. So to prevent a body from getting failed, the stress concentration should be avoided or reduced.

48. Which of the following is also known as military organisation?
A. line organisation
B. line and staff organisation
C. functional organisation
D. effective organisation

Ans. A

Sol. Line or Scalar Organisation: This type of organisation is also known as departmental or military type of organisation. In this type of organisation business activities are divided into three groups, namely finance and accounts, production and sales.

49. PERT has following time estimate:
A. One time estimate
B. Two time estimate
C. Three time estimate
D. Four time estimate

Ans. C

Sol. PERT has three time estimate.

50. The electric resistance welding operates with:
A. Low current and high voltage
B. High current and low voltage
C. Low current and low voltage
D. High current and high voltage

Ans. B

Sol. Electric arc welding is operated with high current and low voltage because high current produces more heat. If voltage is high during welding molten particles moves at a greater speed during transfer of filler metal and will not flow properly over base metal.

51. The efficiency of diesel cycle approaches to Otto cycle efficiency when
A. cutoff is decreased
B. cutoff is increased
C. cutoff is zero
D. cutoff is constant

Ans. C

Sol. When cutoff is zero, then efficiency of otto and diesel become same.

52. The Gulf of Aden connects Arabian Sea to which Sea?
A. Red Sea
B. South China Sea
C. Caspian Sea
D. Andaman

Ans. A

Sol. • The **Gulf of Aden** connects the **Arabian Sea to the Red Sea**.
• The Gulf of Aden connects the Arabian Sea and the Red Sea through the strait of **Bab-el-Mandeb**.
• The Gulf of Aden connects with the **Indian Ocean** through the **Guardafui Channel**.
• The Arabian Sea is a region of the northern Indian Ocean bounded on the north by **Pakistan and Iran**.

53. Which of the following welding process is used to weld ends of two pipes of uniform cross-section ?
A. spot welding
B. seam welding
C. projection welding
D. upset butt welding

Ans. D

Sol. Upset butt welding is a welding technique that produces coalescence simultaneously over the entire area of abutting surfaces or progressively along a joint, by the heat obtained from resistance to electric current through the area where those surfaces are in contact.

54. There is a prismatic bar of diameter d, mass m kg and length L. Then elongation due to its self weight is proportional to:
A. d^0 B. d
C. d^2 D. d^{-2}

Ans. A

Sol. Elongation due to self weight = $Wl/2AE = \rho gl^2/2E$
Hence, elongation does not depend on the bar diameter.

55. Slenderness ratio of a column is defined as the ratio of its length to its
A. Least radius of gyration
B. Least lateral dimension
C. Maximum lateral dimension
D. Maximum radius of gyration

Ans. A

Sol. Slenderness ratio of a column is defined as the ratio of its length to its least radius of gyration.

56. Which of the following are used to make Ball bearings?
A. Carbon steel
B. Cast iron
C. Carbon chrome steel
D. Stainless steel

Ans. C

Sol. Bearings Made of Chrome Steel - SAE 52100. The most common material used to produce the load carrying components in precision ball bearings, roller bearings, and tapered roller bearings is 52100 chrome steel. These components are the bearings inner and outer rings, balls and rollers.

57. In centrifugal pump, the liquid enters the pump from
A. bottom B. top
C. centres D. sides

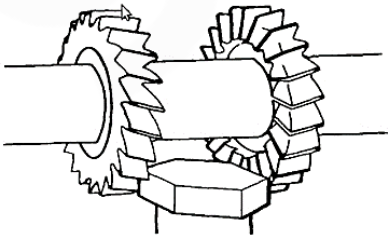
Ans. C

Sol. In centrifugal pump, the liquids enter from the eye of the impeller ie. centre.

58. Two cutters are mounted on the arbor so that two faces are machined simultaneously in
A. Gang milling
B. Straddle milling
C. Pendulum milling
D. Profile milling

Ans. B

Sol. Such a mechanism is employed in Straddle Milling.



In Gang milling more than 2 cutter employed.

59. Prandtl number is a ratio between
A. Kinematic viscosity to Thermal diffusivity
B. Thermal diffusivity to Kinematic viscosity
C. Dynamic viscosity to Thermal diffusivity
D. Thermal diffusivity to Dynamic viscosity

Ans. A

Sol. Prandtl number is the dimensionless number which is a property of the fluid defined as the ratio between Kinematic viscosity of the fluid of its Thermal diffusivity.
So the correct option is (a).

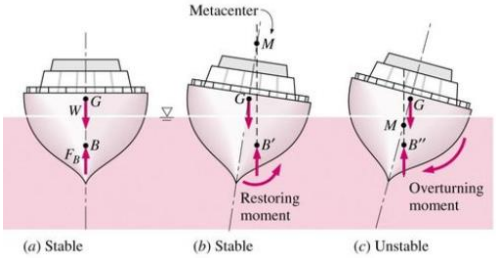
60. The conditions for the stable equilibrium of a floating body are:
A. The meta-centre should lie above the centre of gravity
B. The centre of buoyancy and the centre of gravity must lie on the same vertical line
C. A righting couple should be formed
D. All the above are correct

Ans. D

Sol. All of the above are correct options.

Stability of Floating Body

(a) Stable Equilibrium : if the point M is above G.
(b) Unstable Equilibrium : If the point M is below G.
(c) Neutral Equilibrium : If the point M is at the G.



Moment due to weight and buoyant forces balance from overturning effect.

61. The size of the lathe is expressed as:
A. Gross weight of the lathe
B. Diameter of the chuck
C. Maximum speed of the chuck
D. Swing of the lathe

Ans. D

Sol. Lathe is Generally specified by
1 Swing over the carriage
2 Swing over the bed
3 Swing over the spindle

62. Which of the following stress can be determined using Mohr's circle method?
A. Torsional stress
B. Bending stress
C. Principal stress
D. All of the above

Ans. C
Sol. Principal stress can be determined using Mohr's circle method.

63. Pollution of water is maximally due to___
A. animal activities
B. human activities
C. alien activities
D. all of the above

Ans. B
Sol. The water pollution is caused by the addition of organic and inorganic chemicals as well as the biological materials which change the physical and chemical properties of water. Most of these harmful activities are done by human.

64. Hardness of river water is because it contains.
A. Sodium Chloride
B. Salts of Calcium and Magnesium
C. Both A and B
D. None of These

Ans. B
Sol. **River water** is **harder** than rain water because it contains **salts of Calcium and Magnesium.** As the river water seeps through the ground, it is naturally purified and picks up minerals from the rocks it seeps through. Typical minerals are **sulfur, lime, magnesium** and **calcium.** After it soaks up enough of these minerals to have a concentration of at least **one grain per gallon**, or GPG, the water is said to be **hard.**

65. A tank containing air is stirred by a paddle wheel. The heat transferred to the surrounding from the tank is 4000 kJ and work input to the paddle wheel is 10000kJ. The external workdone by the system is
A. 10000kJ B. 6000kJ
C. 4000kJ D. Zero

Ans. D
Sol. From 1st law of thermodynamics,
$\Delta Q = \Delta U + \Delta W$
$-4000 = \Delta U + (-10000)$
$\Delta U = 6000$ kJ
All energy is stored in the form of internal energy and there is no external workdone by the system.

66. The triple point on a T-S diagram is
A. Line B. Point
C. Triangle D. none of these

Ans. A
Sol. On P-T curve = Point
T-S curve = Line
U-V curve= Triangle

67. Wastes should always be___
A. recycled and reused
B. should be dumped in environment
C. should be stored in house
D. should be dumped in neighbors house

Ans. A
Sol. We have to return our organic waste where it belongs the soil rather than sending banana peels, grass clipping etc. to the municipal dump, and start a compost pile instead. If you recycle your yard and garden waste, you will reduce the amount of energy used to send this waste to the dump.

68. Which of the following is not an advantage of rainwater harvesting?
A. Environment friendly
B. Increase ground water level
C. Mitigate drought effects
D. Contamination

Ans. D
Sol. Rainwater harvesting is a method of collecting rainwater immediately from the surfaces it has fallen directly before it is lost as surface run off. It can help to overcome the inadequacy of surface water, improve groundwater levels and quality, reduces flood hazards and mitigates effects of drought. However, there can be a possibility of contamination without proper cleaning or from poorly constructed containers.

69. Two fluids 1 and 2 have mass densities of p1 and p2 respectively. If p1 > p2, which one of the following expressions will represent the relation between their specific volumes v1 and v2?
A. v1 > v2
B. v1 < v2
C. v1 = v2
D. Cannot be determined due to insufficient information.

Ans. B
Sol. Specific volume(v) is defined as the volume(V) per unit mass(m).
v = v/m = 1 / m/v = 1/p
where p is the mass density. Thus, if p1 > p2, the relation between the specific volumes v1 and v2 will be represented by v1 < v2.

70. Which of the following is the correct statement about availability ?
A. useful work that is obtainable in a process in which system comes to equilibrium with its surroundings.

B. maximum useful work that is obtainable in a process in which system comes to equilibrium with its surroundings.
C. minimum useful work that is obtainable in a process in which system comes to equilibrium with its surroundings.
D. none of the above

Ans. B

Sol. Maximum useful work is given by total work minus pdV work.

71. Which of following is known as white vitriol?
A. Suphuric acid
B. Ferrous Sulphate
C. Zinc Sulphate
D. Copper Sulphate

Ans. C

Sol. Zinc Sulfate is a white crystalline, water-soluble compound. The hydrated form, zinc sulfate heptahydrate known as "white vitriol" and can be prepared by reacting zinc with aqueous sulfuric acid.
It is used in:-
* Making lithopone
* As a mordant in dyeing
* As a preservative for skins and leather
* In medicine as an astringent and emetic.

72. For a laminar flow of a pipe, head loss is
A. directly proportional to velocity
B. inversely proportional to velocity
C. directly proportional to v^2
D. inversely proportional to v^2

Ans. A

Sol. H_f for a laminar flow is $32\mu u_{av}l/\rho gd^2$ hence directly proportional to u_{av}

73. Which one of the following statement was given by Clausius?
A. It is impossible to construct a device that can transfer heat from a cooler body to a hotter body without any work input
B. It is impossible to construct a device that can transfer heat from a hotter body to a cooler body without any effect
C. It is impossible to device a cyclically operating heat engine, the effect of which is to absorb energy in the form of heat from a single thermal reservoir and to deliver and equivalent amount of work.
D. None of the mentioned

Ans. A

Sol. To transfer heat from a cooler body to a hotter body, some work must be expended.

74. If a memory chip is volatile, it will _____.
A. Explode if exposed to high temperatures
B. Lose its contents if power is turned off
C. Be used for data storage only
D. Be used to both read and write data

Ans. B

Sol. Random-access memory (RAM) is normally associated with **volatile** types of memory, where the stored information is **lost** if **power** is removed.

75. Which of the following correctly states how the viscosities of a liquid and a gas will change with temperature?
A. Viscosity increases with the increase in temperature of a liquid and decreases with the increase in temperature of a gas
B. Viscosity increases with the increase in temperature of a liquid and increases with the increase in temperature of a gas
C. Viscosity decreases with the increase in temperature of a liquid and decreases with the increase in temperature of a gas
D. Viscosity decreases with the increase in temperature of a liquid and increases with the increase in temperature of a gas

Ans. D

Sol. Viscosity of a liquid is due to the cohesion between it's molecules. With the increase in temperature of a liquid, cohesion decreases, leading to the decrease in viscosity. Viscosity of a gas is due to the momentum transfer between it's molecules. With the increase in the temperature of a liquid, molecular motion increases, leading to the rise in viscosity.

76. Where is the head office of Central Pollution Control Board located?
A. Noida B. New Delhi
C. Gandhi Nagar D. Bangalore

Ans. B

Sol. • The Central Pollution Control Board (CPCB) has its head office in New Delhi**.**
• It was established in 1974 under the Water (Prevention and Control of Pollution) Act, 1974.

• It is the apex organisation in India in the field of pollution control. The board is led by its Chairperson.

77. The ratio of the maximum shear stress to average shear stress in a beam with circular cross sections is
A. 3:1 B. 2:1
C. 3:2 D. 4:3
Ans. D
Sol. For a circular cross section,
$\frac{\tau_{max}}{\tau_{avg}} = \frac{4}{3}$

78. If the thermal efficiency of a Carnot heat engine is 40%, then Co-efficient of performance of a refrigerator working within same temperature limits would be:
A. 4.5 B. 3.5
C. 1.5 D. None of these
Ans. B
Sol. $\eta_{HEAT\ ENGINE} = 1/\ COP_{HEAT\ PUMP}$
SO $COP_{HEAT\ PUMP} = \frac{1}{0.4} = 2.5$
And $COP_{HEAT\ PUMP} = COP_{REFRIGERATOR} + 1$
SO $COP_{REFRIGERATOR} = 2.5 + 1 = 3.5$

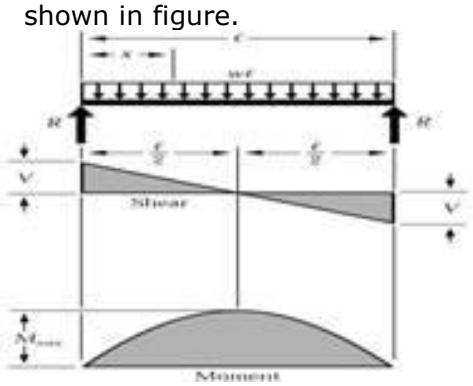
79. The torque acting on a body, rotating with angular acceleration of α is given by
A. $T = I\alpha$ B. $T = I^2\alpha$
C. $T = I^2\alpha^2$ D. $T = I\alpha^2$
Ans. A
Sol. Torque = I*α

80. Who was the first person to measure the speed of light?
A. Hippolyte Fizeau
B. Albert A. Michelson
C. James Bradley
D. Ole Romer
Ans. D
Sol. **Ole Romer** was a Danish astronomer who in **1676** made the first quantitative measurements of the **speed of light**.
Romer also invented the **modern thermometer** showing the temperature between two fixed points, namely the points at which water respectively boils and freezes.

81. The process of removal of environmental pollutants by humans is known as:
A. Bioremediation
B. Autonomy
C. Pasteurization
D. None of the above
Ans. A
Sol. The term 'Bioremediation' is used for the procedure in which the treatment of pollutants or waste has occurred. This treatment is done through the use of microorganisms which further break down the undesirable substances. In this process, the contaminated soils are also clean up.

82. 2 kg block is resting on a surface with coefficient of friction=0.2, a force of 1 N is applied on block, the friction force will be?
A. 4 N B. 3 N
C. 2 N D. 1 N
Ans. D
Sol. When a force of 1 N is applied on block, the friction force will be 1 N as friction forcwe is a self adjusting force, if its limiting value is greater than the force applied, friction force becomes equal to the force applied to stop that body. Here, maximum friction force=2*0.2*10=4 N approximately which is greater than 1 N. Therefore, friction force will be 1 N.

83. A simply supported beam of span l and carrying uniform distributed load w per unit length, then maximum bending moment is given by:
A. $WI^2/2$ B. $WI^2/4$
C. $WI^2/8$ D. $WI^2/16$
Ans. C
Sol. Maximum bending moment occurs at the centre for the above case as shown in figure.



BENDING MAX = $WL^2/8$

84. CPM is
A. Event oriented
B. Activity oriented
C. Both (A) and (B)
D. None of these
Ans. B
Sol. CPM is activity oriented.

85. Ratio of oxygen to acetylene for complete combustion is
A. 1: 1 B. 1.5: 1
C. 2: 1 D. 2.5: 1
Ans. D
Sol. 2.5:1
Complete combustion of a hydrocarbon occurs when oxygen gas

in the surrounding air mixes completely and is present in the stoichiometric mole ratio to react completely with the amount of hydrocarbon. For acetylene, the mole ratio is five moles of oxygen per two moles of acetylene, or 2.5:1.

86. Verification of a login name and password is known as_____.
A. configuration
B. accessibility
C. authentication
D. logging in
E. None of these
Ans. C
Sol. **Authentication** is a process in which the **credentials** provided are compared to those on file in a **database** of authorized users' information on a local **operating system** or within an **authentication** server.

87. Grinding wheel is specified as "A 46 K 10 V 27" . The grain size of a wheel will be
A. Coarse B. Medium
C. Fine D. Very Fine
Ans. B
Sol. 46 represents grain size, which falls under medium size

88. A jet strikes a curved plate at its _____
A. Sides
B. Surface
C. Centre
D. Does not strike
Ans. C
Sol. A jet strikes a curved plate at its centre. Force exerted by a jet on a stationery plate happens in three cases. The three cases are classified depending on their position. The three cases are when plate is vertical, plate is inclined and plate is curved with respect to the jet.

89. Shortest Processing Time (SPT) sequencing minimises the
A. mean flow time
B. inprocess inventory
C. mean lateness
D. All of the above
Ans. E
Sol. The shortest processing time rule orders the jobs in the order of increasing processing times. Whenever a machine is freed, the shortest job ready at the time will begin processing. This algorithm is optimal for finding the minimum total completion time and weighted completion time. In the single machine environment with ready time at 0 for all jobs, this algorithm is optimal in minimizing the mean flow time, minimizing the mean number of jobs in the system, minimizing the mean waiting time of the jobs from the time of arrival to the start of processing, minimizing the maximum waiting time and the mean lateness.

90. In which book is the 'Sanyasi revolt' mentioned?
A. Discovery of India
B. Anandamath
C. Geetanjali
D. None of these
Ans. B
Sol. Under the Sanyasi revolt (1763-1800), people were banned from coming to pilgrimage places.
- From 1763 onwards, the Sanyasi Revolt or uprising had engulfed the area of Bengal, Bihar and Uttar Pradesh.
- Religious people were very upset due to restrictions on pilgrimages.
- This rebellion could be suppressed after a long campaign of Warren Hastings.
- This monstrous revolt has been mentioned by Bankim Chandra Chattopadhyay in his novel Anandmath.

91. Which of the following is also known as hydrated lime?
A. Sodium Hydroxide
B. Calcium carbonate
C. Calcium oxide
D. Calcium hydroxide
Ans. D
Sol. • Hydrated Lime, also known as **calcium hydroxide.**
• It is traditionally called slaked lime.
• It is an inorganic compound.
• Its molecular formula is $Ca(OH)_2$.

92. A technique of controlling noise pollution by planting green plants or trees is known as –
A. Afforestation
B. Green muffler
C. Decibel meter
D. None of the above
Ans. B
Sol. In this technique, we can control noise pollution by planting green plants, normally 4-5 rows of plants are grown near noisy areas like roadsides and industrial areas so that these trees can create some

obstruction for noise to reach to residents.

93. What should be the value of Joule-Thompson coefficient for decrease in temperature during throttling process
A. Positive B. Zero
C. Negative D. Can't say

Ans. A

Sol. for decrease in temperature during throttling process

$$\mu_{JT} = \left(\frac{\partial T}{\partial P}\right)_h > 0$$

94. Type of compressor used in domestic refrigerator
A. Centrifugal compressor
B. Axial compressor
C. Reciprocating compressor
D. All of the above

Ans. C

Sol. Reciprocating, Scroll Compressor and Screw compressor are used in Domestic refrigerator.

95. A beaker is filled with a liquid up to the mark of one litre and weighed. The weight of the liquid is found to be 6.5 N. The specific volume of the liquid will be
A. 1.0 l/kg B. 1.5 l/kg
C. 2.0 l/kg D. 2.5 l/kg

Ans. B

Sol. Specific volume(v) is defined as the volume(V) per unit mass(m). Thus,

$$v = \frac{1}{\frac{6.5}{9.81}} l/kg = 1.5 l/kg$$

96. The process of improving the cutting action of the grinding wheel is called
A. Truing B. Dressing
C. Facing D. Clearing

Ans. B

Sol. The process of improving the cutting action of the grinding wheel is called Dressing

97. The apparent weight of a man in a lift is less than the real weight when_____
A. The lift is going down with an acceleration
B. The lift is going up with uniform speed
C. The lift is going down with uniform speed
D. The lift is going up with an acceleration

Ans. A

Sol. • The apparent weight of a man in a lift is less than the real weight **when the lift is going down with an acceleration.**
• The lift falls freely under gravity. The man also falls freely under gravity that's why the man feels that he has lost his weight.

98. Which gas is present in highest amount in natural gas?
A. Methane B. Ethane
C. Propane D. Butane

Ans. A

Sol. • The Highest amount of gas present in Natural gas is **Methane.**
• The composition of gases in natural gas is :
Methane = 60-90%
Ethane = 0-20%
Propane = 0-20%
Butane = 0-20%.

99. Which of the following is reason of irreversibility?
A. Lack of equilibrium during the process
B. involvement of dissipative effects
C. either a or b or both
D. none of the above

Ans. C

Sol. A reversible process is carried out infinitely slowly, so that every state passed through by the system is an equilibrium state. In the irreversible process every state will not be an equilibrium state as it is carried out very fast. Only the first and the last state of the irreversible process are the equilibrium states. Therefore lack of equilibrium is a cause of irreversibility.
In a dissipative effect the energy is transformed from one form to another form and the final form of energy has a less capacity to do mechanical work. Thus this process becomes irreversible. Therefore involvement of dissipative effect is another cause of irreversibility.

100. Where is the tradition of Birha, Rasiya and Hori folk songs?
A. Rajasthan
B. Madhya Pradesh
C. Uttar Pradesh
D. Gujarat

Ans. C

Sol. **Birha, Rassia and Hori** are the popular Folk song genre of Uttar Pradesh.
• **Birha** genre is mood based and the basic theme revolves around the separation of lover and his beloved.
• **Rasiya** is the form of folk music that is mostly sung in this region on

Holi. The Lathmar or 'Stick Beating' Holi of Braj is very famous for its numerous Rasiya.

• **Hori** is a genre of semi-classical singing, which is popular in Uttar Pradesh and Bihar. It comes under the category of season songs.

101. A structural vertical member subjected to an axial compressive force is called

A. Beam B. Strut
C. Frame D. Column

Ans. D

Sol. A structural vertical member subjected to an axial compressive force is called column.

102. Torsion equation is given by

A. $\frac{T}{J}=\frac{T}{L}=\frac{G\theta}{R}$

B. $\frac{T}{J}=\frac{\tau}{R}=\frac{G\theta}{L}$

C. $\frac{T}{J}=\frac{\tau}{R}=\frac{\theta}{LG}$

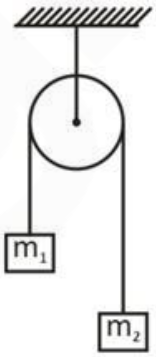
D. $\frac{T}{G}=\frac{\tau}{R}=\frac{J\theta}{L}$

Ans. B

Sol. Where,
T = twisting moment
J = polar moment of inertia
R= radius
G = modulus of rigidity
L = length of the shaft
Torsion equation is given by

$$\frac{T}{J}=\frac{\tau}{R}=\frac{G\theta}{L}$$

103. Find acceleration of mass m_1 ($m_2 > m_1$) assuming pully is massless and friction less

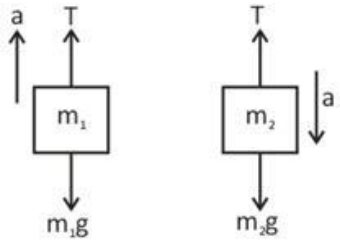


A. $\frac{(m_2+m_1)g}{m_2-m_1}$ B. $\frac{(m_2-m_1)g}{(m_2+m_1)}$

C. $\frac{(m_2+m_1)g}{m_1}$ D. $\frac{(m_2-m_1)g}{m_1}$

Ans. B

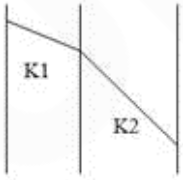
Sol.



$T = m_1g + m_1a$ …(1)
$T + m_2a = m_2g$ …(2)
$\Rightarrow T = m_2g - m_2a$ ….(2)
From (1) and (2)
$m_2g - m_2a = m_1g + m_1a$

$$\Rightarrow a=\frac{(m_2-m_1)g}{(m_1+m_2)}$$

104.



Which of the following relation is true with respect to the diagram?

A. K1>K2 B. K1<K2
C. K1=K2 D. K2=0

Ans. A

Sol. Greater the slope, greater is the temperature gradient which is inversely proportional to thermal conductivity. Therefore, the correct answer is K1>K2 is the relation which is true with respect to the diagram.

105. A 2 kg ball drops vertically onto the floor with a speed of 25m/s. It rebounds with an initial speed of 10m/s. The impulse action on the ball during contact will be

A. 15 N-s B. 70 N-s
C. 30 N-s D. 10 N-s

Ans. B

Sol. Impulse = change in momentum
$= mV_2-mV_1$
= 2*10 -2*(-25)
= 20+50
= 70N-s

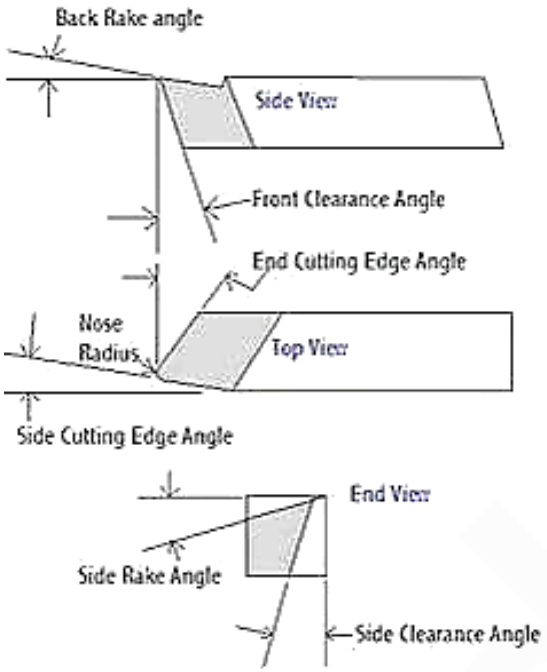
106. Side rake angle of a single point cutting tool is the angle

A. By which the face of the tool is inclined towards the back
B. By which the face of the tool is inclined sideways
C. Between the surface of the flank immediately below the point and a plane at right angles to the center

line of the point of the tool
D. Between the surface of the flank immediately below the point and a line drawn from the point perpendicular to the base

Ans. B

Sol. Representation of the side rake angle is as shown in figure below



107. Austempering of steel is done for obtaining
A. Martensitic structure
B. Austenitic structure
C. Ferritic structure
D. Bainite structure

Ans. D

Sol. Austempering is a heat treating process for medium to high carbon ferrous metals which produces Banite structure which has high strength and toughness.

108. Which gas is responsible for "Global Warming"?
A. Nitrogen (N_2)
B. ethane
C. Carbon dioxide (CO_2)
D. Sulphur dioxide (SO_2)

Ans. C

Sol. Global warming is caused by the emission of greenhouse gasses. 72% of the totally emitted greenhouse gases are Carbon dioxide (CO_2).18% methane and 9% nitrous oxide (NO_2). Carbon dioxide emissions, therefore, are the most important cause of global warming.

109. With decrease in pressure, the latent heat of steam
A. Remains same
B. Increases
C. Decreases
D. Behaves unpredictably

Ans. B

Sol. As saturation pressure decreases enthalpy of vaporization corresponding to that saturation pressure increases.

110. A simply supported beam of length 4 m is with uniformly distributed load of 5 N/m. Find the maximum bending moment and point of contra flexure of the beam.
A. 20 Nm, at the centre of beam
B. 10 Nm, at the fixed end of beam
C. 20 Nm, does not exist
D. 10 Nm, does not exist

Ans. D

Sol. Maximum bending moment= Wl2/8 =10 Nm
In this case, point of contra flexure (the point where Bending moment=0) doesn't exist.

111. Filler material is essentially used in
A. gas welding
B. spot welding
C. seam welding
D. all of these

Ans. A

Sol. Many gas welding processes, such as lead burning, are typically autogenous and a separate wire filler rod of the same metal is only added if there is a gap to fill. Some metals, such as lead or Birmabright aluminium alloy, use offcut strips of the same metal as filler. Steels are usually welded with a filler alloy made specially for the purpose. To prevent rusting in storage, these wires are often lightly copper plated.

112. Which one of the following is a bad thermal conductor?
A. Aluminum B. Copper
C. Glass D. Silver

Ans. C

Sol. • **Glass**, wood and plastic are all excellent insulators and bad thermal conductors.
• In glass, there is no flow of free electrons and hence it doesn't conduct heat but it is a good insulator which allows electricity and heat to pass through it by radiation following the law of optics.

113. In a refrigeration cycle the heat is absorbed by refrigerant at:
A. Evaporator
B. Condenser
C. Expansion valve
D. Compressor

Ans. A

Sol. Evaporator is a heat exchanger that works on low pressure side of a refrigerator. It picks up the heat of the room or space that is to be cooled.

114. In a vessel a large metacentric height
A. Improves stability and makes periodic time to oscillation longer
B. lowers stability and makes periodic time of oscillation shorter
C. Has no effect on stability and the periodic time of oscillation
D. Improves stability and makes the periodic time of oscillation shorter

Ans. D

Sol. Large metacentric height of floating body ensures stability and shortens the time of oscillation.

115. According to Indian Standard specifications $50H7g_6$means that:
1) Actual size is 50 mm
2) Tolerance grade for hole is 7
3) Tolerance grade for shaft is 6
Which of the statements made above are correct?
A. 1 and 2 B. 1, 2 and 3
C. 2 and 3 D. None of these

Ans. C

Sol. In $50H7g_6$
50 represent basic size
H7 represent hole tolerance zone in which H is fundamental deviation and 7 means IT tolerance.
g_6 represent shaft tolerance zone

116. What is the purpose of providing a Draft folder in an email system?
A. to save unsent emails
B. to store spam emails
C. to save a copy of sent emails
D. to store deleted emails

Ans. A

Sol. A **draft** is simply an **email message** you haven't **yet sent**. It's not the same thing as an email waiting to be sent. This act places the message into the **Drafts folder**.

117. How is mass number of an atom determined?
A. By total number of protons
B. By total number of neutrons
C. By adding number of protons and neutrons
D. By total number of electrons

Ans. C

Sol. • The **number of protons and neutrons combined** to give us the mass number of an atom.
• As both protons and neutrons are present in the nucleus of an atom, they are together called nucleons.
• Atomic mass is expressed in atomic mass units or amu.

118. Grinding wheel is specified as "A 46 K 10 V 27". Type of wheel will be
A. Hard B. Soft
C. Medium D. Can't say

Ans. C

Sol. K represents the hardness of the wheel, notation I-P fall under medium

119. What kind of server converts IP addresses to domain names?
A. DNS B. MNS
C. UTP D. RTP

Ans. A

Sol. The **Domain Name System** (DNS) is a hierarchical distributed **naming system** for computers, services, or any resource connected to the Internet or a private network.

120. Pumps in parallel in order have
A. constant discharge
B. constant rpm
C. constant head
D. variable discharge, head and rpm

Ans. C

Sol. Pumps in parallel in order have constant head, head=c while in series have constant discharge.

121. Which of the following is not a greenhouse gas?
A. Water vapour
B. O_2
C. O_3
D. CO_2

Ans. B

Sol. The primary greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Hence from the given options O_2 is the only gas which is not a green house gas.

122. Which of the following factors adversely affect the characteristics of the surface water?
A. Vegetation
B. Soil type
C. Degree of weathering
D. All of the above

Ans. D

Sol. Factors that adversely affect the characteristics of surface water is the extent of surface pollution that in turn depends on the hydrological characteristics, vegetation, soil type, and degree of weathering of rocks. Various physical, chemical and biological characteristics of waste emitted in the surface water are also critical factors. Techniques for the treatment of domestic wastewater and disposal systems also play a

crucial role in determining the characteristics of surface water.

123. What is the capital of Cyprus?
A. Asgabat B. Phnom Penh
C. Ankara D. Nicosia
Ans. D
Sol. * Capital of Cyprus is **Nicosia.**
* Cyprus is an island in the Eastern Basin of the Mediterranean Sea.
* It is the third largest island in the Mediterranean and world's 80th largest island by area.

124. Artificial Intelligence is associated with which generation?
A. First
B. Fifth
C. Third
D. Any of the above
Ans. B
Sol. This **fifth generation** is based on parallel processing hardware and **Artificial Intelligence** software. **Note:-** AI is an emerging branch in computer science, which interprets means and method of making computers think like human beings.

125. The crystal structure of austenite is
A. BCC B. FCC
C. HCP D. BCT
Ans. B
Sol. It has face centred cubic structure.

126. Heat is transferred from an insulated pipe to the surrounding still air by _____.
A. Conduction
B. Convection
C. Radiation
D. All options are correct
Ans. C
Sol. There will be no heat transfer from the surface as heat transfer by conduction and convection always requires contact surface area, as the pipe is insulated heat transfer from the surface will not take place. But radiation heat transfer takes place even in vacuum, that even after insulation there will be some radiation heat transfer.

127. Noise can be recorded in –
A. Ammeter B. Hygrometer
C. Barometer D. Decibel meter
Ans. D
Sol. Noise is 'unpleasant and unwanted sound'. It can be recorded in Decibel meter. Different Decibel (dB) units for various activities.

128. According to which article of the Constitution, the executive power of the Union will be vested in the President ?
A. Article 51 B. Article 56
C. Article 53 D. Article 50
Ans. C
Sol. **Article 53** of the Constitution says that the executive power of the Union shall be vested in the President and shall use it according to this constitution either by himself or by his subordinate officer.
• **Article 52** of the Constitution stipulates a President for India .

129. In a certain Heat Exchanger, both fluids have R=1. The hot fluid enters at 70 C and leaves at 40 C;cold fluid enters at 20 C and leaves at 50 C . Effectiveness of the exchanger is
A. 1.66 B. 0.8
C. 0.6 D. 1
Ans. C
Sol. Effectiveness of the HE is= 70-40/70-20=3/5=0.6

130. Which of the following is correct?
A. There will be no flow across the streamtube
B. There will be no flow along the streamtube
C. There will be no flow both across the streamtube and along it
D. There will be flow both across the streamtube and along it
Ans. A
Sol. Streamtube is a fluid mass bounded by a group of streamlines. Since, the movement of the fluid mass can only be along the streamlines and never across them, there will be no flow across the streamtube

131. When the temperature of a fixed bar is increased, the stress induced in the bar is
A. Tensile B. Compressive
C. Both a and b D. Shear
Ans. B
Sol. When the temperature of a fixed bar is increased then its length should increase but due to thermal stress which is compressive in nature the length of the fixed bar do not increase.

132. The rake angle of a cutting tool is 15°, the shear angle is 45° and the cutting velocity is 35 m/min. What is the velocity of chip along the tool face?
A. 28.5 m/s B. 27.3 m/s
C. 25.3 m/s D. None of these
Ans. A

Sol. From velocity triangle relation between chip velocity and cutting velocity is

$$\frac{V}{\cos(\phi-\alpha)}=\frac{Vc}{\sin\phi}$$

Where v cutting velocity, V_c chip velocity
φ shear angle, α rake angle
So V_c=28.5 m/s

133. The Roots blower and vane-type compressor are the types of
A. displacement compressor
B. steady-flow compressor
C. both of the mentioned
D. none of the mentioned

Ans. A

Sol. These are the two types of rotary positive displacement machines.

134. The sequencing of jobs in the ascending order of their processing time, is called
A. shortest processing time
B. earlier due date (EDD)
C. dispatching
D. none of these

Ans. A

Sol. In this rule, job with shortest processing time is considered first then next and so on. It simply means that arranging processing time in ascending order, the job sequence could be found.

135. Concurrent force system is the system when:
A. Lines of action of all forces pass through a point
B. Lines of action of all forces are parallel to each other
C. Lines of action of all forces lie along same line
D. Lines of action of all forces are not parallel to each other

Ans. A

Sol. Concurrent force system is a type of system of forces in which line of action of all the forces meet at a point. If line of action of forces lie along the same line known as collinear system of forces.

136. A spherical vessel with an inside diameter of 2 m is made of material having an allowable stress in tension of 500 kg/cm2. The thickness of a shell to withstand a pressure of 25 kg/cm2 should be:
A. 5 cm
B. 10 cm
C. 2.5 cm
D. 1.25 cm

Ans. C

Sol. Since $\sigma=\frac{pd}{4t}$

Where t : thickness of shell

So $t=\frac{25\times200}{4\times500}=2.5$ cm.

137. Rotary compressors are used where _____ quantities of gas are needed at relatively _____ pressure.
A. large, high
B. large, low
C. small, high
D. small, low

Ans. B

Sol. Rotary compressors are used where large quantities of gas are needed at relatively low pressure.

138. Haematite iron ore contains iron about
A. 30%
B. 45%
C. 55%
D. 70%

Ans. D

Sol. Pure hematite mineral contains 69.9% iron.

139. Which session of the Indian National Congress approved Gandhi Irwin Pact?
A. Lahore Session
B. Calcutta Session
C. Kanpur Session
D. Karachi Session

Ans. D

Sol. • The Gandhi Irwin Pact was endorsed by the Congress in the Karachi Session of 1931, that was held from March 26-31. Gandhi was nominated to represent Congress in the Second Round Table Conference. Just a week back, Bhagat Singh, Sukhdev and Rajguru had been executed. So, there was anger in the public whose point was that why Gandhi did accept to sign the pact.

140. What is the function of job evaluation?
A. determining relative worth of jobs
B. determining skills required by a worker
C. determining contribution of a worker
D. determining contribution of a job

Ans. A

Sol. A job evaluation is a systematic way of determining the value/worth of a job in relation to other jobs in an organization. It tries to make a systematic comparison between jobs to assess their relative worth for the

purpose of establishing a rational pay structure.

141. The value of normal stress at the principal plane is
A. Maximum
B. Minimum
C. Either maximum or minimum
D. Average of maximum and minimum

Ans. C

Sol. The value of normal stress at the principal plane is either maximum or minimum.

142. In the free expansion process
A. W=0 B. Q=0
C. du=0 D. All of these

Ans. D

Sol. In free expansion, there is no net heat interaction and work done by the system.

143. What are the ores of Lead (Pb)?
A. Zincite (ZnO) and Zinc blende (ZnS)
B. Cinnabar (HgS)
C. Galena (PbS) and Cerrusite ($pbCO_3$)
D. Haematite (Fe_2O_3) and Magnetite (Fe_2O_4)

Ans. C

Sol. **Galena (PbS)** and **Cerrusite ($pbCO_3$)** are the ores of Lead (Pb). **Lead** is the most abundant of the transition metal elements (**Greenwood and Earnshaw 1984**).
Lead is a chalcophile metallic element forming several important minerals ,including **galena PbS, anglesite PbSO4, Cerrusite PbCO3** and **minimum Pb3O4**.
Lead is a chemical element with symbol **Pb** (from the Latin Plumbum) and atomic number **82**. It is a heavy metal that is denser than most common materials.

144. In what context was "Nari Tu Narayani" used by Nirmala Sitharaman in Budget 2019-20?
A. Maternity Benefits
B. Women Empowerment
C. Self Help Groups
D. Mahila Shakti Kendras

Ans. B

Sol. * **Union Finance Minister Nirmala Sitharaman** quotes "Nari Tu Narayani" in her maiden budget speech in the context of women empowerment.
* Nirmala Sitharaman is a member of Rajya Sabha.
* She is currently serving as the Minister of Finance and Minister of Corporate Affairs. She is the second female Finance Minister after Indira Gandhi.

145. In which year Hima Das was honored with the Arjuna Award by the President of India?
A. 2017 B. 2014
C. 2018 D. 2019

Ans. C

Sol. • Hima Das was conferred with **Arjuna Award** by the President of India on **25th September 2018**.
• The Arjuna Awards are given by the **Ministry of Youth Affairs and Sports**, Government of India to recognize outstanding achievement in sports.
• It was started in **1961**.
• The award carries a cash prize of **₹500,000**, a bronze statue of **Arjuna** and a scroll.
• **Hima Das** is the first Indian athlete to win a **gold medal** in a track event at the **IAAF World U20 Championships**.

146. Which of the following equation is valid?
A. TdS = dH + Vdp
B. TdS = dH – Vdp
C. TdS = –dH – Vdp
D. TdS = –dH + Vdp

Ans. B

Sol. We get equation (B) by using TdS = dU + pdV and H = U + pV.

147. The gases present in the atmosphere that cause greenhouse effect are__
A. Carbon dioxide, oxygen, nitrogen
B. Carbon dioxide, sulphur dioxide, methane
C. Nitrous oxide, oxygen, water vapours
D. Methane, water vapours, carbon dioxide

Ans. D

Sol. The gases present in the atmosphere that cause the greenhouse effect are methane, water vapors, carbon dioxide. Greenhouse gasses are those gases which absorb and emits radiant energy within the thermal infrared range.

148. In which type of thermometer two different types of metal wires are joined together at two junctions?
A. Resistance Thermometer
B. Bimetal Thermometer

C. Thermistor Thermometer
D. Thermocouple Thermometer

Ans. D

Sol. In **Thermocouple Thermometer,** two different types of metal wires are joined together at **two junctions**. A **temperature difference** between the **junctions** actually makes the metals to produce a **small electric current** which moves the **metal needle** across the scale.

149. During the boot process, the _____ looks for the system files.
A. CD B. BIOS
C. CPU D. DVD

Ans. B

Sol. BIOS (basic input/output system) is the program a personal computer's microprocessor uses to get the computer system started after you turn it on. It also manages data flow between the computer's operating system and attached devices such as the hard disk, video adapter, keyboard, mouse and printer.

150. The Helmholtz function F is given by
A. U – TS B. U + TS
C. –U – TS D. –U + TS

Ans. A

Sol. Helmholtz function F is a property which is defined by the relation F=U-