



रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD
सी ई एन नं. - 03/2024 / CEN No. - 03/2024



Test Date	22/04/2025
Test Time	9:00 AM - 11:00 AM
Subject	RRB JE Stage 2 Chemical and Metallurgical Supervisor

* Note
Correct Answer will carry 1 mark per Question.
Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.
2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : General Abilities

Q.1 The Millennium Development Goals (MDGs) aimed to reduce extreme poverty by which year?

- Ans ☒ 1. 2015
☐ 2. 2005
☐ 3. 2008
☐ 4. 2014

Q.2 The phenomenon of multiple echoes due to repeated reflections is called _____.

- Ans ☐ 1. diffraction
☐ 2. refraction
☐ 3. resonance
☒ 4. reverberation

Q.3 What is the purpose of the Collation option in the Print settings?

- Ans ☐ 1. To adjust the page orientation
☐ 2. To select a custom print range
☐ 3. To change the printer selection
☒ 4. To print all the pages of a document as a set

Q.4 What was the main objective of the Extremists during the Indian National Movement?

- Ans ☐ 1. To expand the legislative councils
☒ 2. To attain complete independence (Swaraj)
☐ 3. To bring social reforms
☐ 4. To promote British goods in India

Q.5 What is the net force acting on an object if balanced forces are applied?

- Ans ☐ 1. Equal to the mass of the object
☒ 2. Zero
☐ 3. Equal to acceleration
☐ 4. Infinite

Q.6 Which of the following correctly explains why clothes dry faster on a windy day?

- Ans**
- ☐ 1. Wind increases the humidity around the clothes.
 - ☒ 2. Wind removes the water vapour from the clothes' surroundings.
 - ☐ 3. Wind decreases the temperature of the water molecules.
 - ☐ 4. Wind reduces the surface area of the clothes.

Q.7 Which of the following is NOT a source of release of smokestacks?

- Ans**
- ☐ 1. Smelters
 - ☒ 2. Rivers
 - ☐ 3. Thermal power plants
 - ☐ 4. Industries

Q.8 What is the approximate pH of a neutral salt solution?

- Ans**
- ☐ 1. Depends on the temperature
 - ☒ 2. Equal to 7
 - ☐ 3. Less than 7
 - ☐ 4. More than 7

Q.9 The main use of chlorofluorocarbons is in _____.

- Ans**
- ☐ 1. vehicles
 - ☐ 2. chimneys
 - ☐ 3. smog
 - ☒ 4. refrigerants

Q.10 The energy that is derived from the use of radioactive isotopes is termed as _____.

- Ans**
- ☒ 1. nuclear energy
 - ☐ 2. solar energy
 - ☐ 3. thermal energy
 - ☐ 4. geothermal energy

Q.11 Why does a bee sting cause pain and irritation?

- Ans**
- ☐ 1. The sting contains a strong base.
 - ☐ 2. The sting injects a mild sugar solution.
 - ☐ 3. The sting releases carbon dioxide gas.
 - ☒ 4. The sting injects methanoic acid.

Q.12 The practice of Jhum cultivation is prevalent in the _____.

- Ans**
- ☐ 1. North west
 - ☐ 2. South west
 - ☒ 3. North east
 - ☐ 4. South east

Q.13 In which of the following regions the Himalayas has the greatest width?

- Ans**
- ☐ 1. Sikkim
 - ☒ 2. Kashmir
 - ☐ 3. Arunachal Pradesh
 - ☐ 4. Himachal Pradesh

Q.14 If an object is dropped from rest, what will be its velocity after 15 seconds? ($g = 9.8 \text{ m/s}^2$)

- Ans
- ☐ 1. 143 m/s
 - ☐ 2. 149 m/s
 - ☐ 3. 145 m/s
 - ☒ 4. 147 m/s

Q.15 Which of the following correctly represents the chemical formula of a compound formed by aluminium and sulphate ions?

- Ans
- ☐ 1. $\text{Al}_3(\text{SO}_4)_2$
 - ☐ 2. $\text{Al}(\text{SO}_4)_3$
 - ☒ 3. $\text{Al}_2(\text{SO}_4)_3$
 - ☐ 4. Al_2SO_4

Q.16 Which official in the Gupta administration was responsible for peace and war matters?

- Ans
- ☒ 1. Sandhi-Vigrahika
 - ☐ 2. Mahapratihara
 - ☐ 3. Vishayapati
 - ☐ 4. Mahadandanayaka

Q.17 What happens when a computer is put into Sleep mode?

- Ans
- ☒ 1. It keeps the session active in RAM while using minimal power.
 - ☐ 2. It restarts automatically after a few minutes.
 - ☐ 3. It shuts down completely.
 - ☐ 4. It stores data on the hard drive and powers off.

Q.18 The Rudra Veena is predominantly associated with which genre of Hindustani music?

- Ans
- ☐ 1. Khayal
 - ☐ 2. Thumri
 - ☐ 3. Ghazal
 - ☒ 4. Dhrupad

Q.19 Inertia depends on which property of an object?

- Ans
- ☐ 1. Velocity
 - ☒ 2. Mass
 - ☐ 3. Shape
 - ☐ 4. Acceleration

Q.20 Which of the following is NOT a component of a CPU?

- Ans
- ☐ 1. Arithmetic Logic Unit (ALU)
 - ☐ 2. Control Unit (CU)
 - ☐ 3. Cache Memory
 - ☒ 4. Hard Disk

Q.21 The Industrial Policy Resolution of 1956 categorised industries into how many groups?

- Ans
- ☒ 1. Three
 - ☐ 2. Nine
 - ☐ 3. Five
 - ☐ 4. Seven

Q.22 The glass panel used in greenhouses is known to retain _____.

- Ans
- ☐ 1. pH
 - ☐ 2. humidity
 - ☐ 3. rainfall
 - ☒ 4. heat

Q.23 Who among the following inaugurated the 38th National Games held in Dehradun in January 2025?

- Ans
- ☐ 1. Pushkar Singh Dhami
 - ☒ 2. Narendra Modi
 - ☐ 3. Droupadi Murmu
 - ☐ 4. Anurag Thakur

Q.24 What is the primary function of the F4 key in MS Excel when editing a cell reference in a formula?

- Ans
- ☐ 1. Refreshes the worksheet
 - ☐ 2. Repeats the last action
 - ☐ 3. Opens the Find and Replace dialog
 - ☒ 4. Toggles between absolute and relative references

Q.25 What is the first step to securing ones smartphone or tablet?

- Ans
- ☐ 1. Turning off mobile data
 - ☐ 2. Installing more apps
 - ☒ 3. Setting a password/PIN-protected lock screen
 - ☐ 4. Using only free Wi-Fi networks

Q.26 Which of the following is a characteristic difference between colloids and true solutions?

- Ans
- ☐ 1. True solutions show the Tyndall effect, but colloids do not.
 - ☐ 2. True solutions have visible solute particles, whereas colloids have invisible dispersed particles.
 - ☐ 3. True solutions exhibit Brownian motion, but colloids do not.
 - ☒ 4. True solutions have a single-phase system, whereas colloids have a two-phase system.

Q.27 Which of the following cities hosted the inaugural Kho Kho World Cup in January 2025?

- Ans
- ☐ 1. Mumbai
 - ☐ 2. Chennai
 - ☒ 3. New Delhi
 - ☐ 4. Kolkata

Q.28 Which Article provides Ministers the right to participate in parliamentary proceedings but without voting rights?

- Ans
- ☒ 1. Article 88
 - ☐ 2. Article 53
 - ☐ 3. Article 77
 - ☐ 4. Article 78

Q.29 If the absolute refractive index of a medium is less than 1, it means _____.

- Ans
- ☐ 1. the medium absorbs all light
 - ☐ 2. light travels slower in that medium than in vacuum
 - ☒ 3. light travels faster in that medium than in vacuum
 - ☐ 4. the medium is a perfect reflector

Q.30 The fine powder that is obtained from the modified and recycled form of plastic is called _____.

- Ans**
- ☐ 1. polyethylene
 - ☐ 2. polystyrene
 - ☒ 3. polyblend
 - ☐ 4. polythene

Q.31 Which defect of vision occurs due to the weakening of ciliary muscles with age?

- Ans**
- ☐ 1. Astigmatism
 - ☐ 2. Myopia
 - ☐ 3. Hypermetropia
 - ☒ 4. Presbyopia

Q.32 Which of the following is NOT toxic to non-target organisms in the soil?

- Ans**
- ☒ 1. Organic fertilisers
 - ☐ 2. Pesticides
 - ☐ 3. Fungicides
 - ☐ 4. Herbicides

Q.33 What does PCB stand for?

- Ans**
- ☒ 1. Printed Circuit Board
 - ☐ 2. Peripheral Connection Bus
 - ☐ 3. Primary Control Board
 - ☐ 4. Processing Circuit Board

Q.34 The maximum sound is generated _____.

- Ans**
- ☐ 1. from house chimneys
 - ☐ 2. from industrial smoke
 - ☐ 3. from vehicular emissions
 - ☒ 4. by the take off of a jet plane

Q.35 Which of the following states is NOT covered under the Atal Bhujal Yojana?

- Ans**
- ☐ 1. Uttar Pradesh
 - ☐ 2. Rajasthan
 - ☒ 3. Jharkhand
 - ☐ 4. Maharashtra

Q.36 According to the Tendulkar methodology, what was the estimated percentage of people below the poverty line in rural areas in 2011-12?

- Ans**
- ☒ 1. 25.7%
 - ☐ 2. 20%
 - ☐ 3. 27.5%
 - ☐ 4. 15.5%

Q.37 What is India's global military ranking in the 2025 Global Firepower (GFP) index?

- Ans**
- ☐ 1. 3rd
 - ☐ 2. 2nd
 - ☒ 3. 4th
 - ☐ 4. 5th

Q.38	If you want the primary recipient to see that others have received a copy of an email, you should enter their email addresses in the _____ field.
Ans	<div><div><input checked="" type="checkbox"/></div>1. To</div> <div><div><input checked="" type="checkbox"/></div>2. Bcc</div> <div><div><input checked="" type="checkbox"/></div>3. Subject</div> <div><div><input checked="" type="checkbox"/></div>4. Cc</div>
Q.39	Which state of matter shows the highest expansion when temperature is increased?
Ans	<div><div><input checked="" type="checkbox"/></div>1. Plasma</div> <div><div><input checked="" type="checkbox"/></div>2. Liquids</div> <div><div><input checked="" type="checkbox"/></div>3. Solids</div> <div><div><input checked="" type="checkbox"/></div>4. Gases</div>
Q.40	Which of the following companies announced plans in February 2025 to construct the world's longest undersea cable, aiming to enhance internet connectivity across five continents, with landing points in India?
Ans	<div><div><input checked="" type="checkbox"/></div>1. Google</div> <div><div><input checked="" type="checkbox"/></div>2. Meta</div> <div><div><input checked="" type="checkbox"/></div>3. Microsoft</div> <div><div><input checked="" type="checkbox"/></div>4. Amazon</div>
Q.41	What happens when an acid reacts with a metal oxide?
Ans	<div><div><input checked="" type="checkbox"/></div>1. A salt and water are formed.</div> <div><div><input checked="" type="checkbox"/></div>2. Only water is formed.</div> <div><div><input checked="" type="checkbox"/></div>3. A salt and hydrogen gas are formed.</div> <div><div><input checked="" type="checkbox"/></div>4. Only salt is formed.</div>
Q.42	What is the maximum number of Ministers allowed in the Council of Ministers, including the Prime Minister, as per the 91 st Amendment Act?
Ans	<div><div><input checked="" type="checkbox"/></div>1. 10% of Lok Sabha strength</div> <div><div><input checked="" type="checkbox"/></div>2. 15% of Lok Sabha strength</div> <div><div><input checked="" type="checkbox"/></div>3. 20% of Lok Sabha strength</div> <div><div><input checked="" type="checkbox"/></div>4. 12% of Lok Sabha strength</div>
Q.43	Which of the following CANNOT be considered as a measure to control global warming?
Ans	<div><div><input checked="" type="checkbox"/></div>1. Cutting down use of fossil fuel</div> <div><div><input checked="" type="checkbox"/></div>2. Efficiently using energy</div> <div><div><input checked="" type="checkbox"/></div>3. Reduction in emission of greenhouse gases</div> <div><div><input checked="" type="checkbox"/></div>4. Causing deforestation</div>
Q.44	Dr. BR Ambedkar described which part of the Indian Constitution as its 'novel features', while Granville Austin referred to it as the 'Conscience of the Constitution'?
Ans	<div><div><input checked="" type="checkbox"/></div>1. Preamble</div> <div><div><input checked="" type="checkbox"/></div>2. Directive Principles of State Policy</div> <div><div><input checked="" type="checkbox"/></div>3. Fundamental Duties</div> <div><div><input checked="" type="checkbox"/></div>4. Fundamental Rights</div>
Q.45	What is the shortcut key to start a slideshow from the beginning?
Ans	<div><div><input checked="" type="checkbox"/></div>1. F5</div> <div><div><input checked="" type="checkbox"/></div>2. Ctrl + P</div> <div><div><input checked="" type="checkbox"/></div>3. Alt + Tab</div> <div><div><input checked="" type="checkbox"/></div>4. Shift + F5</div>

Q.46 What is the primary purpose of using a firewall on a Personal Computer?

- Ans
- ☐ 1. To increase storage space
 - ☐ 2. To speed up internet connectivity
 - ☐ 3. To clean up temporary files
 - ☒ 4. To block unauthorised access and protect the computer

Q.47 Identify the correct formula for the compound formed between Mg^{2+} and PO_4^{3-} ions.

- Ans
- ☐ 1. MgPO_4
 - ☒ 2. $\text{Mg}_3(\text{PO}_4)_2$
 - ☐ 3. $\text{Mg}_2(\text{PO}_4)_3$
 - ☐ 4. $\text{Mg}(\text{PO}_4)_3$

Q.48 In an electric circuit, what is the correct way to connect an ammeter?

- Ans
- ☒ 1. In series with the component
 - ☐ 2. In parallel with the component
 - ☐ 3. In parallel with the source
 - ☐ 4. In either series or parallel

Q.49 The primary agent that helps in the decomposition of biodegradable matter in domestic sewage is _____.

- Ans
- ☐ 1. phosphate
 - ☐ 2. nitrate
 - ☒ 3. bacterium
 - ☐ 4. chloride

Q.50 Which of the following is the correct way to insert a new column in a spreadsheet?

- Ans
- ☐ 1. Go to File > New > Column.
 - ☒ 2. Go to Home > Insert > Insert Sheet Columns.
 - ☐ 3. Press Ctrl + X and then Insert.
 - ☐ 4. Use Ctrl + Z to insert a column.

Section : Technical Abilities

Q.1 What is a significant environmental concern associated with using non-renewable energy sources?

- Ans
- ☐ 1. Water scarcity
 - ☐ 2. Habitat destruction
 - ☒ 3. Greenhouse gas emissions
 - ☐ 4. Overpopulation

Q.2 Which of the following is a common industrial method for preparing ammonium nitrate?

- Ans
- ☐ 1. Haber-Bosch process
 - ☐ 2. Electrolysis of ammonium salts
 - ☐ 3. Metathesis reaction
 - ☒ 4. Neutralisation of ammonia with nitric acid

Q.3 Which of the following is an INCORRECT statement about hard water?

- Ans
- ☐ 1. Hard water contains dissolved calcium and magnesium salts
 - ☒ 2. Hard water lowers the boiling point of water
 - ☐ 3. Hard water does not lather well with soap and forms white scum
 - ☐ 4. Hard water decreases the cleansing ability of soap

Q.4 Which of the following queries will correctly retrieve the name of Professor from Professor table with ID 101, 102 or 104?

- Ans
- ☐ 1. SELECT NAME FROM Professor WHERE id CONTAINS (101, 102, 103);
 - ☐ 2. SELECT NAME FROM Professor WHERE id BETWEEN 101 AND 103;
 - ☒ 3. SELECT NAME FROM Professor WHERE id IN (101, 102, 104);
 - ☐ 4. SELECT NAME FROM Professor WHERE id = (101, 102, 103);

Q.5 Which of the following types of coke ovens are heated from outside and the heat required for carbonisation is transmitted through the side walls?

- Ans
- ☐ 1. Beehive ovens
 - ☐ 2. Flatter and wider ovens
 - ☐ 3. Non recovery ovens
 - ☒ 4. Slot type by-product recovery ovens

Q.6 What is the primary use of gasoline as a petroleum product?

- Ans
- ☐ 1. Manufacturing plastics
 - ☐ 2. Lubricating machinery
 - ☐ 3. Heating homes
 - ☒ 4. Powering internal combustion engines

Q.7 What is the primary combustible component of producer gas?

- Ans
- ☐ 1. Nitrogen
 - ☒ 2. Carbon monoxide
 - ☐ 3. Hydrogen
 - ☐ 4. Carbon dioxide

Q.8 Arrange the following materials in descending order, as per the value of their thermal conductivity.

- 1) Pure iron
- 2) Liquid water
- 3) Steam
- 4) Pure Brass

- Ans
- ☐ 1. 4-3-2-1
 - ☒ 2. 4-1-2-3
 - ☐ 3. 2-3-1-4
 - ☐ 4. 1-2-3-4

Q.9 Which of the following factors favours high thermal stability of coke in the blast furnace?

- Ans
- ☐ 1. High chemical reactivity
 - ☒ 2. Absence of large lumps in feed coke
 - ☐ 3. Low carbonisation temperature
 - ☐ 4. Maximum inert inclusions of large sizes

Q.10 What will be the output of the following C code?

```
#include <stdio.h>
void main()
{
int x = 10, y = 20;
printf("%d",!(x < y) ? ++x : y);
}
```

- Ans**
- ☒ 1. 20
 - ☐ 2. 10
 - ☐ 3. 30
 - ☐ 4. 11

Q.11 Which of the following ceramics has a two-layer silicate sheet structure?

- Ans**
- ☐ 1. Silica glass
 - ☒ 2. Kaolinite clay
 - ☐ 3. Silica
 - ☐ 4. Fullerene

Q.12 Which of the following is the chemical name of natural rubber?

- Ans**
- ☐ 1. Chloroprene
 - ☐ 2. Acrylonitrile-butadiene copolymer
 - ☐ 3. Styrene-butadiene copolymer
 - ☒ 4. Polyisoprene

Q.13 Select the correct pair related to types of doors and their features.

- Ans**
- ☐ 1. Collapsible door - Made of PVC panels
 - ☐ 2. Revolving door - Made of shutter slide on sides with help of runners and guided rails
 - ☒ 3. Battened and ledged door - Made of vertical bond and horizontal supports
 - ☐ 4. Flush door - Made of single wood plank

Q.14 The mass density of water is ____ in the standard conditions.

- Ans**
- ☒ 1. 1000 kg/m³
 - ☐ 2. 10 kg/m³
 - ☐ 3. 1 kg/m³
 - ☐ 4. 100 kg/m³

Q.15 Which of the following options correctly identifies Data Control Language (DCL) commands in SQL Query?

- Ans**
- ☐ 1. CREATE, DROP
 - ☒ 2. GRANT, REVOKE
 - ☐ 3. SELECT, INSERT
 - ☐ 4. UPDATE, DELETE

Q.16 A surveyor is conducting a compass survey between two stations, A and B. The observed fore bearing (FB) of line AB is 124°30'. Determine the back bearing (BB) of line BA, considering there is no local attraction.

- Ans**
- ☐ 1. 94°30'
 - ☐ 2. 234°30'
 - ☐ 3. 214°30'
 - ☒ 4. 304°30'

Q.17 What is the primary component of LPG (liquefied petroleum gas)?

- Ans
- ☐ 1. Methane
 - ☐ 2. Carbon dioxide
 - ☐ 3. Nitrogen
 - ☒ 4. Propane

Q.18 Which of the following is an example of a web hosting control panel?

- Ans
- ☐ 1. Apache
 - ☒ 2. cPanel
 - ☐ 3. MySQL
 - ☐ 4. PHP

Q.19 Which of the following is NOT a part of the gating system?

- Ans
- ☐ 1. Runner
 - ☐ 2. Gate
 - ☒ 3. Core
 - ☐ 4. Sprue

Q.20 In which application(s) is/are load cells commonly used?

- Ans
- ☒ 1. Weighing scales and industrial force measurement
 - ☐ 2. Electromagnetic wave measurement
 - ☐ 3. Temperature measurement
 - ☐ 4. Sound level detection

Q.21 A BJT will operate in an active region if _____.

- Ans
- ☐ 1. an emitter base junction is reverse biased and a collector base junction is forward biased
 - ☐ 2. an emitter base junction is forward biased and a collector base junction is forward biased
 - ☐ 3. an emitter base junction is reverse biased and a collector base junction is reverse biased
 - ☒ 4. an emitter base junction is forward biased and a collector base junction is reverse biased

Q.22 At constant pressure, volume of expansion coefficient of a substance represents the variation of _____.

- Ans
- ☐ 1. viscosity with temperature
 - ☒ 2. density with temperature
 - ☐ 3. specific heat with volume
 - ☐ 4. thermal conductivity with volume

Q.23 Theoretically, If $E_b = V$ in a DC motor, the motor is likely operating at _____.

- Ans
- ☐ 1. a stalled condition
 - ☒ 2. no load
 - ☐ 3. overload
 - ☐ 4. full load

Q.24 Which of the following is NOT a method of ranging used in chaining?

- Ans
- ☒ 1. Optical ranging
 - ☐ 2. Reciprocal ranging
 - ☐ 3. Indirect ranging
 - ☐ 4. Direct ranging

Q.25 Which of the following characteristics is the least desirable in a building stone used for foundation construction?

- Ans
- ✓ 1. High water absorption
 - ✗ 2. Good durability
 - ✗ 3. Low porosity
 - ✗ 4. High compressive strength

Q.26 Which of the following is the relation between the atomic radius, r , and the lattice parameter, a , for the BCC crystal?

- Ans
- ✗ 1. $r = a$
 - ✗ 2. $r = \frac{a}{(2\sqrt{2})}$
 - ✓ 3. $r = \frac{(a\sqrt{3})}{4}$
 - ✗ 4. $r = a\sqrt{2}$

Q.27 What is a common method to reduce friction between two surfaces?

- Ans
- ✓ 1. Applying a lubricant
 - ✗ 2. Roughening the surface
 - ✗ 3. Increasing the pressure
 - ✗ 4. Increasing the surface area

Q.28 Which of the following elements is primarily responsible for the corrosion resistance of stainless steel?

- Ans
- ✗ 1. Molybdenum
 - ✗ 2. Nickel
 - ✗ 3. Carbon
 - ✓ 4. Chromium

Q.29 Which of the following types of electrical currents is commonly used in arc welding?

- Ans
- ✗ 1. Only Alternating Current (AC)
 - ✗ 2. Only static electricity
 - ✓ 3. Both AC and DC, depending on the welding process and material
 - ✗ 4. Only Direct Current (DC)

Q.30 Which of the following operators is used to find the remainder after division?

- Ans
- ✗ 1. /
 - ✗ 2. -
 - ✗ 3. +
 - ✓ 4. %

Q.31 In a Zener diode voltage regulator circuit, what is the purpose of the series resistor (R_s) connected between the input voltage source and the Zener diode?

- Ans
- ✗ 1. To drop the excess voltage and regulate the output
 - ✗ 2. To filter out noise and ripples in the input voltage
 - ✓ 3. To limit the current through the Zener diode
 - ✗ 4. To increase the voltage rating of the Zener diode

Q.32 Which of the following is the main objective of primary wastewater treatment?

- Ans**
- ☐ 1. To use biological processes to break down organic matter
 - ☐ 2. To remove all bacteria and viruses from the water
 - ☒ 3. To remove floating materials and settleable solids
 - ☐ 4. To add chemicals to disinfect the water

Q.33 What are the two main types of junction capacitance in a PN-junction diode, based on charge storage?

- Ans**
- ☒ 1. Diffusion capacitance and transition capacitance
 - ☐ 2. Conduction capacitance and breakdown capacitance
 - ☐ 3. Stray capacitance and conduction capacitance
 - ☐ 4. Stray capacitance and leakage capacitance

Q.34 The stress–strain behaviour of which of the following polymeric materials shows large recoverable strains produced at low stress levels?

- Ans**
- ☐ 1. Thermosetting polymer
 - ☐ 2. Plastic polymer
 - ☐ 3. Brittle polymer
 - ☒ 4. Elastomer

Q.35 What will be the output of the following C code?

```
#include <stdio.h>
void main()
{
    int x=10,result=0;
    if (++x > 2)
        result=x+2;
    printf("%d",result);
}
```

- Ans**
- ☐ 1. 6
 - ☐ 2. 0
 - ☒ 3. 13
 - ☐ 4. 12

Q.36 A concave mirror is used to form an image of an object. The object distance (u) is 30 cm and the image distance (v) is 15 cm. Calculate the focal length (f) of the mirror.

- Ans**
- ☒ 1. -10 cm
 - ☐ 2. -30 cm
 - ☐ 3. 10 cm
 - ☐ 4. 30 cm

Q.37 What is NOT the unit of measurement for water hardness?

- Ans**
- ☐ 1. Milligrams of calcium carbonate per litre
 - ☐ 2. Parts per million
 - ☒ 3. Grams per gallon
 - ☐ 4. Grains per gallon

Q.38 How does the limiting value of static friction depend on the area of contact?

- Ans**
- ☒ 1. Independent of area
 - ☐ 2. Directly proportional to (area)²
 - ☐ 3. Inversely proportional to area
 - ☐ 4. Directly proportional to area

Q.39 At what temperature does ammonium sulphate become ferroelectric?

- Ans**
- ☐ 1. 0°C
 - ☐ 2. 100°C
 - ☐ 3. 25°C
 - ☒ 4. -49.5°C

Q.40 Which of the following polymers are linear polymers with flexible chains?

- Ans**
- ☐ 1. Phenolics
 - ☐ 2. Epoxies
 - ☐ 3. Network polymers
 - ☒ 4. Polyethylene

Q.41 An ideal refrigeration machine has a fixed lower temperature. The COP of the machine can be increased by _____.

- Ans**
- ☐ 1. decreasing the operating speed of the machine
 - ☐ 2. increasing the higher temperature
 - ☐ 3. increasing the operating speed of the machine
 - ☒ 4. decreasing the higher temperature

Q.42 Which of the following transmission modes is most suitable for voice-over IP (VoIP)?

- Ans**
- ☐ 1. Simplex
 - ☐ 2. Parallel
 - ☐ 3. Half-duplex
 - ☒ 4. Full-duplex

Q.43 What is primary function of a rectifier?

- Ans**
- ☐ 1. To regulate output signal
 - ☐ 2. To amplify the input signal
 - ☒ 3. To convert AC signal in DC signal
 - ☐ 4. To filter out unwanted frequencies

Q.44 The Control Unit receives opcode information from the:

- Ans**
- ☐ 1. Accumulator (AC)
 - ☐ 2. Program Counter (PC)
 - ☐ 3. Memory Address Register (MAR)
 - ☒ 4. Instruction Register (IR)

Q.45 What is a significant impact of pollution on biodiversity?

- Ans**
- ☒ 1. Extinction of sensitive species
 - ☐ 2. Improved soil fertility
 - ☐ 3. Enhanced aquatic ecosystems
 - ☐ 4. Increase in species diversity

Q.46 Which property of tin makes it suitable for use in solder?

- Ans**
- ☐ 1. High density
 - ☐ 2. High electrical conductivity
 - ☐ 3. Corrosion resistance
 - ☒ 4. Low melting point

Q.47 Which property makes melamine foam suitable for soundproofing applications?

- Ans
- ☒ 1. Low thermal conductivity
 - ☒ 2. High porosity
 - ☒ 3. Chemical reactivity
 - ☒ 4. High density

Q.48 In a common emitter configuration the current amplification factor is expressed as _____.

- Ans
- ☒ 1. $(\Delta I_C / \Delta I_B)_{VCE}$
 - ☒ 2. $(\Delta I_E / \Delta I_C)_{VCE}$
 - ☒ 3. $(\Delta I_C \times \Delta I_B)_{VCE}$
 - ☒ 4. $(\Delta I_B / \Delta I_C)_{VCE}$

Q.49 What is the effect of subcooling on the performance of a vapour compression refrigeration cycle?

- Ans
- ☒ 1. It decreases the refrigeration effect.
 - ☒ 2. It increases the condenser pressure.
 - ☒ 3. It increases the refrigeration effect.
 - ☒ 4. It reduces compressor work.

Q.50 Read the following statements regarding a piezoelectric transducer and select which is/are correct.

- A. The use of piezoelectric transducer element is confined primarily to dynamic measurement.
B. Piezoelectric material, used in an underwater detection system, is known as sonar.

- Ans
- ☒ 1. Only B
 - ☒ 2. Only A
 - ☒ 3. Neither A nor B
 - ☒ 4. Both A and B

Q.51 Which of the following techniques is used in time-sharing systems to ensure fair CPU allocation?

- Ans
- ☒ 1. First-come-first-served scheduling
 - ☒ 2. Priority scheduling
 - ☒ 3. Shortest job first scheduling
 - ☒ 4. Round-robin scheduling

Q.52 Which IEEE standard defines Ethernet LAN (Local Area Network)?

- Ans
- ☒ 1. IEEE 802.3
 - ☒ 2. IEEE 802.15
 - ☒ 3. IEEE 802.5
 - ☒ 4. IEEE 802.11

Q.53 What is the term for flowing water ecosystems like rivers and streams?

- Ans
- ☒ 1. Lentic
 - ☒ 2. Lotic
 - ☒ 3. Marine
 - ☒ 4. Wetland

Q.54 Which of the following is NOT a typical application for high carbon steel?

- Ans**
- ☒ 1. Springs
 - ☒ 2. Cutting tools
 - ☒ 3. Knives
 - ☒ 4. Structural beams

Q.55 For a simply supported beam of span L subjected to a central point load P , the shear force just to the left of the load is _____.

- Ans**
- ☒ 1. $P/2$
 - ☒ 2. $P/4$
 - ☒ 3. P
 - ☒ 4. 0

Q.56 A radiator, in a domestic heating system, operates at a temperature of 27°C . The heat flux at the surface of a radiator, if it behaves as a black body, will be _____.

- Ans**
- ☒ 1. 45.927 W/m^2
 - ☒ 2. 4.5927 W/m^2
 - ☒ 3. 4592.7 W/m^2
 - ☒ 4. 459.27 W/m^2

Q.57 Reynolds number can be represented as the ratio of:

- Ans**
- ☒ 1. Inertia force to Viscous force
 - ☒ 2. Viscous force to Buoyancy force
 - ☒ 3. Viscous force to Inertia force
 - ☒ 4. Buoyancy force to Viscous force

Q.58 In which of the following processes does the formation of polymers occur by stepwise intermolecular chemical reactions that may involve more than one monomer species and there is usually a small molecular weight byproduct such as water?

- Ans**
- ☒ 1. Crystallisation
 - ☒ 2. Condensation polymerisation
 - ☒ 3. Chain reaction polymerisation
 - ☒ 4. Addition polymerisation

Q.59 Which of the following is added to natural rubber and heated to make ebonite?

- Ans**
- ☒ 1. Sulphur
 - ☒ 2. Phosphorous
 - ☒ 3. Magnesium
 - ☒ 4. Calcium

Q.60 Which of the following polymers have the lowest coefficient of thermal expansion?

- Ans**
- ☒ 1. Network polymers
 - ☒ 2. Thermoplastic polymers
 - ☒ 3. Linear polymers
 - ☒ 4. Branched polymers

Q.61 What is the phenomenon that occurs in some thermoplastic polymers in which very localised plastic deformation leads to the formation of small and interconnected microvoids called?

- Ans**
- ☒ 1. Devitrification
 - ☒ 2. Crazing
 - ☒ 3. Crystallisation
 - ☒ 4. Annealing

Q.62 In which application does glycerine NOT serve as a humectant in the food industry?

- Ans**
- ☒ 1. To prevent the oxidation of food colour
 - ☐ 2. To control ice crystal formation in frozen desserts
 - ☐ 3. To retain moisture in processed meats
 - ☐ 4. To maintain consistency and prevent drying in dairy products

Q.63 Which of the following is an important chemical parameter to consider when assessing water potability?

- Ans**
- ☐ 1. Acidity
 - ☐ 2. High concentration of heavy metals
 - ☒ 3. Appropriate pH levels
 - ☐ 4. High pH

Q.64 What is the typical calorific value of producer gas?

- Ans**
- ☐ 1. 4,500 - 5,000 kcal/m³
 - ☒ 2. 1,000 - 1,200 kcal/m³
 - ☐ 3. 8,000 - 10,000 kcal/m³
 - ☐ 4. 2,500 - 3,000 kcal/m³

Q.65 Which of the following is one of the main DISADVANTAGES of using hard water in a boiler?

- Ans**
- ☐ 1. Improved water flow
 - ☐ 2. Increased heating efficiency
 - ☐ 3. Reduced maintenance costs
 - ☒ 4. Scaling and limescale buildup

Q.66 What is the process by which an atomic nucleus splits into two or more smaller nuclei, releasing a large amount of energy?

- Ans**
- ☐ 1. Fusion
 - ☐ 2. Radioactive decay
 - ☒ 3. Fission
 - ☐ 4. Nuclear transmutation

Q.67 As per the following options, what is the most suitable property of glycerol?

- Ans**
- ☐ 1. It is insoluble in water
 - ☒ 2. It is hygroscopic
 - ☐ 3. It is a solid at room temperature
 - ☐ 4. It has a strong odor

Q.68 The EMF induced in the secondary winding of a transformer depends on the ____.

- Ans**
- ☒ 1. magnetic flux linkage
 - ☐ 2. armature reaction
 - ☐ 3. power factor
 - ☐ 4. load resistance

Q.69 A positron is emitted in ____.

- Ans**
- ☒ 1. beta-plus decay
 - ☐ 2. beta-negative decay
 - ☐ 3. alpha decay
 - ☐ 4. gamma decay

Q.70 Which of the following is the primary ore used for the extraction of nickel?

- Ans
- ✓ 1. Pentlandite
 - ✗ 2. Bauxite
 - ✗ 3. Galena
 - ✗ 4. Hematite

Q.71 Which of the following is an aerobic process used in secondary wastewater treatment?

- Ans
- ✗ 1. Anaerobic Digestion
 - ✗ 2. Upflow Anaerobic Sludge Blanket (UASB)
 - ✓ 3. Activated Sludge Process
 - ✗ 4. Anaerobic Filters

Q.72 The following truth table is related to which gate?

Input		Output
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

- Ans
- ✗ 1. NOR gate
 - ✗ 2. OR gate
 - ✓ 3. NAND gate
 - ✗ 4. XOR gate

Q.73 Read the given statements and select which is/are correct.

- A. Resistance strain gauges are very useful for measurement of tension, torque, force and stresses in structures.
B. Strain gauges are used in load cells and proving rings to measure force by the strain produced.

- Ans
- ✓ 1. Both A and B
 - ✗ 2. Only B
 - ✗ 3. Only A
 - ✗ 4. Neither A nor B

Q.74 Which of the following is NOT a function of lubricant oils?

- Ans
- ✓ 1. Increasing friction
 - ✗ 2. Cooling through heat dissipation
 - ✗ 3. Protecting against corrosion and rust
 - ✗ 4. Cleansing by removal of contaminants

Q.75 Which of the following is NOT a type of polymer PTC (positive temperature coefficient) thermistor?

- Ans
- ✓ 1. Monoswitch
 - ✗ 2. Semifuse
 - ✗ 3. Multifuse
 - ✗ 4. Polyswitch

Q.76 Which of the following pairs of lime types and their characteristics is correctly matched?

- Ans**
- ☐ 1. Slaked Lime – Used in RCC Construction
 - ☐ 2. Hydraulic Lime – Gains Strength in Air Only
 - ☐ 3. Quick Lime – Highly Stable
 - ☒ 4. Fat Lime – High Plasticity

Q.77 Which of the following is a primary air pollutant?

- Ans**
- ☐ 1. Nitrogen trioxide
 - ☐ 2. Ozone
 - ☐ 3. Sulphur trioxide
 - ☒ 4. Sulphur dioxide

Q.78 What type of cooling is typically used in outdoor distribution transformers?

- Ans**
- ☐ 1. Dry-type
 - ☐ 2. Air natural
 - ☒ 3. Oil-immersed
 - ☐ 4. Forced air

Q.79 A thermocouple works on the principle of _____.

- Ans**
- ☐ 1. Peltier effect
 - ☐ 2. Raman effect
 - ☐ 3. Ohm's law
 - ☒ 4. Seebeck effect

Q.80 What type of network device assigns IP addresses dynamically in a LAN?

- Ans**
- ☒ 1. DHCP server
 - ☐ 2. DNS server
 - ☐ 3. Router
 - ☐ 4. Switch

Q.81 Which of the following is an example of point-source water pollution?

- Ans**
- ☐ 1. Runoff from agricultural land
 - ☐ 2. Animal faeces from dogs and birds
 - ☒ 3. Wastewater pipe from a factory
 - ☐ 4. Pollutants from car parks

Q.82 Which of the following methods is used to prepare benzene from sodium benzoate?

- Ans**
- ☒ 1. Decarboxylation
 - ☐ 2. Oxidation
 - ☐ 3. Polymerisation
 - ☐ 4. Hydrolysis

Q.83 Which of the following is a major environmental concern associated with Blast Furnace Gas (BFG)?

- Ans**
- ☐ 1. Release of particulate matter
 - ☐ 2. High sulphur dioxide emissions
 - ☐ 3. Generation of methane
 - ☒ 4. Emission of carbon dioxide

Q.84 In which type of gear train are the input and output shafts collinear?

- Ans**
- ☒ 1. Simple gear train
 - ☒ 2. Reverted gear train
 - ☒ 3. Epicyclic gear train
 - ☒ 4. Compound gear train

Q.85 What is the most common method for producing aluminium from its ore?

- Ans**
- ☒ 1. Smelting
 - ☒ 2. Leaching
 - ☒ 3. Electrolytic reduction
 - ☒ 4. Blast furnace process

Q.86 What is the primary method for extracting copper from sulphide ores like chalcopyrite?

- Ans**
- ☒ 1. Electrolytic refining
 - ☒ 2. Magnetic separation
 - ☒ 3. Leaching
 - ☒ 4. Smelting and converting

Q.87 Which type of pattern is specifically designed to produce hollow castings by incorporating cores?

- Ans**
- ☒ 1. Segmental pattern
 - ☒ 2. Shell pattern
 - ☒ 3. Loose piece pattern
 - ☒ 4. Cope and drag pattern

Q.88 In a vapour compression refrigeration system, the highest temperature in the cycle occurs _____.

- Ans**
- ☒ 1. before the capillary tube
 - ☒ 2. after compression
 - ☒ 3. after the capillary tube
 - ☒ 4. after evaporation

Q.89 Select the correct statement valid only for reversible process conducted by closed system; neglect change in kinetic and potential energy.

- Ans**
- ☒ 1. $TdS = dU + TdV$
 - ☒ 2. $TdS = dU + WdS$
 - ☒ 3. $dQ = dU + TdS$
 - ☒ 4. $dQ = dU + pdV$

Q.90 Piezoelectric load cells work on the same principle of _____ as in strain gauge load cell to measure force.

- Ans**
- ☒ 1. leaching
 - ☒ 2. deformation
 - ☒ 3. electromagnet
 - ☒ 4. titration

Q.91 If n_{12} is the refractive index of medium 1 with respect to medium 2 and n_{31} is the refractive index of medium 3 with respect to medium 1, then n_{32} , the refractive index of medium 3 with respect to medium 2 will hold the relation _____.

- Ans**
- ☒ 1. $n_{32} = n_{31} \times n_{12}$
 - ☒ 2. $n_{31} = n_{32} \times n_{12}$
 - ☒ 3. $n_{32} = n_{31} - n_{12}$
 - ☒ 4. $n_{12} = n_{32} \times n_{31}$

Q.92 Which of the following is NOT a product of petroleum refining?

- Ans**
- ☐ 1. Asphalt
 - ☐ 2. Kerosene
 - ☒ 3. Natural gas
 - ☐ 4. Lubricating oil

Q.93 What will be the correct answer of the infix expression $20 - 5 * 2$?

- Ans**
- ☒ 1. 10
 - ☐ 2. 0
 - ☐ 3. 30
 - ☐ 4. 20

Q.94 Which of the following is a characteristic of metallurgical coke?

- Ans**
- ☐ 1. Contains volatile matter
 - ☐ 2. Very fragile
 - ☒ 3. Strong and porous
 - ☐ 4. Highly dense

Q.95 What is the value of critical angle for the diamond-air interface (refractive index of diamond is 2.42)?

- Ans**
- ☐ 1. 47°
 - ☐ 2. 25.6°
 - ☒ 3. 24.4°
 - ☐ 4. 90°

Q.96 Which process is used to break down heavy hydrocarbons into lighter ones?

- Ans**
- ☐ 1. Alkylation
 - ☐ 2. Reforming
 - ☐ 3. Distillation
 - ☒ 4. Cracking

Q.97 Which of the following is a close packed plane for the HCP crystal?

- Ans**
- ☐ 1. $(\bar{1}0\bar{1}1)$
 - ☐ 2. $(\bar{1}010)$
 - ☐ 3. $(\bar{1}101)$
 - ☒ 4. (0001)

Q.98 High silicon steel is commonly used in:

- Ans**
- ☐ 1. aircraft frames
 - ☐ 2. automobile engines
 - ☐ 3. cooking utensils
 - ☒ 4. electrical transformers

Q.99 Which of the following is NOT a stage of the Addition Polymerisation process?

- Ans**
- ☐ 1. Propagation
 - ☐ 2. Termination
 - ☒ 3. Crystallisation
 - ☐ 4. Initiation

Q.100 What is a 'carbon sink'?

- Ans
- ☐ 1. A type of fossil fuel
 - ☒ 2. A place where carbon is stored away from the atmosphere
 - ☐ 3. A process that rapidly cycles carbon
 - ☐ 4. A place where carbon is released into the atmosphere

