

FINAL ANSWER KEY

Question 135/2024/OL

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Category 648/2023

Code:

Exam: Junior Instructor in Laboratory Assistant (Chemical Plant)

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Question1:-An element Hydrogen combines with oxygen to form water as a product, the same element hydrogen combines with oxygen to form hydrogen peroxide as another product. Which law of chemical combination is illustrated in this example.

A:-Law of Definite Proportion

B:-Law of conservation of mass

C:-Law of Multiple proportion

D:-Avogadros Law

Correct Answer:- Option-C

Question2:-Calculate the Molarity of a solution prepared by dissolving 20 g of NaOH in 500 ml of water

A:-1M

B:-0.5M

C:-2M

D:-1.5M

Correct Answer:- Option-A

Question3:-Equilibrium constant for the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$ is 7. What is the equilibrium constant for the reaction $4NH_3 \rightarrow 2N_2 + 6H_2$

A:-7

B:- $\frac{1}{7}$

C:-49

D:- $\frac{1}{49}$

Correct Answer:- Option-D

Question4:-How many electrons are present in the 4s atomic orbital of ${}_{24}Cr$ atom ?

A:-2

B:-3

C:-1

D:-5

Correct Answer:- Option-C

Question5:-What is the IUPAC name of the element with atomic number 110 ?

A:-Unniltrium

B:-Unununnium

C:-Ununquadium

D:-Ununnilium

Correct Answer:- Option-D

Question6:-Group 16 elements form Hydrides having the general formula H_2M (M=O, S, Se, Te). Which among these is the strongest reducing agent ?

A:- H_2O

B:- H_2S

C:- H_2Se

D:- H_2Te

Correct Answer:- Option-D

Question7:-A balloon is filled with oxygen at 300K. It will burst if pressure exceeds 0.3 atm. If at 1 atm pressure the gas occupies 2.27 litre volume, upto what volume the balloon can be expanded without changing the temperature.

A:-5.34 L

B:-6.88 L

C:-7.56 L

D:-8.82 L

Correct Answer:- Option-C

Question8:-A container is filled with 16 g Oxygen, 42 g Nitrogen and 8 g Helium. If the total pressure of the container is 12 atm, what is the partial pressure of Nitrogen in the container

A:-3.5 atm

B:-4.5 atm

C:-2.5 atm

D:-5.5 atm

Correct Answer:- Option-B

Question9:-According to WHO standards, what is the standard limit of Ammonia in mg/L in drinking water

A:-1.5

B:-2.5

C:-3.5

D:-4.5

Correct Answer:- Option-A

Question10:-What is the amount of CO in g/km in vehicular exhaust of passenger cars according to Bharath Stage 4 Norms ?

A:-1.8

B:-1.0

C:-3.2

D:-4.9

Correct Answer:- Option-B

Question11:-How many joules of heat is absorbed when 72 g of water is vaporised at its boiling point. Latent heat of vaporisation of water is 2260 kJ/kg ?

A:-100 kJ

B:-213 kJ

C:-113 kJ

D:-200 kJ

Correct Answer:- Option-C

Question12:-4 kg of ice at -10°C is mixed with 10 kg of water at 10°C in an insulating vessel having negligible heat capacity. Calculate the final mass of water remaining in the container. Specific heat of water and ice are respectively $4.184 \text{ kJ K}^{-1} \text{ Kg}^{-1}$ and $2.092 \text{ kJ K}^{-1} \text{ Kg}^{-1}$. Molar enthalpy of fusion of ice is 334.7 kJ Kg^{-1}

A:-11 kg

B:-13 kg

C:-30 kg

D:-25 kg

Correct Answer:- Option-A

Question13:-What is the percentage of carbon in pig iron ?

A:-5

B:-3

C:-4

D:-6

Correct Answer:- Option-C

Question14:-In the extraction of Aluminium, purified alumina is mixed with Na_3AlF_6 or CaF_2 . this is to

A:-Increase the conductivity

B:-Decrease the melting point

C:-Only A

D:-Both A and B

Correct Answer:- Option-D

Question15:-Among the hydrides of group 15 elements (nitrogen family) which is having the lowest Boiling point

A:- NH_3

B:- PH_3

C:- AsH_3

D:- SbH_3

Correct Answer:- Option-B

Question16:- PCl_5 contains two types of P-Cl bond called axial and equatorial bond. The bond length of P-Cl equatorial bond is 202 pm. What is the bond length of P-Cl axial bond ?

A:-202 pm

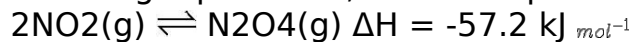
B:-200 pm

C:-240 pm

D:-198 pm

Correct Answer:- Option-C

Question17:-Equilibrium is affected by change in temperature. What happens to the following equilibrium, when temperature is increased



A:-Rate of forward reaction increases

B:-Rate of backward reaction increases

C:-No change in the rate of reaction

D:-None of the above

Correct Answer:- Option-B

Question18:-A compound contains the elements Carbon, hydrogen and Oxygen with percentage mass 26.08, 4.34 and 69.5 respectively. What is the Empirical Formula of the compound ?

A:- CH_2O_2

B:- CH_3O_2

C:- CH_2O_3

D:- CH_2O

Correct Answer:- Option-A

Question19:- $^{60}Co_{27}$ decays with a half life of 69.3 years to produce $^{60}Ni_{28}$. What is the decay constant of the radioactive disintegration of $^{60}Co_{27}$

A:-100 years

B:-10 years

C:-0.1 year

D:-0.01 year

Correct Answer:- Option-D

Question20:-When a positron is emitted from an atom, the mass number and atomic number of the daughter nucleus ?

A:-Mass number increases, atomic number remains the same

B:-Mass number does not change, atomic number decreases

C:-Mass number does decreases, atomic number does not changes

D:-Mass number does decreases, atomic number decreases

Correct Answer:- Option-B

Question21:-The motion of a couple is

A:-Combined translatory and rotational

B:-Rotational

C:-Translatory

D:-Oscillatory

Correct Answer:- Option-B

Question22:-The ratio of the distance moved by the effort to the distance moved by the load is called

A:-Efficiency

B:-Acceleration

C:-Mechanical advantage

D:-Velocity Ratio

Correct Answer:- Option-D

Question23:-The ratio of linear stress to the linear strain is called

A:-Modulus of Rigidity

B:-Bulk Modulus

C:-Modulus of Elasticity

D:-Factor of Safety

Correct Answer:- Option-C

Question24:-According to _____, when a material is loaded within elastic limit, the stress is directly proportional to strain

A:-Hooke's Law

B:-Mohr's Law

C:-Lami's Theorem

D:-Varingon's Theorem

Correct Answer:- Option-A

Question25:-The heat energy stored in the gas and used for increasing its temperature is known as

A:-Molecular Energy

B:-Kinetic Energy

C:-Internal Energy

D:-External Energy

Correct Answer:- Option-C

Question26:-Heat transfer is possible from one body to another by

A:-Conduction

B:-Convection

C:-Radiation

D:-All of the above

Correct Answer:- Option-D

Question27:-The actual power delivered by the engine is known as

A:-Brake Power

B:-Indicated Power

C:-Frictional Power

D:-None of the above

Correct Answer:- Option-A

Question28:-The specific heat of air at constant pressure is _____ KJ/Kg°K

A:-0.718

B:-1.005

C:-1.415

D:-0.525

Correct Answer:- Option-B

Question29:-The change in internal energy of a perfect gas is directly proportional to the change in temperature. This statement is called

A:-Joule's Law

B:-Avogadro's Law

C:-Charle's Law

D:-Boyle's Law

Correct Answer:- Option-A

Question30:-If a system will be in a state of thermodynamic equilibrium, which of the following equilibrium are satisfied

A:-Mechanical

B:-Thermal

C:-Chemical

D:-All of the above

Correct Answer:- Option-D

Question31:-In shunt type ohm meter zero marked at

A:-Left side of the scale

B:-Right side of the scale

C:-Central of the scale

D:-Either left or right side of the scale

Correct Answer:- Option-A

Question32:-What material is used for cover submarine cable ?

A:-Paper and Paraffin Wax

B:-Gutta percha

C:-Bitumen Gutta percha

D:-Porcelain

Correct Answer:- Option-B

Question33:-What is the coefficient of linear expansion of COPPER at 20°C ?

A:- 1.7×10^{-6} per °C

B:- 0.17×10^{-6} per °C

C:- 17×10^{-6} per °C

D:- 0.017×10^{-6} per °C

Correct Answer:- Option-C

Question34:-One Calorie equal to

A:- 0.4184×10^7 ergs

B:- 418.4×10^7 ergs

C:- 41.84×10^7 ergs

D:- 4.184×10^7 ergs

Correct Answer:- Option-D

Question35:-Which fuse element used in GEC HRC cartridge fuse ?

A:-Silver

B:-Copper

C:-Aluminum

D:-Lead-tin alloy

Correct Answer:- Option-A

Question36:-What is the dielectric constant of pure water ?

A:-80

B:-155

C:-50

D:-1

Correct Answer:- Option-A

Question37:-What is the electrochemical equivalent of mercury ?

A:-2.0791 milli-gram/coulomb

B:-0.304 milli-gram/coulomb

C:-1.0738 milli-gram/coulomb

D:-1.118 milli-gram/coulomb

Correct Answer:- Option-A

Question38:-What is the minimum resistance can obtain by combining of three resistance each of value $1/3$ ohm them ?

A:- $1/6$ Ohm

B:-3 Ohm

C:-1 Ohm

D:- $1/9$ Ohm

Correct Answer:- Option-D

Question39:-What is the colour of pure Zinc

A:-Bluish White

B:-Bluish Gray

C:-Bluish Red

D:-Bluish Yellow

Correct Answer:- Option-A

Question40:-Which rule makes a connection to the switch as live controller ?

A:-Rule 50

B:-Rule 66

C:-Rule 32

D:-Rule 63

Correct Answer:- Option-C

Question41:-1 Torr =

A:- 19.34×10^{-3} PSI

B:- 19.34×10^{-6} PSI

C:- 19.34×10^{-4} PSI

D:- 19.34×10^{-5} PSI

Correct Answer:- Option-A

Question42:-Among the following statement which is/are correct about the thermal conductivity gauge

i) it is used for the measurement of vacuum

ii) Pirani gauge is an example for thermal conductivity gauge

iii) Ionization gauge is an example for thermal conductivity gauge

A:-Only (ii and iii)

B:-Only (i and iii)

C:-All of the above (i, ii and iii)

D:-Only (i and ii)

Correct Answer:- Option-D

Question43:-Which of the following statement is/are wrong in the case of filled system thermometer ?

- i) The bourdon tube coils tight as pressure increases and uncoils as pressure decreases.
- ii) Due to immersion error a lower temperature is indicated by the thermometer
- iii) Accuracy and temperature span is much higher compared to electrical type instruments

A:-Only (i and ii)

B:-All of the above (i, ii and iii)

C:-Only (i and iii)

D:-Only (ii and iii)

Correct Answer:- Option-C

Question44:-Which thermocouple has the most linear characteristics

A:-Type J

B:-Type K

C:-Type R

D:-Type S

Correct Answer:- Option-B

Question45:-Which of the following statement is/are true in the case of two position controller

- i) process disturbances and interferences causes the output to cycle rapidly.
- ii) a differential gap is added to prevent cycling.
- iii) two position controllers are generally hydraulic devices.

A:-Only (i and iii)

B:-Only (ii and iii)

C:-Only (i and ii)

D:-All of the above (i, ii and iii)

Correct Answer:- Option-C

Question46:-Hydraulic controllers are used where

A:-Both high power and slow speed of response are required

B:-Both high power and fast speed of response are required

C:-Both low power and fast speed of response are required

D:-Both low power and slow speed of response are required

Correct Answer:- Option-B

Question47:-To avoid loading effects, a transducer should have

A:-High input impedance and High output impedance

B:-Low input impedance and High output impedance

C:-Low input impedance and Low output impedance

D:-High input impedance and Low output impedance

Correct Answer:- Option-D

Question48:-Which of the following statement is wrong regarding SMART transmitter

- i) calibrate the unit over much wider range
- ii) smart transmitters have lower error and lower rangeability
- iii) smart transmitters allow only one way communication

A:-Only (ii and iii)

B:-Only (i and iii)

C:-All of the above (i, ii and iii)

D:-Only (i and ii)

Correct Answer:- Option-A

Question49:-Which of the following statements are wrong regarding circular chart recorder ?

- i) Time lines are straight lines
- ii) Chart based on polar coordinates
- iii) readability is the same for all values of scale

A:-Only (ii and iii)

B:-Only (i and iii)

C:-All of the above (i, ii and iii)

D:-Only (i and ii)

Correct Answer:- Option-B

Question50:-Which of the following statements are true regarding strip chart recorder ?

- i) A graphic recorder
- ii) Self balancing type recorder
- iii) They are generally used on the potentiometric type instrument

A:-Only (ii and iii)

B:-Only (i and iii)

C:-All of the above (i, ii and iii)

D:-Only (i and ii)

Correct Answer:- Option-C

Question51:-The halogens present in an organic compound is determined by

A:-Kjeldahl's method

B:-Duma's method

C:-Carius method

D:-Fusion method

Correct Answer:- Option-C

Question52:-The product formed by the hydroboration oxidation of but-1-ene is

A:-Butanal

B:-Butanone

C:-Butan-2-ol

D:-Butan-1-ol

Correct Answer:- Option-D

Question53:-(+)-Sucrose is known as table sugar. Select the incorrect statement about sucrose from the following

A:-It is a non reducing sugar

B:-It reduces Tollen's reagent

C:-It doesnot form osazone

D:-It undergoes hydrolysis

Correct Answer:- Option-B

Question54:-At the isoelectric point, amino acids exist as

A:-Dipolar ion with a zero net charge

B:-Dipolar ion with a positive net charge

C:-Dipolar ion with a negative net charge

D:-Non polar form

Correct Answer:- Option-A

Question55:-The correct statement about the heterocyclic compound Pyridine is

A:-It undergoes electrophilic, substitution reaction under vigorous condition and the substitution occurs mainly at the 3-position

B:-It undergoes electrophilic, substitution reaction easily at the 3-position

C:-It undergoes electrophilic, substitution easily at the 2-position

D:-It undergoes Friedel-Crafts reaction easily

Correct Answer:- Option-A

Question56:-Condensation of two molecules of dimethyl aniline with one molecule of benzaldehyde produce the dye

A:-Fluorescein

B:-Crystal violet

C:-Malachite green

D:-Congo red

Correct Answer:- Option-C

Question57:-The strengths of Acetic acid (I), chloroacetic acid (II), dichloroacetic acid (III) and trichloroacetic acid (IV) follow the order

A:-I > II > III > IV

B:-II > I > III > IV

C:-I > IV > III > II

D:-IV > III > II > I

Correct Answer:- Option-D

Question58:-The product formed when phenyl magnesium bromide reacts with

acetaldehyde followed by hydrolysis is

A:-Phenol

B:-1-phenyl ethanol

C:-Ethyl bromide

D:-Bromobenzene

Correct Answer:- Option-B

Question59:-Read the following statements about soap and select the options in which all the answers are correct

I) Soap is formed by saponification

II) Saturated fats give soft soaps

III) Unsaturated fats give soft soaps

IV) Soft soaps are usually the potassium salts

A:-I, II, III,

B:-I, II, IV

C:-I, III, IV

D:-I, II, III, IV

Correct Answer:- Option-C

Question60:-The pleasant smell of fruits is due to the presence of

A:-Carbohydrates

B:-Acetylene

C:-Amines

D:-Esters

Correct Answer:- Option-D

Question61:-1 ppm =

A:-10 Watts/m²K

B:-1 mg/l

C:-1 N/m²

D:-10 LPM

Correct Answer:- Option-B

Question62:-A stronger oxidant commonly used for COD test is

A:- Cr_2O_7

B:- H_2O_2

C:- KNO_3

D:- N_2O

Correct Answer:- Option-A

Question63:-Which law states that the relative lowering of vapour pressure of solution is equal to the mole fraction of the solute ?

A:-Boyl's law

B:-Dalton's law

C:-Rault's law

D:-Henry's law

Correct Answer:- Option-C

Question64:-The indicator used to determine hardness of water by EDTA method

A:-Phenolphthalein

B:-Methyl orange

C:-Potassium permanganate

D:-Eriochrome black-T

Correct Answer:- Option-D

Question65:-The another name of carbamide

A:-Carbon tetrachloride

B:-Urea

C:-Ammonia

D:-Carbon dioxide

Correct Answer:- Option-B

Question66:-Temporary hardness of water can be removed by

A:-Filtration

B:-de-mineralisation

C:-Boiling

D:-Freezing

Correct Answer:- Option-C

Question67:-Hydrated sodium alumino silicate is known as

A:-Zeolite

B:-Soda ash

C:-Brine

D:-Hypochlorous acid

Correct Answer:- Option-A

Question68:-Negative logarithm of hydrogen ion concentration is called

A:-Acidity

B:-Alkalinity

C:-pH

D:-Turbidity

Correct Answer:- Option-C

Question69:-The major raw material for the manufacture of phosphorous fertilizer is

A:-Phosphate rock

B:-Phosphoric acid

C:-Hydrogen phosphate

D:-Phosphorous pentoxide

Correct Answer:- Option-A

Question70:-Hardness can be expressed in terms of equivalents of

A:-Calcium sulphate

B:-Calcium carbonate

C:-Calcium phosphate

D:-Calcium chloride

Correct Answer:- Option-B

Question71:-In Orsat's apparatus KOH is used to absorb

A:-Oxygen

B:-Carbon dioxide

C:-Carbon monoxide

D:-Nitrous oxide

Correct Answer:- Option-B

Question72:-Bomb Calorimeter is used for determining the calorific value of

A:-Solid fuel

B:-Liquid fuel

C:-Gaseous fuel

D:-Both (A) and (B)

Correct Answer:- Option-D

Question73:-Coal having maximum carbon content and maximum calorific value is

A:-Peat

B:-Bituminous

C:-Anthracite

D:-Lignite

Correct Answer:- Option-C

Question74:-The amount of Nitrogen in coal is determined by

A:-Proximate analysis

B:-Burning it completely in air

C:-Burning it in absence of air

D:-Ultimate analysis

Correct Answer:- Option-D

Question75:-If flue gas contain Carbon monoxide it indicates

i) Complete combustion

- ii) Incomplete combustion
- iii) Short supply of oxygen
- iv) Oxygen is excess

A:-Only (i)

B:-Only (ii and iv)

C:-Only (i and iv)

D:-Only (ii and iii)

Correct Answer:- Option-D

Question76:-Which of the following contain highest percentage of volatile matter ?

A:-Peat

B:-Bituminous

C:-Anthracite

D:-Lignite

Correct Answer:- Option-A

Question77:-Presence of functional groups in an organic compound can be determined by

A:-IR spectroscopy

B:-Microwave spectroscopy

C:-UV spectroscopy

D:-Any of the above

Correct Answer:- Option-A

Question78:-If the molar concentration of the sample is tripled and length of the path of the beam through the sample is doubled, then absorbance at a particular wavelength will be

A:-3 times

B:-2/3 times

C:-3/2 times

D:-6 times

Correct Answer:- Option-D

Question79:-Particle size analysis can be done using sieve analysis for the particle diameter

A:-Less than 0.075 mm

B:-Less than 0.075 microns

C:-Less than 75 microns

D:-Greater than 0.075 mm

Correct Answer:- Option-D

Question80:-In Tyler standard screens the 200 mesh screen have an opening of 0.0029 inch. 150 mesh screen, a coarser screen placed just above the 200 mesh screen will have an opening of size

A:-0.0058 inch

B:-0.0041 inch

C:-0.0036 inch

D:-0.0015 inch

Correct Answer:- Option-B

Question81:-Alkaloid present in black pepper is

A:-Caryophyllene

B:-Piperine

C:-Cinnamaldehyde

D:-1-phellandrene

Correct Answer:- Option-B

Question82:-If carbon content of steel is increased, which of the following parameter of steel will be reduced ?

A:-Brittleness

B:-Hardness

C:-Ductility

D:-None of the above

Correct Answer:- Option-C

Question83:-Effect of vanadium on properties of alloy steel is

A:-To lower melting point

B:-To modify colour

C:-To provide better castability

D:-To enhance Tensile strength

Correct Answer:- Option-D

Question84:-Rancidity of lipids or fat rich food is due to

A:-Oxidation of fatty acids

B:-Hydrogenation of unsaturated fatty acids

C:-Reduction of fatty acids

D:-Dehydrogenation of saturated fatty acids

Correct Answer:- Option-A

Question85:-Partial hydrogenation of vegetable oils in presence of Ni catalyst at 200°C gives

A:-Vanaspati ghee

B:-Margarine

C:-Both (A) and (B)

D:-None of these

Correct Answer:- Option-A

Question86:-The salt used in fruit processing operations below 0.1% is

A:-Calcium

B:-Magnesium

C:-Sodium

D:-None of these

Correct Answer:- Option-A

Question87:-The test used to evaluate the efficacy of preservatives is

A:-Preservative characteristic test

B:-Preservative challenge test

C:-Preservative activity test

D:-LAL test

Correct Answer:- Option-B

Question88:-Identify the compound that does not act as a target for drug action in the human body

A:-RNA

B:-DNA

C:-Vitamin C

D:-Protein

Correct Answer:- Option-C

Question89:-Animal fats having a greater proportion of saturated acid residues have

A:-Low iodine value

B:-Low saponification value

C:-High iodine value

D:-None of these

Correct Answer:- Option-A

Question90:-The indicator for adulteration of ghee is

A:-Acid value

B:-Iodine value

C:-Saponification value

D:-Reichert Meissl value

Correct Answer:- Option-D

Question91:-Which of the following is a major use of phase-contrast microscopy

A:-Observing the chemical composition of microbial cells

B:-Analyzing fluorescence-labeled cellular structures

C:-Examining microbial motility and live cell morphology

D:-Identifying genetic material within eukaryotic cells

Correct Answer:- Option-C

Question92:-In the context of membrane filters used for liquid sterilisation, what does 'pore size' refer to and why is it important ?

A:-The thickness of the filter, which determines the filter's ability to withstand high pressure

B:-The diameter of the tiny holes in the filter, which controls the size of microorganisms that can pass through

C:-The uniformity of the filter material's density, which affects its filtration efficiency

D:-The surface area of the filter, which directly determines the filtration speed

Correct Answer:- Option-B

Question93:-Which among the following statements regarding capsules and slime layers is correct ?

A:-A capsule is tightly attached and excludes small particles, while a slime layer is loosely attached and more easily deformed

B:-A capsule is less involved in biofilm formation compared to a slime layer

C:-A capsule is always visible under a microscope, whereas a slime layer cannot be seen

D:-A capsule is typically found in Gram-negative bacteria, while a slime layer is found in Gram-positive bacteria

Correct Answer:- Option-A

Question94:-Which of the following is an example of a Gram-positive microbe ?

A:-Escherichia coli

B:-Pseudomonas aeruginosa

C:-Staphylococcus aureus

D:-Salmonella typhi

Correct Answer:- Option-C

Question95:-Which of the following is an example of an enrichment medium used to enhance the growth of specific microbes ?

A:-Nutrient Agar

B:-MacConkey Agar

C:-Selenite F Broth

D:-Eosin Methylene Blue (EMB) Agar

Correct Answer:- Option-C

Question96:-Which of the following is a primary factor that differentiates lager beer

fermentation from ale beer fermentation ?

A:-The type of yeast used and fermentation temperature

B:-The sugar content of the malt used

C:-The pH of the fermentation medium

D:-The amount of hops used in the fermentation process

Correct Answer:- Option-A

Question97:-What is the primary function of hops in beer production ?

A:-To ferment malt sugars into ethanol

B:-To enhance the aroma and add bitterness, balancing the sweetness of the malt

C:-To prevent the growth of *Saccharomyces cerevisiae*

D:-To increase the yeast's ethanol tolerance

Correct Answer:- Option-B

Question98:-Which among the following statements about SEM (Scanning electron microscope) is correct ?

A:-SEM provides a three-dimensional view of the surface structures of microorganisms

B:-SEM directly observes the internal structures of microorganisms without preparation

C:-SEM uses visible light to achieve high-resolution imaging

D:-SEM requires no fixation or dehydration of samples before imaging

Correct Answer:- Option-A

Question99:-Which of the following bacteria uses light energy and organic compounds as a carbon source ?

A:-Chemoheterotrophs

B:-Chemoautotrophs

C:-Photoheterotrophs

D:-Photoautotrophs

Correct Answer:- Option-C

Question100:-Which of the following is a primary component of endotoxins found in the outer membrane of Gram-negative bacteria ?

A:-Lipid A

B:-Peptidoglycan

C:-Lipoteichoic acid

D:-Protein A

Correct Answer:- Option-A