Sample practice questions for Computer Based Test Fixed Term Research Associates/ Project Associates

Fixed Term Project Assistants

1. BSC/MSC- Chemistry Sample Questions

Q. Bond order of which among the following molecules is zero?

a) A. F2
b) B. O2
c) C. Be2
d) D. Li2

Q. The mass of one Avogadro number of helium atom is

a) 1.00 gram
b) 4.00 gram
c) 8.00 gram
d) 4 x 6.02 x 1023 gram

Q. If 1.45 J of heat are added to a 2.00 g sample of aluminum metal and the temperature of the metal increases by 0.798 oC, what is the specific heat of aluminum?
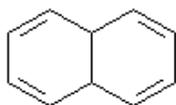
a) 0.579 J/g deg
b) 0.909 J/g deg
c) 1.68 J/g deg
d) 3.63 J/g deg

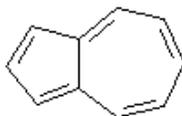Q. Which of the following molecules does not have a net dipole moment?

a) H2O
b) NH3
c) BF3
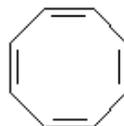d) BrF5
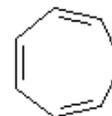
Q. Which of the following compounds is aromatic?

(a)   (b)   (c)   (d)

Q. What is the major product of the following reaction?
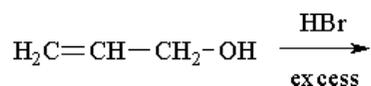
$$H_2C=CH-CH_2-OH \xrightarrow[\text{excess}]{\text{HBr}}$$

(a)
$$CH_3-\underset{\underset{Br}{|}}{CH}-CH_2-Br$$

(b)
$$H_2C=CH-CH_2-Br$$

(c)
$$CH_3-\underset{\underset{Br}{|}}{CH}-CH_2-OH$$

(d)
$$CH_3-\underset{\underset{OH}{|}}{CH}-CH_2-OH$$

Q. The half-life of francium-212 is 19 minutes. How many minutes will it take for 1 gram of this isotope to decay to 0.125 grams?

    a. 4.75 minutes
    b. 9.5 minutes
    c. 38 minutes
    d. 57 minutes

Q. The molecule N2 is isoelectronic with...

    a. O2
    b. F2
    c. NO
    d. CN-

2. BSC/MSC- Microbiology/Biotechnology Sample Questions

Q.A molecular technique in which DNA sequences between two oligonucleotide primers can be amplified is known as

a) southern blotting

b) northern blotting

c) polymerase chain reaction

d) DNA replication

Q. In genetic engineering, a chimera is

    a) an enzyme that links DNA molecules

    b) a plasmid that contains foreign DNA

    c) a virus that infects bacteria

    d) a fungi

Q. Which of the following microorganism is used for the production of citric acid?

    a) *Lactobacillus bulgaricus*

    b) *Saccharomyces cerevisiae*

    c) *Aspergillus niger*

    d) *Streptococcus lactis*

Q. What are different substrates used for ethanol production?

    a) Starch containing substrate

    b) Juices from sugarcane or molasses or sugar beet

    c) Waste product from wood or processed wood

    d) All of the above

Q. After the fermentation is over, ethanol is recovered by

    a) centrifugation

    b) distillation

    c) filtration

    d) cell disintegration

Q. _____is a gram-negative organism

    a) Actinomyces

    b) Bacillus

    c) Clostridium

    d) None of these

Q. What is the colour of gram -positive bacteria on a gram staining?

a) Purple

b) Pink

c) Colourless

d) Green

Q. Which of the following(s) is/are the products of the light reactions of photosynthesis?

a) ATP only

b) NADPH only

c) ATP and O_2 only

d) ATP, NADPH, and O_2

Q. Nitrogen fixation is a process that requires

a) energy

b) an anaerobic environment

c) both (a) and (b)

d) an aerobic environment

Q. To which of the following adenine always binds?

a) Guanine

b) Cytosine

c) Thymine

d) None of these

3. Diploma Chemical Engineering/Chemical Technology and Petroleum Refining Sample Questions

Q. Space velocity is the proper performance measure of flow reactors. The space velocity has the units of

a) Time
b) (time)-1
c) Velocity
d) (velocity)-1

Q. In petroleum refining Operations, the process used to convert paraffins and naphthenes to aromatics is

a) Hydrotreating
b) Hydrocracking
c) Catalytic reforming
d) (D)Isomerization

Q. For obtaining a given separation in distillation column the minimum number of theoretical stages is obtained with

a) minimum reflux ratio
b) optimum reflux ratio
c) Total reflux
d) Zero reflux ratio

Q. The total number of molecule in 8.5 gm of an ideal NH3 gas is................1023

a) 6.023
b) 3.0115
c) 12.046
d) 9.0345

Q. When the temperature of an ideal gas is increased from 27oC to 927oC, the kinetic energy will be

a) same
b) twice
c) eight times
d) four times

Q. Reynolds number for flow of water at room temperature through 2 cm dia pipe at average velocity of 5 cm/sec is around

a) 10000
b) 100
c) 10
d) 1000

Q. A gaseous mixture contains methane and inert gas. 20 ml of this mixture requires 16 ml of O2 for complete combustion. What is the percentage of methane in the mixture?

a) 20
b) 40
c) 60
d) 80

Q. In liquid liquid extraction the solvent B is used to separate solute C from a given solution of A and C. If A and B are completely insoluble in one another, the selectivity of B will be

a) 0
b) 1
c) ∞
d) 1

Q. Laminar flow of a Newtonion fluid ceases to exist, when the Reynolds number exceeds

a) 4000
b) 2100
c) 1500
d) 3000

Q. A floating body displaces a volume of liquid equal to

a) its own weight
b) its submerged weight
c) its own volume
d) its submerged volume

Fixed Term Research Associates

1. M.Tech -Chemical Engineering Sample Questions

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c) Velocity
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b) 1

c) ∞

d) 1

Q. Methane is being cracked on a catalyst $CH_4 \rightarrow C + 2H_2$ Under circumstances such that CH4 (A) diffuses to the cracking surface and H2 (B)   diffuses back. At steady state the ratio NA/(NA+NB) is

a) 1/3

b) -1

c) 2/3

d) -2

Q. Gases A and B are fed continuously to a tank with a volume of 30 ft3. The normal tank conditions are 40 psia and 80oF and the normal flow rates of A and B are 40 and 10 cfm, respectively, measured at tank conditions. What is the time-constant of the system?

a) 0.75 min

b) 3 min

c) 0.60 min

d) 1.67 min

2. M.Tech - Mechanical Engineering Sample Questions

Q. Wear and tear of engine is caused due to

    a) Gravity of moving parts

    b) Density of the moving parts

    c) Friction between moving parts

    d) Magnetic force

Answer: c

Q. Select the incorrect statement from the following options

    a) Lubricant keep out dirt

    b) Lubricant act as a seal

    c) Lubricant transmit fluid power

    d) Lubricant enhance corrosion

Answer : d

Q. Supercharging is the process of _____.

    (a) Supplying the intake of an engine with air at a density greater than the density of the surrounding atmosphere

    (b) providing forced cooling air

    (c) injecting excess fuel for raising more load

    (d) supplying compressed air to remove combustion products fully

Answer: a

Q. In isothermal process, the law followed is

    (a) Charle's law

    (b) Boyle's law

    (c) Gay-Lussac law

    (d) Avogadro's law

Answer: b

Q. Heat transfer takes place as per -

    (a) Zeroth law of thermodynamics

    (b) First law of thermodynamic

    (c) Second law of the thermodynamics

    (d) Kirchhoff law

Answer: c

Q. When heat is transferred from one particle of hot body to another by actual motion of the heated articles, it is referred to as heat transfer by

(a) Conduction

(b) Convection

(c) Radiation

(d) Conduction and convection

Answer: b

Q. . Which of the following is an example of top-down approach for the preparation of nanomaterials?

a) Gas phase agglomeration

b) Molecular self-assembly

c) Mechanical ball milling

d) Molecular beam epitaxy

Answer: c

Q. The properties of nano materials like melting point, solubility, color, etc change by varying the -

a) Size

b) Composition

c) Surface properties

d) None of the mentioned

Answer: a

Q. The efficiency of present day's best solar cell is about

a) 10-15%

b) 40%

c) 100%

d) 75%

Answer: b

Q. What is a heliostat

a) it measures solar radiation

b) it measures solar constant

c) it focuses solar radiation at a point

d) it measures latitude of the earth

Answer: c

2. MTECH-Electrical/Electronic Engineering Sample Questions

Q. In the figure given, for the initial capacitor voltage is zero. The switch is closed at $t = 0$. The final steady-state voltage across the capacitor is
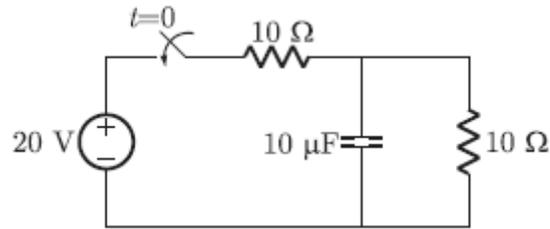
a) 20 V
b) 10 V
c) 5 V
d) 0 V

Q. In the following circuit, the input voltage V in 100 sin^100_t h. For 100_$R\,C$ = 50, the average voltages across R (in volts) under steady-state is nearest to
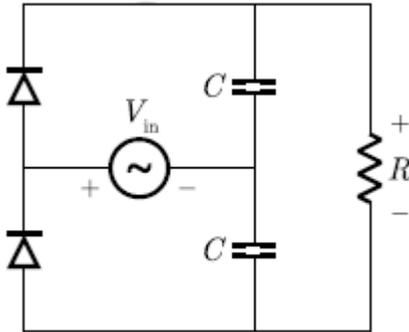
a. 100
b. 31.8
c. 200
d. 63.6

Q. For a tachometer, if $q(t)$ is the rotor displacement in radians, $e(t)$ is the output voltage and K_t is the tachometer constant in V/rad/sec, then the transfer function $\frac{E(s)}{Q(s)}$ will be

e. $K_t S^2$
f. K_t/s
g. $K_t s$
h. K_t

Q. The algebraic equations

$$F(s) = s^5 - 3s^4 + 5s^3 - 7s^2 + 4s + 20$$

Is given. F(s) =0 has
a) a single complex root with the remaining roots being real
b) one positive real root and four complex roots, all with positive real parts
c) one negative real root, two imaginary roots, and two roots with positive real parts
d) one positive real root, two imaginary roots, and two roots with negative real parts

Q. A unity feedback is provided to the above system $G(s)$ to make it a closed loop system as shown in figure.
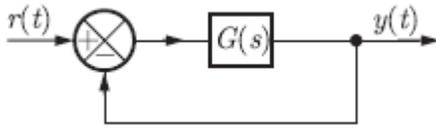
For a unit step input $r(t)$, the steady state error in the input will be
   a) 0
   b) 2
   c) 1
   d) ∞

Q. The induction of a power transmission line increases with
   a) Decrease in the line length
   b) Increase in diameter of conductor
   c) Increase in spacing between the phase conductors
   d) Increase in load current carried by the conductors

Q. The hysteresis loop of magnetic material has an area of 5 cm^2 with the scales given as 1 cm = 2AT and 1 cm =50mwb. At 50 Hz the total hysteresis loss is
   a) 15w
   b) 20w
   c) 25w
   d) 50w

Q. A switched mode power supply operating at 20 KHz to 100 KHz range uses as the main switching element
   a) Thyristor
   b) MOSFET
   c) Triac
   d) UJT

Q. A 4 x 1 MUX is used to implement a 3-input Boolean function as shown in figure. The Boolean function $F(A, B,C)$ implemented is
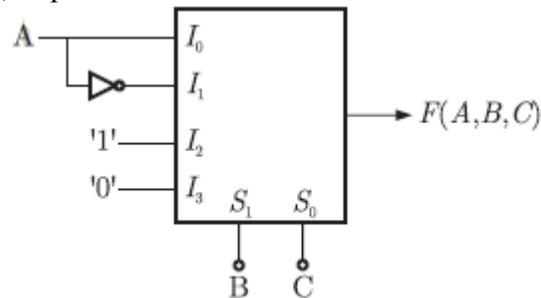
   a) $F(A,B,C) = \Sigma(1,2,4,6)$
   b) $F(A,B,C) = \Sigma(1,2,6)$
   c) $F(A,B,C) = \Sigma(2,4,5,6)$
   d) $F(A,B,C) = \Sigma(1,5,6)$

Q. For a given stepper motor, the following torque has the highest numerical value
   a.   Detent torque
   b.   Pull-in torque
   c.   Pull-out torque
   d.   Holding torque