University of Mumbai
Examination 2020

Program: First Year Engineering
Curriculum Scheme: REV- 2019
Examination: First Year Semester II
Course Code: FEC203 and Course Name: Applied Chemistry-II

Time: 2 hour Max. Marks: 60

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	Which of the following is an example of corrosion?
Option A:	Rusting of iron
Option B:	Tarnishing of silver
Option C:	Liquefaction of ammonia
Option D:	BOTH A and B
Q2.	Find the % atom economy of the reaction: $C_6H_6 + 4.5\ O_2$ ------> $C_4H_2O_3 + 2CO_2 + 2H_2O$
Option A:	44.1
Option B:	98
Option C:	48
Option D:	144
Q3.	Starting material for greener synthesis of adipic acid is :
Option A:	Benzene
Option B:	Glucose
Option C:	Aniline
Option D:	Butane
Q4.	The hydrocarbon having 100 octane number is

Option A:	iso-heptane
Option B:	iso-octane
Option C:	2,3 dimethyl pentane
Option D:	2,2,4-trimethylpentane
Q5.	Proximate analysis of fuel is determination of percentage of :
Option A:	C, H, N, S, H2O
Option B:	C, H2O, ash and volatile matter
Option C:	C only
Option D:	useful heat evolved
Q6.	Which of the following is not a category of catalysis?
Option A:	Homogeneous
Option B:	Heterogeneous
Option C:	Artificial
Option D:	Enzymatic
Q7.	Green chemistry reduces the use of _____
Option A:	Energy
Option B:	Gaseous fuels
Option C:	Solid fuels
Option D:	liquid fuels
Q8.	the property of rust is

Option A:	Non adhesive
Option B:	it is non porous
Option C:	protects iron from corrosion
Option D:	it is porous
Q9.	the reaction at anode surface is
Option A:	neutralisation
Option B:	oxidation
Option C:	reduction
Option D:	No reaction
Q10.	1 gm of sulphur on combustion produce _____calorie of heat .
Option A:	2240
Option B:	8080
Option C:	34500
Option D:	587
Q11.	Gaseous fuels on combustion produce
Option A:	oxygen & nitrogen
Option B:	carbon di oxide and water
Option C:	carbon di oxide and nitrogen
Option D:	Nitrogen and carbondioxide
Q12.	The different types of energies associated with a molecule are _____

Option A:	Electronic energy
Option B:	Vibrational energy
Option C:	Rotational energy
Option D:	All of the mentioned
Q13.	The spectra can be broadly classified into two categories. They are ____
Option A:	Atomic and molecular spectra
Option B:	Atomic and electronic spectra
Option C:	Molecular and electronic spectra
Option D:	None of the mentioned
Q14.	What is the wavelength range for UV spectrum of light?
Option A:	400 nm – 700 nm
Option B:	700 nm to 1 mm
Option C:	0.01 nm to 10 nm
Option D:	10 nm to 400 nm
Q15.	A cell from the following which converts electrical energy into chemical energy
Option A:	Dry cell
Option B:	Electrochemical cell
Option C:	Electrolytic cell
Option D:	None of these

Q2. (15 Marks)	Solve any Three out of Five (5 marks each)
A	What is bio-diesel? Explain method to obtain biodiesel. What are the advantages of biodiesel.
B	Discuss differential aeration corrosion with the help of suitable example.
C	Describe Emission Spectroscopy. Write a note on Electromagnetic Spectrum
D	Find the cell potential of a galvanic cell based on the following reduction half-reactions at 25 °C $Cd^{2+} + 2\ e^- \rightarrow Cd$ $E^0 = -0.403$ V $Pb^{2+} + 2\ e^- \rightarrow Pb$ $E^0 = -0.126$ V where $[Cd^{2+}] = 0.020$ M and $[Pb^{2+}] = 0.200$ M.
E	A coal sample was found to contain the following constituents C=81%, O=7%, H=5%, S=2% ,N=1%, & Ash=4%. Calculate the minimum amount of oxygen & Air required for complete combustion of 5Kg coal.

Q3. (15 Marks)	Solve any Three out of Five (5 marks each)
A	What is electrode potential? Derive the Nernst equation for single electrode potential.
B	Define Fuel. A sample of coal has the following composition by mass. C=70% ,H=10%, O=4%, S=2%, N=2%, and Ash=12% . calculate GCV and NCV by Dulong's formula.
C	How do the following factors affect the rate of corrosion: (i) Passive character of metal (ii) pH of medium (iii) Purity of metal Explain Sacrificial anodic protection method.
D	 1.Calculate Atom Economy 2.Explain conventional and green route of manufacturing Ibuprofen, which principle of green chemistry is shown in this synthesis.
E	What is Green Chemistry .Give its significance Difference between octane number and cetane number.