



ARAB ACADEMY FOR SCIENCE & TECHNOLOGY
COLLEGE OF Engineering & Technology

Lecturer : chemistry Staff.

a

Course : Eng. Chemistry

Course No. : BA118

Date : 2-6-2012

Marks: 40

Time: 09:00 – 11:00 (2 hrs)

Final Examination Paper

SECTION I

{25 marks}

Answer the following questions

1. a- Describe and explain the *mechanism* of Galvanic corrosion: {9M}
b- State and explain the factors affecting of the following:
 - (i) Erosion corrosion
 - (ii) Pitting corrosion.
 - (iii) Galvanic corrosion.c- Write in-details about Inhibitors as protection technique.

2. a- Discuss the effects and important of the following properties of liquid fuel : {8M}
 - (i) Sulphur content.
 - (ii) Viscosity .
 - (iii) Flash point.b- Compare between combustion of Carbon, Hydrogen and sulphur .
c- Deduce the combustion equation of Methane gas (CH_4).

3. a- Compare between Scale and Sludge. {8M}
b- Explain and discuss disadvantages of Scale formation in Boilers.
c- Describe and explain Ion exchange method, with illustrate flow sheet of process.

NB; atomic mass H=1, C=12, O=16, N=14, $CV_C=33.7$ & 10.5 , $CV_H=65.4$, $CV_S=9.1$ MJ. $CV_{methane}=100$ MJ $CV_S=9.1$ MJ

SECTION II

{15 Marks}

Encircle The Best Choice from a,b,c and of The Following

1. Cathodic reaction of Fe-Cu galvanic cell is (in neutral)
 - a- reduction reaction
 - b- $\text{Cu}^{++} + 2\text{e} \rightarrow \text{Cu}$
 - c- $2\text{H}_2\text{O} + \text{O}_2 + 4\text{e} \rightarrow 4\text{OH}^-$
 - d- $\text{Fe} \rightarrow \text{Fe}^{++} + 2\text{e}$
2. The high tendency corrosion of iron is due to
 - a- the activity of iron
 - b- the nature of iron ores
 - c- ability of iron to oxidize
 - d- all of the above.
3. Stainless steel pump for sea water when shutdown tends to
 - a- stress corrosion cracking.
 - b- intergranular corrosion.
 - c- pitting corrosion.
 - d- both a and c.
4. The following forms of corrosion are localized form
 - a- differential aeration corrosion.
 - b- stress cracking and intergranular corrosion.
 - c- intergranular corrosion and pitting corrosion.
 - d- both a and c.
5. Aluminum metal, is passive in atmosphere due to formation
 - a- aluminum oxide layer.
 - b- adhesive , insoluble and non porous layer.
 - c- passive layer.
 - d- all of the above.
6. Coating layer must be
 - a- active or passive with environment.
 - b- inert or non- passive with environment .
 - c- inert or passive with environment .
 - d- both a and b.

7. Increase the velocity of fluid through the pipe lines, tends to
- a- increasing the chemical attack.
 - b- increasing erosion and decreasing chemical attack.
 - c- decreasing pitting corrosion.
 - d- all of the above.
8. Formation of carbon monoxide in fuel combustion is due to
- a- higher viscosity of fuel .
 - b- lower viscosity of fuel.
 - c- less amount of air during combustion process.
 - d- all of the To arrive a good ignition and complete
9. combustion of fuel must be
- a- low specific gravity.
 - b- contains high % of hydrogen.
 - c- enough amount of air supply.
 - d- all of the above.
10. High surface tension of fuel tends to
- a- bad ignition.
 - b- good ignition.
 - c- more cohesive force.
 - d- both b and c.
11. 1 Kg Carbon needs the following amount of air to complete combustion
- a- $\frac{8}{3}$ Kg.
 - b- 52.174 Kg.
 - c- 11.594 Kg.
 - d- 0.613 Kg.
12. 1 Kg fuel composed of 40 % C, 50 % H₂ , 8 % O₂ , 1 % Ash.(10% incomplete combustion). The amount of Energy equals
- a- 46.162 MJ.
 - b- 45.252 MJ.
 - c- 14.982 MJ.
 - d- non of the above.

13. pH of water outside Cation and Anion exchange resins equals
- a- less acidic.
 - b- 7.
 - c- less than 7.
 - d- more than 7.
14. Hardness of water is due to presence of the following salts
- a- calcium and magnesium carbonate.
 - b- calcium and magnesium sulphate.
 - c- calcium and magnesium bicarbonate.
 - d- both b and c.
15. Increasing of scale layer on the inner wall of boiler tubes tends to
- a- increasing the heat transfer and tube efficiency.
 - b- increasing the steam productivity.
 - c- decreasing the heat transfer and tube efficiency.
 - d- non of the above.

Good Luck

Members of Course Examination Committee	Signature	Date
Prof. Mohamed Amer- Dr. Ibrahim Hassan		
Dr. Ibrahim Hassan		
Prof. Alss Abdel Bary		