Write the following information in the first page of Answer Script before starting answer

ODD SEMESTER EXAMINATION: 2020-21

Exam ID Number_____

Course_____ Semester_____

Paper Code_____Paper Title_____

Type of Exam: _____ (Regular/Back/Improvement)

Important Instruction for students:

1. Student should write objective and descriptive answer on plain white paper.
2. Give page number in each page starting from 1st page.
3. After completion of examination, Scan all pages, convert into a single PDF, rename the file with Class Roll No. (2019MBA15) and upload to the Google classroom as attachment.
4. Exam timing from 10am – 1pm (for morning shift).
5. Question Paper will be uploaded before 10 mins from the schedule time.
6. Additional 20 mins time will be given for scanning and uploading the single PDF file.
7. Student will be marked as ABSENT if failed to upload the PDF answer script due to any reason.

B.Sc. FOOD SCIENCE & TECHNOLOGY
THIRD SEMMESTER
INSTRUMENTATION TECHNIQUES IN FOOD ANALYSIS
BFST – 301

Duration : 3 hrs. **Full Marks : 70**

〔 PART-A: Objective 〕

Time : 20 min. **Marks : 20**

Choose the correct answer from the following: ***1×20=20***

1. Hydrogen and oxygen combine to form H2O2 and H2O containing 5.93% and 11.2 % hydrogen respectively. The data illustrates :
a. Law of conservation of mass
b. Law of constant proportion
c. Law of reciprocal proportion
d. Law of multiple proportion

2. Which of the following statement is false about double beam absorption instruments?
a. It is similar to single beam instruments except two beams are present
b. Tungsten bulb is used as a source
c. Reference beam must have a higher intensity than sample beam
d. Both the beams after they pass through respective samples are compared

3. One atoms of an element x weigh 6.64310-23 g. Number of moles in 20 kg is :
a. 4
b. 40
c. 100
d. 500

4. Which of the following statements is not true about mass spectrometry?
a. Impurities of masses different from the one being analyzed interferes with the result
b. It has great sensitivity
c. It is suitable for data storage
d. It is suitable for library retrieval

5. Non Hazardous substitution for RIA is
a. Uv
b. HPLC
c. NMR
d. None of the above

6. The hydrated salt Na2CO3 ***x*** H2O undergoes 63 % loss in mass on heating and become anhydrous. The value of ***x*** is:
a. 10
b. 12
c. 8
d. 18

7. An isocratic elution in HPLC is one in which the composition of the solvent
a. Remains constant
b. Changes continuously
c. Changes in a series of steps
d. None of these

8. Degassing of the mobile phase can be done by all of the following except
a. Distillation
b. Sparging
c. Reverse Osmosis
d. Vacuum Pumping

9. Which of the following statements is true for a refractive index detector in HPLC?

a. It is more sensitive than a UV detector
b. It can only be used for isocratic elutions
c. It does not respond to many solutes
d. none of above

10. Which of the following will improve the efficiency of the separation process in liquid chromatography?

a. Increase in sample size, increase in column diameter
b. Reduction in sample size, increase in column diameter
c. Increase in sample size, reduction in column diameter
d. Reduction in sample size, reduction in column diameter

11. Why is it generally preferable to use absorbance as a measure of absorption rather than % transmittance?

a. Because %T cannot be measured as accurately as absorbance
b. Because %T is dependent on the power of the incident radiation
c. Because absorbance is proportional to the concentration of the analyte, whereas %T is not
d. none of the above

12. Which of the following types of liquid chromatography uses immobilized biochemical as a stationary phase?

a. Ion exchange chromatography
b. Exclusion chromatography
c. Affinity chromatography
d. Gel permeation chromatography

13. In fluorescence microscopy, which of the following performs the function of removing all light except the blue light?

a. Exciter filter
b. Barrier filter
c. Dichroic mirror
d. Mercury arc lamp

14. Which of the following is not an IR vibrational mode?

a. Scissoring
b. Stretching
c. Rocking
d. Rolling

15. Which of the following is not application of HPLC?

a. Pre-concentration of trace components
b. Ligand-exchange chromatography
c. Ion-exchange chromatography of protein
d. identification of polysaccharide

16. For a typical adsorbent such as silica gel, the most popular pore diameter are,

a. 60&100 A°
b. 70& 120A°
c. 89 & 110 A°
d. ALL OF THE ABOVE

17. A solution of HCl with a concentration of $4\ 10^{-4}$ mol L^{-1} has a pH of which of the following?

a. 2.67
b. 3.21
c. 3.40
d. 4.31

18. What is the minimum distance for the eye to focus any object?

a. 11 cm
b. 25 cm
c. 32 cm
d. 4 2 cm

19. Which of the following structures represents the conjugate acid of HPO_4^{2-} ?

a. $H_2PO_4^-$ **b.** H_3PO_4

c. $H_4PO_4^+$ **d.** PO_4^{3-}

20. Which one of the following is equal to the pK_a of a weak acid?

a. Its relative molecular mass b. The pK_b of its conjugate base

c. The pH of a solution containing equal amounts of the acid and its conjugate base d. The equilibrium concentration of its conjugate base

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PART-B: Descriptive

Time : 2 hrs. 40 min. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. How instrumentation is important in our daily life explain (in terms food safety and hygiene)? **10**

2. **a.** Give a brief introduction of colorimetric. **4**

b. Write down the principle of colorimetric. **4**

c. What is the function of colorimetric? **2**

3. **a.** Give a brief note on use of chromatography in biomedical field. **5**

b. Write down the principle of reverse HPLC. **5**

4. **a.** What is meant by the term developing in chromatography? **4**

b. What is meant by the term R_f value? On what factors does the R_f value of a compound depend? **4**

c. Name the scientist who introduced chromatographic technique with year. **2**

5. **a.** How will you calculate the molality? Explain with example. **5**

b. What will be the concentration of sample in X^3 dilution in? Explain with example. **5**

6. **a.** Give short notes on buffer. **2**

b. Which of these molecules has the highest buffering capacity? **4**
i. Hydrochloric acid (HCl) ii. Acetic acid ($C_2H_4O_2$) iii. Water (H_2O)

c. Explain Handerson Hasselblach equation. **4**

7. **a.** What do you understand by microbiological essay of antibiotic? Explain the methods of essay. **6**

b. How will you prepare media and standard solution? **4**

8. Write short notes on ***any two*** **5×2=10**

a. molal solution
b. percent solution
c. ph value

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