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**Reg. No. :** .....

**Code No. : 30300 E    Sub. Code : JMCH 5 C/  
SECH 5 C**

B.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2020.

Fifth Semester

Chemistry – Main

Major Elective – II — ANALYTICAL CHEMISTRY

(For those who joined in July 2016 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The symbol of mean is

(a)  $\bar{X}$

(b)  $X$

(c)  $\sum X$

(d)  $\sum \bar{X}$

2. Relative standard deviation is given by the formula
- (a)  $\frac{S}{X} \times 100$                       (b)  $S \times S$
- (c)  $\frac{S}{X} \times 1000$                       (d) None of the above
3. The pH of the drinking water should be in the range of
- (a) 5.0 – 6.0                      (b) 6.0 – 7.0
- (c) 7.0 – 8.5                      (d) 8.0 – 9.0
4. Increase in the TDS level of water may cause
- (a) Cholera                      (b) Night blindness
- (c) Typhoid fever                      (d) Constipation
5. The knocking characteristic of a fuel is determined by using
- (a) Iodine number
- (b) Octane number
- (c) Cetane number
- (d) Saponification number

6. Primary fuel is
- (a) Natural gas                      (b) Kerosene  
(c) Water gas                      (d) Producer gas
7.  $W = Zct$  is the formula which represent —————.
- (a) Ohm's law                      (b) Faraday's I law  
(c) Faraday's II law              (d) Ampere law
8. Which one of the following is an electroanalytical method?
- (a) Thermo gravimetric analysis  
(b) Differential thermal analysis  
(c) Thermometric titrations  
(d) Polarography
9. In thermometric titrations the detector used is
- (a) Galvanometer                  (b) Photocell  
(c) Thermistor                      (d) All the above
10. Nephelometry Technique is similar to —————.
- (a) Colorimetry                      (b) Flame photometry  
(c) Amperometry                      (d) Fluorimetry

PART B — ( $5 \times 5 = 25$  marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write a note on the method of least squares.

Or

- (b) Explain :

- (i) Confidence level
- (ii) Students-t-test

12. (a) Write a note on the Water Quality Standards.

Or

- (b) Explain acidity, alkalinity and pH of drinking water? How are they measured?

13. (a) Compare and explain the properties of coal and coke.

Or

- (b) Write down the characteristics of a good fuel.

14. (a) State the principle and explain any two important applications of amperometric titrations.

Or

- (b) Write notes on :
- (i) Diffusion current
  - (ii) Half-wave potential
15. (a) Explain the applications of spectrophotometry with suitable examples.

Or

- (b) Discuss the factors affecting the TGA and DTA curves.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Name three types of determinate errors. How are they detected and eliminated?

Or

- (b) Write notes on :
- (i) Curve fitting
  - (ii) Accuracy and precision
  - (iii) Computational rules

17. (a) Define the term hardness of water. Discuss the hardness and its determination in detail.

Or

- (b) Discuss briefly BOD and COD. Explain their determinations.

18. (a) Write notes on :  
(i) Producer Gas  
(ii) Water Gas  
(iii) Octane number

Or

- (b) Explain the method of measurement of nitrogen and sulphur content in coal.

19. (a) Explain the principle and applications of Electrogravimetric analysis.

Or

- (b) Discuss in detail :  
(i) Over voltage  
(ii) Dropping mercury electrode

20. (a) Explain the principle, instrumentation and applications of thermometric titrations in detail.

Or

- (b) Discuss the principle of fluorescence and its applications and limitations in detail.