

ECHE 101

B.TECH. IInd SEMESTER EXAMINATION, 2023-24

B.TECH.

(Engineering Chemistry)

(CSE, ME)

(CBCS Mode)

AFFIX PRESCRIBED
RUBBER STAMP

Paper ID

(To be filled in the
OMR Sheet)

Date (तिथि) : _____

6002

अनुक्रमांक (अंकों में) :

Roll No. (In Figures) :

2	4	1	4	7	5	0	0	1	0	0	2	1		
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अनुक्रमांक (शब्दों में) : _____

Roll No. (In Words) : _____

Time : 1:30 Hrs.

समय : 1:30 घण्टे

Max. Marks : 75

अधिकतम अंक : 75

नोट : पुस्तिका में 50 प्रश्न दिये गये हैं, सभी प्रश्न करने होंगे। प्रत्येक प्रश्न 1.5 अंक का होगा।

Important Instructions :

1. The candidate will write his/her Roll Number only at the places provided for, i.e. on the cover page and on the OMR answer sheet at the end and nowhere else.
2. Immediately on receipt of the question booklet, the candidate should check up the booklet and ensure that it contains all the pages and that no question is missing. If the candidate finds any discrepancy in the question booklet, he/she should report the invigilator within 10 minutes of the issue of this booklet and a fresh question booklet without any discrepancy be obtained.

महत्वपूर्ण निर्देश :

1. अभ्यर्थी अपने अनुक्रमांक केवल उन्हीं स्थानों पर लिखेंगे जो इसके लिए दिये गये हैं, अर्थात् प्रश्न पुस्तिका के मुख्य पृष्ठ तथा साथ दिये गये ओ०एम०आर० उत्तर पत्र पर, तथा अन्यत्र कहीं नहीं लिखेंगे।
2. प्रश्न पुस्तिका मिलते ही अभ्यर्थी को जाँच करके सुनिश्चित कर लेना चाहिए कि इस पुस्तिका में पूरे पृष्ठ हैं और कोई प्रश्न छूटा तो नहीं है। यदि कोई विसंगति है तो प्रश्न पुस्तिका मिलने के 10 मिनट के भीतर ही कक्ष परिप्रेक्षक को सूचित करना चाहिए और बिना त्रुटि की दूसरी प्रश्न पुस्तिका प्राप्त कर लेना चाहिए।

1. In Graphite the distance between the adjacent layers is _____ nm.
- (A) 0.142
 - (B) 0.335
 - (C) 836.8
 - (D) None of these
2. Who is the father of 'Tire'?
- (A) Virginio Bruni Tedeschi
 - (B) John Dunlop
 - (C) Michelin
 - (D) K.M. Manner
3. No. of Triple Point found in the phase diagram of water?
- (A) 0
 - (B) 1
 - (C) 2
 - (D) 3
4. The absorbance is directly proportional to:
- (A) Wave length
 - (B) Path length
 - (C) Concentration and path length both
 - (D) Wave length and path length both
5. Example of one dimensional nanomaterial is_____.
- (A) Grapheme quantum dots
 - (B) CQDs
 - (C) Electron
 - (D) Carbon Nanotubes

6. Which polymer is used in Electro chromic Smart windows?
- (A) PEDOT
 (B) Polyaniline
 (C) Polypyrrole
 (D) All of them
7. Regeneration of zeolite is achieved by passing _____ solution through it.
- (A) 10% NaCl
 (B) 10% CaCl₂
 (C) 10% MgCl₂
 (D) 10 NaHCO₃
8. A molecule C₃H₆O give I.R. absorption bond near 1717 cm⁻¹. What will be the structural formula on the basis of IR absorption bond?
- (A) CH₂ = CH - CH₂OH
 (B) $\begin{array}{c} O \\ || \\ CH_3 - C - CH_3 \end{array}$
 (C) (A) and (B) both
 (D) None of the above
9. Which statement is correct for metallic conductor?
- (A) Electrical conductivity increases with a rise in temperature
 (B) Electrical conductivity decreases with a rise in temperature
 (C) When temperature increases, the resistance decreases in metal
 (D) None of them
10. The molecular weight of polyethylene containing 1000 repeating unit is ____.
- (A) 14000
 (B) 28000
 (C) 42000
 (D) 56000
- Handwritten notes for Q10:*
 $[CH_2 - CH_2]_n$
 126 126
 18

11. The correct formula of viscosity Index of lubricating oil is :
- (A) $VI = \frac{L-U}{L-H} \times 100$
- (B) $VI = \frac{L+U}{L-H} \times 100$
- (C) $VI = \frac{L \times U}{L+H} \times 100$
- (D) $VI = \frac{L+U-h}{100}$
12. Presence of functional group in a compound can be established by using_____.
- (A) X-ray diffraction
- (B) DSC
- (C) SEM
- (D) IR spectroscopy
13. Choose the correct pair of paramagnetic species.
- (A) NO^+ and NO^-
- (B) O_2^+ and O_2^-
- (C) O_2 and CO
- (D) NO and NO^+
14. Which polymer is used in light bulbs?
- (A) Polycarbonate
- (B) Polyester ✓
- (C) Polyethylene ✓
- (D) Polyamide ✓
15. In which cell anode is negative Electrode and cathode is positive Electrode?
- (A) Electrolytic cell
- (B) Electrochemical cell
- (C) (A) & (B) both
- (D) None of them

16. 'Biogas' has a calorific value of about _____.

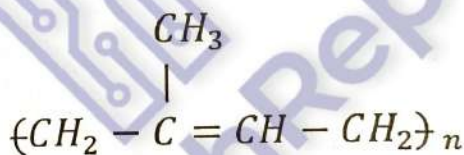
- (A) 5000 Kcal/m³
- (B) 3000 Kcal/m³
- (C) 2000 Kcal/m³
- (D) 2500 Kcal/m³

17. What is the no. of unpaired electron in molecular orbital diagram of CN molecule?

- (A) 1
- (B) 0
- (C) 2
- (D) 3

13

18. What is the name of Structural formula?

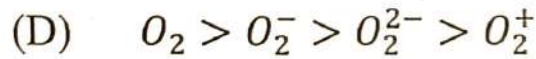
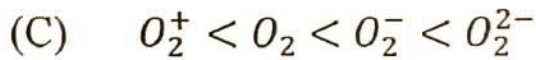
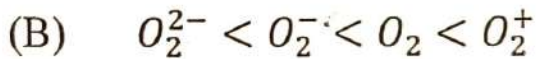
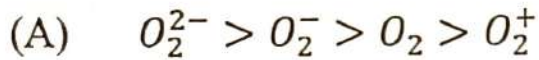
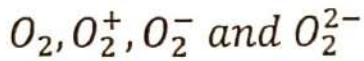


19. What is used in cement as a setting regulator?

- (A) CaCO₃
- (B) CaSO₄ · 2H₂O
- (C) CuSO₄ · 5H₂O
- (D) MgSO₄ · 7H₂O

20. What is value of percentage carbon in Anthracite coal?
- (A) 50
(B) 80
(C) 93
(D) 67
21. What is the correct Bond angle in H_2O ?
- (A) 107°
(B) 104.5°
(C) 92.6°
(D) 90.0°
22. The melting point of Nylon 6,6 is about _____.
- (A) $225^\circ C$
(B) $264^\circ C$
(C) $175^\circ C$
(D) None of them
23. The formula of 'Natrolite' is _____.
- (A) $CaO \cdot Al_2O_3 \cdot 3SiO_2 \cdot 2H_2O$
(B) $Na_2O \cdot Al_2O_3 \cdot 3SiO_2 \cdot 2H_2O$
(C) $CaO \cdot Al_2 \cdot 4SiO_2 \cdot 4H_2O$
(D) $Na_2Ze \cdot CaZe \cdot MgZe$
24. Choose the correct increasing order of calorific value of different fuels:
1. Hydrogen Gas 2. Kerosine Oil
3. Charcoal 4. Wood
- (A) 4,2,3,1
(B) 1,2,3,4
(C) 4,3,2,1
(D) 1,3,2,4

25. Arrange the following species on the basis of ascending bond order:



26. Zinc Oxide is white when cold and yellow when heated. It is due to the development of:

(A) Frenkel defect

(B) Metal Excess defect

(C) Schottky defect

(D) Metal deficiency defect

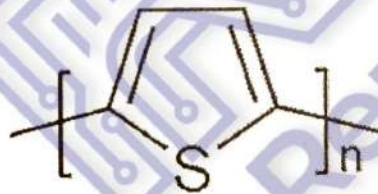
27. What is the name of structural formula?

(A) Polypyrrole

(B) Polythiophene

(C) Polyaniline

(D) Polyacetylene



28. What material can replace glass?

(A) Polycaprolactum

(B) PHB

(C) Acrylic and Polycarbonate

(D) Teflon

29. What is PAO in lubricant?

(A) Polyalpha olefin

(B) Polyalpha oxalate

(C) Polyanti oxidants

(D) None of them

30. Who first introduced 'Port land cement'?
- (A) Joseph Aspdin
- (B) William Aspdin
- (C) Josiah Willard Gibbs
- (D) Both (B) & (C)
31. Which option below gives only spins active Nuclei?
- (A) ^1H , ^{13}C , ^{15}N , ^{19}F
- (B) ^1H , ^{12}C , ^{12}F
- (C) ^2H , ^{19}F , ^{31}P
- (D) None of them
32. When absorption maxima (λ_{max}) of a compound shifts to shorter wavelength, it is known as ____.
- (A) Blue shift
- (B) Black shift
- (C) Red shift
- (D) Green shift
33. Who got the Nobel Prize for his contributions to liquid crystals and polymers in 1991.
- (A) P.G. de Gennes
- (B) Richard R. Ernst
- (C) Nadine Gordimer
- (D) None of them

34. What is the correct formula of p-Azoxyanisole?
- (A) $\text{CH}_3\text{OC}_6\text{H}_4\text{CH}=\text{CHCOOH}$
(B) $\text{CH}_3\text{OC}_6\text{H}_4\cdot\text{NONC}_6\text{H}_4\text{COCH}_3$
(C) $\text{C}_2\text{H}_5\text{OC}_6\text{H}_4\cdot\text{NONC}_6\text{H}_4\text{COC}_2\text{H}_5$
(D) None of these
35. Which of the following defects are shown by Ag Br crystal?
- (A) Schottky defect
(B) Frenkel defect
(C) Schottky and Frenkel both
(D) Metal deficiency defect
36. Formula of ferrocene is:
- (A) $[\text{Fe}(\text{CN})_6]^{4-}$
(B) $[\text{Fe}(\text{CN})_6]^{3+}$
(C) $[\text{Fe}(\text{CO})_5]$
(D) $[\text{Fe}(\text{C}_5\text{H}_5)_2]$
37. Choose correct option of a π -bonded organometallic compound:
- (A) Zeise's salt
(B) Ferrocene
(C) Dibenzene chromium
(D) None of them
38. 'PET' is produced from the polycondensation of _____.
- (A) Butadiene and styrene
(B) Terephthalic acid and Ethylene glycol
(C) Tartaric acid and Ethylene glycol
(D) Ethylene and Terephthalic acid

39. Ozone resistance rubber is _____.
- (A) EPDM rubber
 - (B) Nitrile rubber
 - (C) Neoprene rubber
 - (D) All of the above
40. What is the formula of soda ash?
- (A) NaHCO_3
 - (B) Na_2CO_3
 - (C) CaHNaO_2
 - (D) $\text{Ca}(\text{HCO}_3)_2$
41. Choose the example of solid lubricants:
- (A) PAO
 - (B) Graphite
 - (C) MoS_2
 - (D) (B) and (C) both
42. How many NMR signal gives the compound 'Ethanol':
- $\text{CH}_3\text{CH}_2\text{OH}$
- (A) Six
 - (B) Three
 - (C) Two
 - (D) One
43. In Greek, 'chromophore' means _____.
- (A) Colour reducer
 - (B) Colour Intensifiers
 - (C) Colour carrier
 - (D) None of the above

44. How many fundamental vibrations are there in H_2O ?

(A) 0

(B) 1

(C) 2

(D) 3

3n-6
3n-6
9-6
3

45. The proportion of hexamethylenediamine and adipic acid used in the preparation of nylon 6,6 is _____.

(A) 3:1

(B) 1:3

(C) 1:1

(D) 1:2

46. Transition which requires radiation of longest wavelength in UV-visible spectrometer is _____ transition.

(A) $\pi \rightarrow \sigma^*$

(B) $n \rightarrow \pi^*$

(C) $\sigma \rightarrow \sigma^*$

(D) $\sigma \rightarrow \pi^*$

47. What polymer is 'Mylar'?

(A) SBR

(B) NBR

(C) PLA

(D) PET

48. What is the correct absorption frequency range for -OH group in IR spectra?
- (A) 3610-3640 cm^{-1}
 - (B) 2850-2960 cm^{-1}
 - (C) 1690-1760 cm^{-1}
 - (D) 1180-1360 cm^{-1}
49. Which one is biodegradable polymer among the following?
- (A) PLA ✓
 - (B) HB-HV ✓
 - (C) Natural rubber
 - (D) All of them
50. What nm wavelength is infrared?
- (A) Between 780 nm and 1000 nm
 - (B) Range of 3000 nm to 1 nm
 - (C) Between about 10 and 400 nm
 - (D) 700-400 nm
