Max Marks: 200 **Date: 09.10.2022**

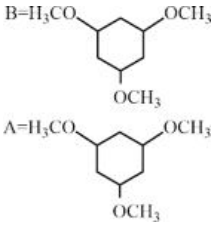
ABHIMANYU BATCH
CHEMISTRY : PART TEST Set - B
Topic: Organic FLT

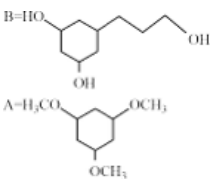
1. $CH_3CN \xrightarrow{Na+C_2H_5OH} X$

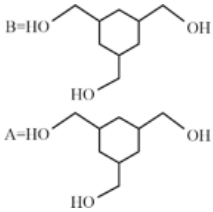
The compound X is

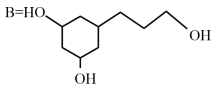
(a) CH_3CONH_2 (b) $CH_3CH_2NH_2$ (c) C_2H_6 (d) CH_3NHCH_3

2. Among the compounds A and B with molecular formula $C_9H_{18}O_3$, A is having higher boiling point the B. The possible structures of A and B are:

(a) 

(b) 

(c) 

(d) 

3. Which of the following is used in the manufacture of thermosetting plastics?

(a) Formaldehyde (b) Acetaldehyde (c) Acetone (d) Benzaldehyde

4. Which one of the following biomolecules is insoluble in water

(a) Keratin (b) Haemoglobin (c) Ribonuclease (d) Adenine

5. An aromatic compound 'A' (C_7H_9N) on reacting with $NaNO_2$/HCl at 0ºC forms benzyl alcohol and nitrogen gas. The number of isomers possible for the compound 'A' is

(a) 5 (b) 7 (c) 3 (d) 6

6. In CH_3CH_2Br, % of Br is

(a) 80 (b) 75 (c) 70 (d) 7

7. Some meta-directing substituents in aromatic substitution are given. Which one is most deactivating?

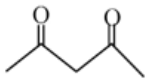
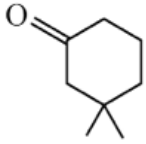
(a) $-C \equiv N$ (b) $-SO_3H$ (c) –COOH (d) $-NO_2$

8. The charring of sugar, when treated with conc. H_2SO_4 is due to

(a) Oxidation (b) Reduction (c) Dehydration (d) Hydrolysis

Space for Rough Work

9. Most acidic hydrogen is present in

(a)  (b)  (c) $(CH_3CO)_3CH$ (d) $(CH_3)_3COH$

10. Which of the following reaction is not the oxidation?

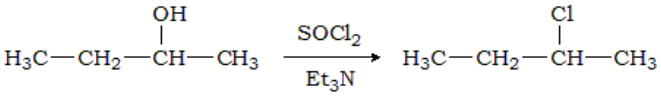
(a) $CH_3 - CHO \rightarrow CH_3COOH$ (b) $C_2H_5OH \rightarrow CH_3 - CHO$

(c) $C_2H_5OH \rightarrow CH_3 - COOH$ (d) $CH_3COOH \rightarrow C_2H_5OH$

11. Which of the following aldehyde contains α – C atom but does not have any α – H atom?

(a) Propionaldehyde (b) Benzaldehyde (c) Isobutyraldehyde (d) Formaldehyde

12. In the following reaction Which of the following phenomenon takes place?



(a) Retention (b) Inversion (c) Racemisation (d) Epimerisation

13. Commercially methanol is prepared by

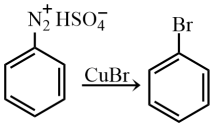
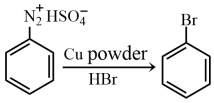
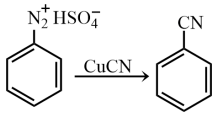
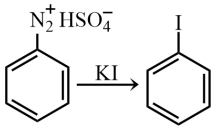
(a) Reduction of CO in presence of $ZnO.Cr_2O_3$

(b) Methane reacts with water vapour at 900°C in presence of Ni catalytst

(c) Reduction of HCHO by $LiAlH_4$

(d) Reduction of HCHO by aqueous NaOH

14. Which of the following reactions is an example of Gattermann reaction?

(a)  (b)  (c)  (d) 

15. Which polymer has 'chiral' monomer(s) ?

(a) Buna-N (b) Nylon 6,6 (c) Neoprene (d) PHBV

16. The function of anhydrous $AlCl_3$ in the Friedel-Craft's reaction is to

(a) Absorb water (b) Absorb HCl

(c) To produce electrophile (d) To produce nucleophile

Space for Rough Work

17. The correct increasing order of boiling points of comparable molecular masses of the following compounds.

A. n – Butane B. Methoxy ethane C. propanal D. Acetone
E. propan – 1 – ol

(a) A < B < C < D < E (b) A < C < D < B < E (c) A < B < D < C < E (d) A < B < E < D < C

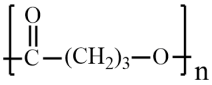
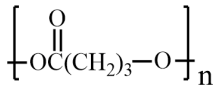
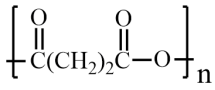
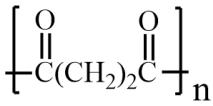
18. $C_3H_8 + Cl_2 \xrightarrow{\text{Light}} C_3H_7Cl + HCl$ is an example of

(a) elimination (b) substitution
(c) addition (d) rearrangement reaction

19. Fructose reduces Tollens' reagent due to :

(a) Asymmetric carbons
(b) Primary alcoholic group
(c) Secondary alcoholic group
(d) Enolisation of fructose followed by conversion to aldehyde by base

20. The homopolymer formed from 4-hydroxybutanoic acid is

(a)  (b)  (c)  (d) 

21. The deficiency of vitamin B_1 causes

(a) Beri-beri (b) Scurvy (c) Rickets (d) Anaemia

22. CH_3COCH_3 can be obtained by

(a) Heating acetaldehyde with Methanol (b) Oxidation of n-propyl alcohol
(c) Oxidation of isopropyl alcohol (d) Reduction of propionic acid

23. Six carbon atoms of benzene are of

(a) One type (b) Two types (c) Three types (d) Six types

24. Which one of the following class of compounds is obtained by polymerization of acetylene?

(a) Poly-ene (b) Poly-amide (c) Poly-yne (d) Poly-ester

25. In the preparation of Grignard reagent from haloalkane, the metal used is

(a) Mg (b) Zn (c) Li (d) K

Space for Rough Work

Date: 09.10.2022

ABHIMANYU BATCH
MATHEMATICS : PART TEST
Topic: Differential Equation

26. The rate of growth of bacteria is proportional to number present. If initially, there were 1000 bacteria and the number doubles in 1 hour, then the number of bacteria after 2½ hours are _____ (Given: $\sqrt{2}=1.414$)

(a) $400\sqrt{2}$ approximately (b) 5056 approximately

(c) 5656 approximately (d) 4646 approximately

27. A body cools according to Newton's law from 100ºC to 60ºC in 20 minutes. The temperature of the surrounding being 20ºC, then the temperature of the body after one hour is _____

(a) 30ºC (b) 40ºC (c) 15ºC (d) 20ºC

28. If the population grows at the rate of 8% per year, then the time taken for the population to be doubled is _____ (Given: log 2 = 0.6912)

(a) 4.3 years (b) 8.64 years (c) 10.27 years (d) 6.8 years

29. Bacteria increases at the rate proportional to the numbers of bacteria present. If the original number N doubles in 4 hours, then the number of bacteria will be 4N in _____

(a) 4 hours (b) 2 hours (c) 8 hours (d) 6 hours

30. The population of a village increases at a rate proportional to the population at that time. In a period of 10 years the population grew from 20,000 to 40,000, then the population after another 20 years is

(a) 1,60,000 (b) 1,20,000 (c) 1,00,000 (d) 80,000

31. The rate at which the metal cools in moving air is proportional to the difference of temperatures between the metal and air. If the air temperature is 290 K and the metal temperature drops from 370 K to 330 K in 10 minutes, then the time required to drop the temperature upto 295 K is

(a) 30 min (b) 40 min (c) 20 min (d) 35 min

Space for Rough Work

32. A spherical raindrop evaporates at a rate proportional to its surface area. If its radius originally in 3 mm and 1 our later has been reduced to 2 mm, then the expression of radius r of the raindrop at any time t is ____ (where $0 \leq t < 3$)

(a) $r = 3 - t$ (b) $r = t + 3$ (c) $r = t + 5$ (d) $r = t - 5$

33. A population P grew at the rate given by the equation $\frac{dP}{dt} = 0.05P$, then the population will be double in _____ years.

(a) 12 (log 2) (b) 20 (log 2) (c) 5 (log 2) (d) 10 (log 2)

34. A bacteria culture is known to grow at a rate proportional to the amount present. If the initial number of bacteria is 300 and if it is observed that the population has increased by 20% after 2 hrs, then the expression for the approximate number of bacteria in such a culture is given by _____ (Given that $\log_e 1.2 = 0.18232$)

(a) $N = 300 \cdot e^{0.09116\,t}$ (b) $N = 300 \cdot e^{2\,t}$ (c) $N = 360 \cdot e^{2\,t}$ (d) $N = 360 \cdot e^{0.09116\,t}$

35. If the population grown at the rate of 8% per year then the time taken for the population to be doubled is _____ . (Given log 2 = 0.6912)

(a) 6.8 years (b) 4.3 years (c) 10.27 years (d) 8.64 years

36. Bismath has half life period of 5 days. A sample originally has a mass of 1000 mg, then the mass of Bismath after 30 days is _____

(a) 15.625 mg (b) 13.625 mg (c) 14.625 mg (d) 16.625 mg

37. If the half life period of a substance is 5 years, then the total amount of substance after 15 years when initial amount is 64 gms is _____

(a) 2 gms (b) 8 gms (c) 16 gms (d) 32 gms

38. If the surrounding air is kept at 25ºC and a body cools from 80ºC to 50ºC in 30 minutes them temperature of the body after one hour will be _____ approximately.

(a) 32.36 ºC (b) 31.72 ºC (c) 36.36 ºC (d) 34.75 ºC

Space for Rough Work

39. Population of a town increases at a rate proportional to the population at that time. If it increases from 40, 000 to 60, 000 in 40 years, then in another 20 years, the population will be (taking $\sqrt{1.5} = 1.2247$)

(a) 73,428 (b) 73,248 (c) 73,842 (d) 73,482

40. Population of city increases at a rate proportional to the population. Within a period of 30 years the population grew from 20 lakhs to 40 lakhs. After a further period of 15 years, the population of the city (in lakhs) will be

(a) 56.2 (b) 56.3 (c) 56.4 (d) none of these

41. A population grows at the rate of 5% per year. Then the population will be doubled in

(a) $10 \cdot \log 2$ years (b) $20 \cdot \log 2$ years (c) $30 \cdot \log 2$ years (d) n.o.t.

42. Suppose the rate of growth of a population is proportional to the difference between some maximum size P and the number N of individuals in the population at time t. If the population size is N_0 at time t = 0, then

(a) $N = P - (P - N_0)\, e^{-kt}$ (b) $N = P - N_0 \cdot e^{-kt}$

(c) $N = N_0 P \cdot e^{-kt}$ (d) None of these

43. Bacteria in a culture multiply at a rate proportional to the number present. If the original number N_0 doubles in 3 hours, then the number of bacteria will be $4N_0$ in

(a) 4.5 hrs. (b) 6 hrs (c) 9 hrs (d) n.o.t

44. An ice ball melts at a rate proportional to the amount of ice present at that instant. If half the quantity of ice melts in 20 minutes, then after an hour, the amount of ice left will be

(a) one third of the original (b) one-eighth of the original

(c) one-fifth of the original (d) none of these

45. Radium disintegrates at a rate proportional to the amount present. If half the original amount disappears is 1600 years, then the amount left after the first 100 years is $\left(\frac{1}{2}\right)^n$ th of the original, where : n =

(a) $\frac{1}{16}$ (b) $\frac{1}{100}$ (c) $\frac{1}{8}$ (d) n.o.t

Space for Rough Work

46. Rate of decay of radium varies as the amount present. If 60 mg are present now and the half life of radium is 1690 years, then the amount of radius present 100 years from now is

(a) 56 mg (b) 57 mg (c) 58 mg (d) 59 mg

47. In a certain chemical reaction, the amount x of a substance is related to the speed of the reaction $\frac{dx}{dt}$ by the differential equation $\frac{dx}{dt} = k(a-x)(2a-x)$, where a, k are constants and x = 0 when t = 0. If x = 2 when t = 1 and x = 2.8 when t = 3, then, when t = 2, the amount x is

(a) $\frac{6}{7}$ (b) $\frac{3}{7}$ (c) $\frac{18}{7}$ (d) n.o.t

48. A persons assets reducing in such a way that the rate of reduction of assets is proportional to the square-root of the assets existing at that time. If the assets at the beginning are Rs. 10 lakhs and they dwindle down to Rs. 10,000 after 2 years, then the person will be bankrupt in n years from the start, where : n =

(a) $1\frac{2}{9}$ (b) $2\frac{2}{9}$ (c) $3\frac{2}{9}$ (d) none of these

49. [When interest is compounded continuously, the rate of change of money present at time t varies as the amount present at time t.]

If Rs. 100 invested at 5% are compounded continuously, then the original investment will double itself in

(a) 13.9 years (b) 13.6 years (c) 13.4 years (d) n.o.t

50. A sum of Rs. 2000 is deposited in a bank at the rate of interest of 6% compounded continually. The depositor wants to withdraw the entire amount at the expiry of 8 years and 4 months. If $\sqrt{e} = 1.649$, then he will get

(a) Rs. 3298 (b) Rs. 3289 (c) Rs. 3258 (d) Rs. 3285

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Space for Rough Work

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Max Marks: 200 **Date: 09.10.2022**

ABHIMANYU BATCH
CHEMISTRY : PART TEST Set - B ANSWER KEY
Topic: Organic FLT

1.	(b)	2.	(a)	3.	(a)	4.	(a)	5.	(a)
6.	(b)	7.	(d)	8.	(c)	9.	(c)	10.	(d)
11.	(b)	12.	(b)	13.	(a)	14.	(b)	15.	(d)
16.	(c)	17.	(a)	18.	(b)	19.	(d)	20.	(a)
21.	(a)	22.	(c)	23.	(a)	24.	(a)	25.	(a)

Date: 09.10.2022

ABHIMANYU BATCH
MATHEMATICS : PART TEST ANSWER KEY
Topic: Differential Equation

26.	(c)	27.	(a)	28.	(b)	29.	(c)	30.	(a)
31.	(b)	32.	(a)	33.	(b)	34.	(a)	35.	(d)
36.	(a)	37.	(b)	38.	(c)	39.	(d)	40.	(c)
41.	(b)	42.	(a)	43.	(b)	44.	(b)	45.	(a)
46.	(c)	47.	(c)	48.	(b)	49.	(a)	50.	(a)