APSET 2014 Question Paper for Chemical Science Paper II

SUBJECT CODE	SUBJECT	PAPER
A-02-02	CHEMICAL SCIENCES	II

HALL TICKET NUMBER	QUESTION BOOKLET NUMBER
	501067

OMR SHEET NUMBER

DURATION	MAXIMUM MARKS	NUMBER OF PAGES	NUMBER OF QUESTIONS
1 HOUR 15 MINUTES	100	16	50

This is to certify that, the entries made in the above portion are correctly written and verified.

Candidate's Signature **Name and Signature of Invigilator**

Instructions for the Candidates

1. Write your Hall Ticket Number in the space provided on the top of this page.
2. This paper consists of fifty multiple-choice type of questions.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested **to open the booklet and compulsorily examine it as below**:
   (i) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
   (ii) **Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.**
   (iii) After this verification is over, the Test Booklet Number should be entered in the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
   Example: (A) (B) ● (D)
   where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Answer Sheet given to you**. If you mark at any place other than in the circle in the Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. **The candidate must handover the OMR Answer Sheet to the invigilators at the end of the examination compulsorily** and must not carry it with you outside the Examination Hall. The candidate is allowed to take away the carbon copy of OMR Sheet and used Question paper booklet at the end of the examination.
10. **Use only Blue/Black Ball point pen.**
11. **Use of any calculator or log table etc., is prohibited.**
12. **There is no negative marks for incorrect answers.**

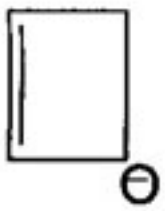
అభ్యర్థులకు సూచనలు

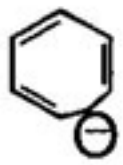
1. ఈ పుట పై భాగంలో ఇవ్వబడిన స్థలంలో మీ హాల్ టికెట్ నంబరు రాయండి.
2. ఈ ప్రశ్న పత్రము యాభై బహుపైచ్చిక ప్రశ్నలను కలిగి ఉంది.
3. పరీక్ష ప్రారంభమున ఈ ప్రశ్నాపత్రము మీకు ఇవ్వబడుతుంది. మొదటి ఐదు నిమిషములలో ఈ ప్రశ్నాపత్రమును తెరిచి కింద తెలిపిన అంశాలను తప్పనిసరిగా సరిచూసుకోండి.
   (i) ఈ ప్రశ్న పత్రమును చూడడానికి కవర్‌పేజి అంచున ఉన్న కాగితపు సీలును చించండి. స్టిక్కర్ సీలులేని మరియు ఇదివరకే తెరిచి ఉన్న ప్రశ్నాపత్రమును మీరు అంగీకరించవద్దు.
   (ii) కవరు పేజి పై ముద్రించిన సమాచారం ప్రకారం ఈ ప్రశ్నపత్రములోని పేజీల సంఖ్యను మరియు ప్రశ్నల సంఖ్యను సరిచూసుకోండి. పేజీల సంఖ్యకు సంబంధించి గానీ లేదా సూచించిన సంఖ్యలో ప్రశ్నలు లేకపోవుట లేదా నిజప్రతి కాకపోవుట లేదా ప్రశ్నలు క్రమపద్ధతిలో లేకపోవుట లేదా ఏవైనా లేదాలుండుట వంటి దోషపూరితమైన ప్రశ్న పత్రాన్ని వెంటనే మొదటి ఐదు నిమిషాల్లో పరీక్షా పర్యవేక్షకునికి తిరిగి ఇచ్చివేసి దానికి బదులుగా సరిగ్గా ఉన్న ప్రశ్నపత్రాన్ని తీసుకోండి. తదనంతరం ప్రశ్నపత్రము మార్చబడదు అదనపు సమయం ఇవ్వబడదు.
   (iii) పై విధంగా సరిచూసుకొన్న తర్వాత ప్రశ్నపత్రం సంఖ్యను OMR పత్రము పై అదేవిధంగా OMR పత్రము సంఖ్యను ఈ ప్రశ్నాపత్రము పై నిర్దిష్టస్థలంలో రాయవలెను.
4. ప్రతి ప్రశ్నకు నాలుగు ప్రత్యామ్నాయ ప్రతిస్పందనలు (A), (B), (C) మరియు (D) లుగా ఇవ్వబడ్డాయి. ప్రతిప్రశ్నకు సరైన ప్రతిస్పందనను ఎన్నుకొని కింద తెలిపిన విధంగా OMR పత్రములో ప్రతి ప్రశ్నా సంఖ్యకు ఇవ్వబడిన నాలుగు వృత్తాల్లో సరైన ప్రతిస్పందనను సూచించే వృత్తాన్ని బాల్ పాయింట్ పెన్‌తో కింద తెలిపిన విధంగా పూరించాలి.
   ఉదాహరణ : (A) (B) ● (D)
   (C) సరైన ప్రతిస్పందన అయితే
5. ప్రశ్నలకు ప్రతిస్పందనలను ఈ ప్రశ్నపత్రములో ఇవ్వబడిన OMR పత్రము పైన ఇవ్వబడిన వృత్తాల్లోనే పూరించి గుర్తించాలి. అలాకాక సమాధాన పత్రంపై వేరొక చోట గుర్తిస్తే మీ ప్రతిస్పందన మూల్యాంకనం చేయబడదు.
6. ప్రశ్న పత్రము లోపల ఇచ్చిన సూచనలను జాగ్రత్తగా చదవండి.
7. చిత్తుపనిని ప్రశ్నపత్రము చివర ఇచ్చిన ఖాళీస్థలములో చేయాలి.
8. OMR పత్రము పై నిర్దిత స్థలంలో సూచించవలసిన వివరాలు తప్పించి ఇతర స్థలంలో మీ గుర్తింపును తెలిపే విధంగా మీ పేరు రాయడం గానీ లేదా ఇతర చిహ్నాలను పెట్టడం గానీ చేసినట్లయితే మీ అనర్హతకు మీరే బాధ్యులవుతారు.
9. పరీక్ష పూర్తయిన తర్వాత మీ **OMR** పత్రాన్ని తప్పనిసరిగా పరీక్ష పర్యవేక్షకుడికి ఇవ్వాలి. వాటిని పరీక్షగది బయటకు తీసుకువెళ్లకూడదు. పరీక్షపూర్తయిన తరువాత అభ్యర్థులు ప్రశ్న పత్రాన్ని, OMR పత్రం యొక్క కార్బన్ కాపీని తీసుకువెళ్లవచ్చు.
10. నీలి/నల్ల రంగు బాల్ పాయింట్ పెన్ మాత్రమే ఉపయోగించాలి.
11. లాగరిథమ్ టేబుల్స్, క్యాలిక్యులేటర్‌లు, ఎలక్ట్రానిక్ పరికరాలు మొదలగునవి పరీక్షగదిలో ఉపయోగించడం నిషేధం.
12. తప్పు సమాధానాలకు మార్కుల తగ్గింపు లేదు.

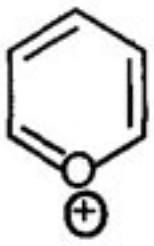
CHEMICAL SCIENCE
Paper – II

1. Identify the aromatic compound.

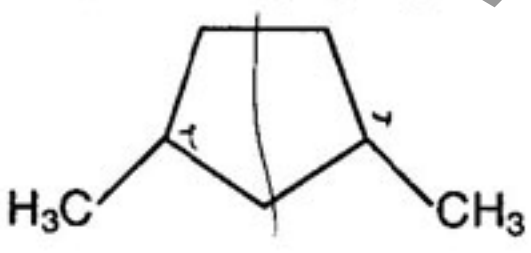
(A) 

(B) 

(C) 

(D) 

2. How many stereoisomers are possible for 1, 3-dimethylcyclopentane ?



(A) One

(B) Two

(C) Three

(D) Four

3. The correct order of the solubility of the following in water is

(A) $BeSO_4 < MgSO_4 < CaSO_4 < SrSO_4$

(B) $BeSO_4 > MgSO_4 > CaSO_4 > SrSO_4$

(C) $BeSO_4 < MgSO_4 = CaSO_4 < SrSO_4$

(D) $BeSO_4 > MgSO_4 = CaSO_4 < SrSO_4$

4. Match the following :

I. Beckmann rearrangement	1. Oxetane
II. Paterno-Büchi reaction	2. Olefin
III. Wittig reaction	3. Enamine
IV. Stork reaction	4. Caprolactam

	I	II	III	IV
(A)	1	2	3	4
(B)	2	3	4	1
(C)	4	1	2	3
(D)	3	2	1	4

5. In a radical polymerization reaction, 10^4 monomer molecules are consumed to form 10 polymer molecules in dt time. What is the degree of polymerization (DP) ?

(A) 10^5

(B) 10^4

(C) 10^3

(D) 10^2

6. The correct relationship between vibrational frequency ($\bar{\nu}$) and force constant (k) is

(A) $(\bar{\nu})^2 \alpha k^2$

(B) $(\bar{\nu}) \alpha \frac{1}{k}$

(C) $(\bar{\nu})^2 \alpha k$

(D) $(\bar{\nu}) \alpha (k)^{-\frac{1}{2}}$

7. Gibbs-Helmholtz equation is expressed as

(A) $\left[\frac{\partial(\Delta G/T)}{\partial T}\right]_P = \frac{-\Delta H}{T^2}$

(B) $\left[\frac{\partial(\Delta G/T)}{\partial T}\right]_V = \frac{-\Delta E}{T^2}$

(C) $dG = -SdT + vdP$

(D) $dH = Tds + vdP$

8. The number of radial nodes for a 3s orbital is

(A) 0

(B) 1

(C) 2

(D) 3

9. Wave function of a particle at some point x has the value ψ, then the probability of finding the particle between x and x+dx is proportional to

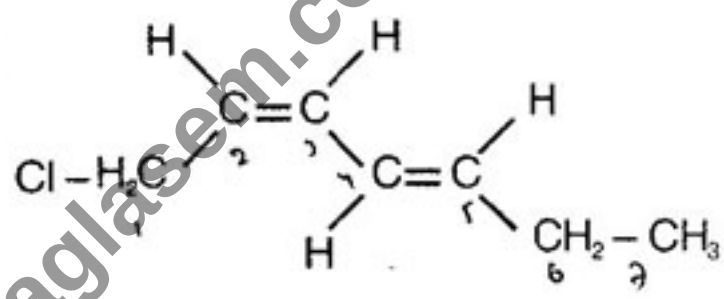
(A) $|\psi| dx$

(B) $|\psi|^3 dx$

(C) $|\psi|^2 dx$

(D) $|\psi|$

10. Give the IUPAC name for the given structure



(A) 1– Chloro – 2Z,4Z – heptadiene

(B) 1– Chloro – 2Z,4E – 2,4 – heptadiene

(C) 7– Chloro – 2Z,4E – heptadiene

(D) 1– Chloro – 2E,4Z – 2,4 – heptadiene

11. Which of the following amino acid belongs to neutral category ?

I. Glycine

II. Arginine

III. Tyrosine

IV. Asparagine

(A) I, II

(B) II, III

(C) III, IV

(D) I, III

12. The correct decreasing order of the first ionization energy of the elements P, S, Cl is

(A) Cl, S, P

(B) Cl, P, S

(C) P, Cl, S

(D) S, Cl, P

13. Which of the following does not obey 18-electron rule ?

(A) $[Co(NH_3)_6]Cl_3$

(B) $Fe(CO)_5$

(C) $Mn(CO)_5$

(D) $Ru(CO)_5$

14. Zero point energy (E_o)of a harmonic oscillator is

(A) $E_o = h^2/8\,mL^2$

(B) $E_o = \frac{1}{2}\,h\nu$

(C) $E_o = 0$

(D) $E_o = 4h^2 / 8\,mL^2$

15. The ground state term symbol of Li is

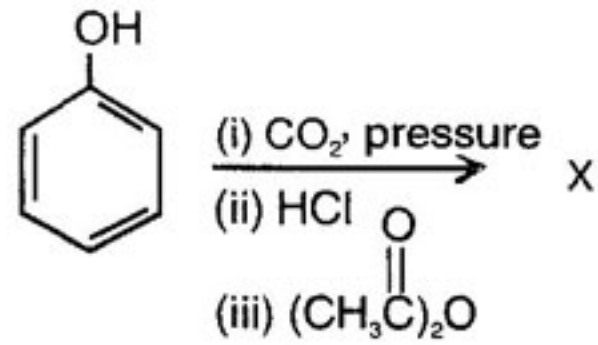
(A) $^2S_{\frac{1}{2}}$

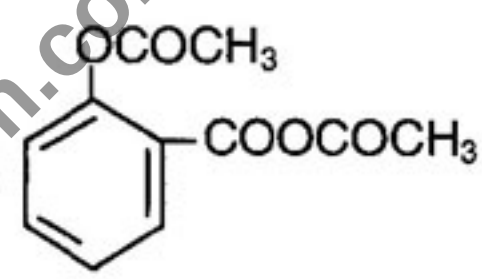
(B) $^2P_{\frac{1}{2}}$

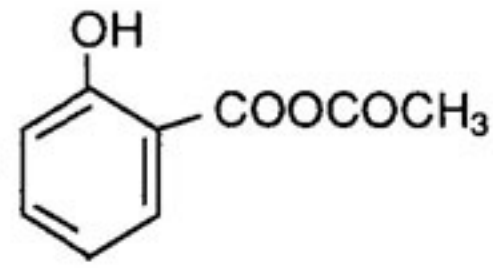
(C) $^1S_{\frac{1}{2}}$

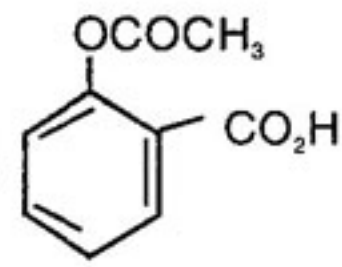
(D) $^1D_2$

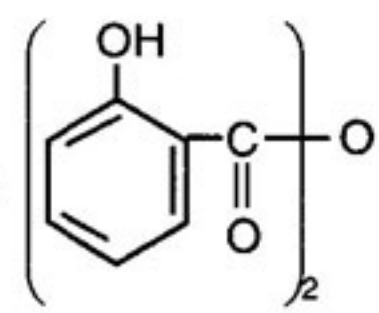
16. The major product in the following reaction is



(A) 

(B) 

(C) 

(D) 

17. The catalyst produced by treating $TiCl_4$ with $(C_2H_5)_3Al$ is

(A) Wilkinson's catalyst

(B) Ziegler – Natta catalyst

(C) ZSM – 5 catalyst

(D) $[PdCl_4]^{2-}$ catalyst

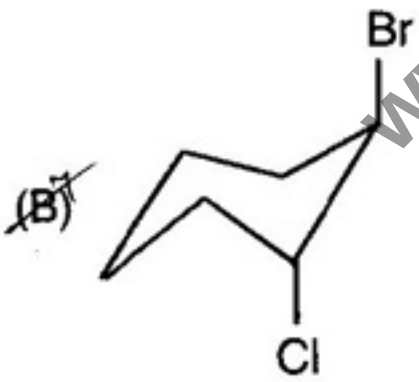
18. Electronic configuration of Gd^{+3} is

(A) $[Rn]\,4f^7$ (B) $[Rn]\,4f^{10}$

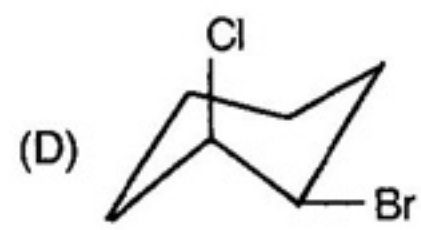
(C) $[Xe]\,4f^7$ (D) $[Xe]\,4f^{10}$

19. The most stable conformer is

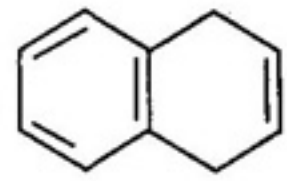
(A) 

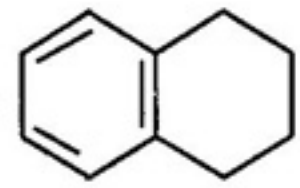
(B) 

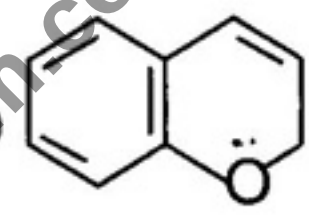
(C) 

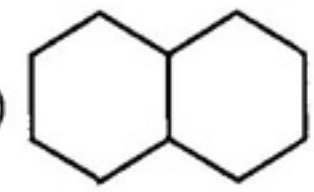
(D) 

20. The isoelectronic compound with naphthalene is

(A) 

(B) 

(C) 

(D) 

21. According to MO theory, the strength of bonding in O_2^+, O_2 and O_2^- in follows the order:

(A) $O_2^+ > O_2 > O_2^-$

(B) $O_2^- > O_2 > O_2^+$

(C) $O_2 > O_2^+ > O_2^-$

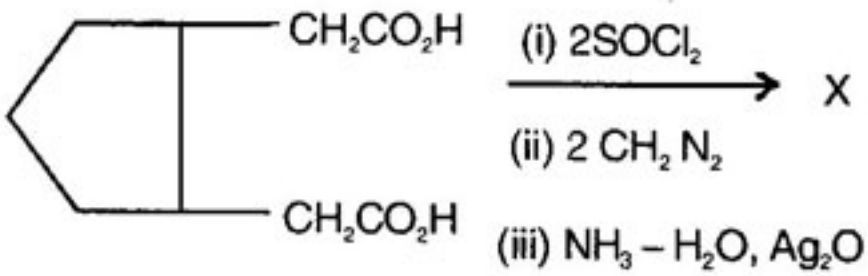
(D) $O_2 > O_2^- > O_2^+$

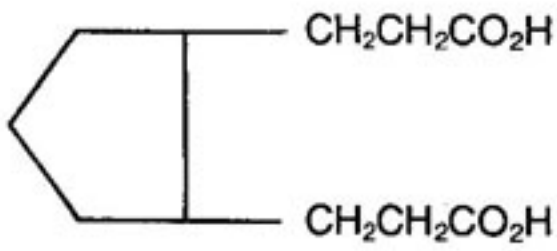
22. What is the point group of trans 1, 2-dichloro ethene ?

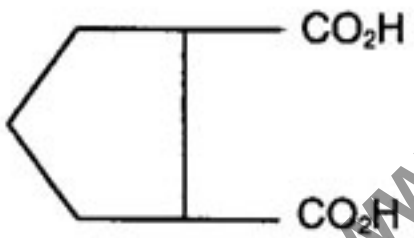
(A) C_{2v} (B) C_{2h}

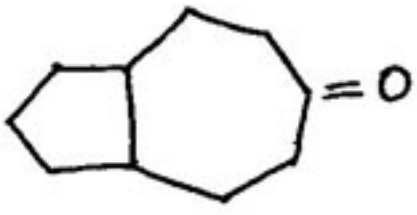
(C) D_{2h} (D) D_{2d}

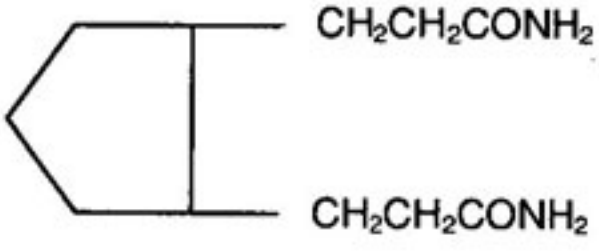
23. The major product in the following reactions is



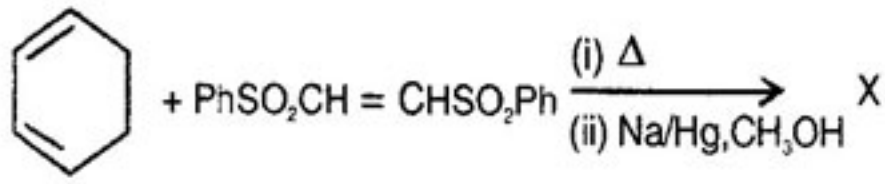
(A)


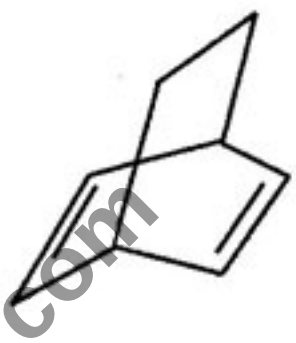
(B)


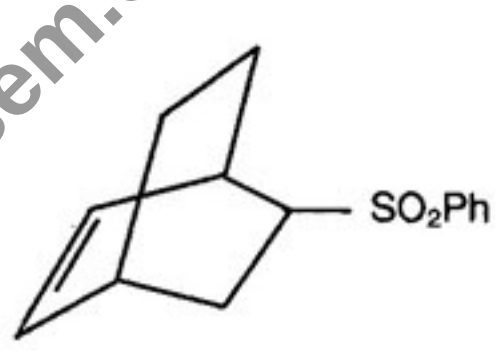
(C)


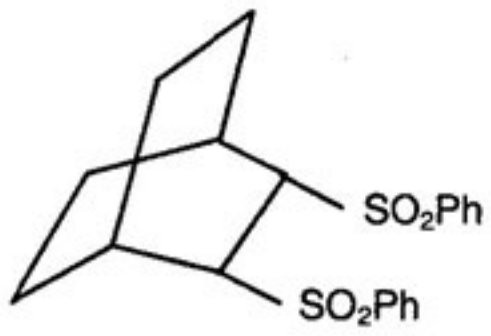
(D)


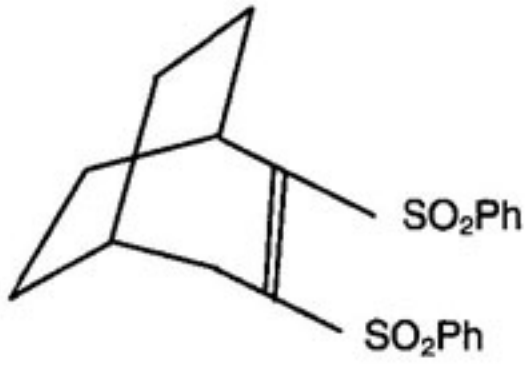
24. The major product in the following reaction is



(A)


(B)


(C)


(D)


25. Number of B – B bonds present in tetraborane, B_4H_{10} is

(A) 1

(B) 2

(C) 3

(D) 4

26. The metal atom present in Wilkinson's catalyst is

(A) W

(B) Rh

(C) Pt

(D) Ir

27. The following two compounds are

and

(A) C(3) epimers

(B) C(2) epimers

(C) Different configuration at C(2)

(D) Mesomers

28. The major product in the following reaction is

(A)

(B)

(C)

(D)

29. The gas released by PS-II in photosynthesis process that occurs in green plants is

(A) O_2

(B) N_2

(C) CO

(D) CO_2

30. For a Co^{3+} octahedral complex, the mean pairing energy is 17400 cm^{-1} and Δ_0 is 24700 cm^{-1}. The CFSE of the complex in Dq units is

(A) 0 Dq

(B) – 6 Dq

(C) – 24 Dq + 2P

(D) – 12 Dq + 3p

31. The number of degrees of freedom at water (l) $\rightleftharpoons$ water (g) equilibrium is

(A) 0

(B) 1

(C) 2

(D) 3

32. The molar partition function (Q) for system of distinguishable independent molecules is related to the molecular partition (q) as

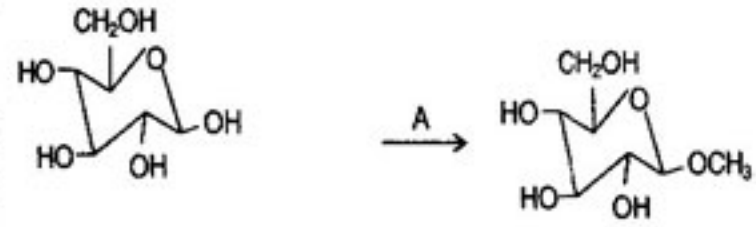
(A) $Q = q^N$

(B) $Q = Nq$

(C) $Q = RT\left(\frac{\partial \ln q}{\partial \ln v}\right)$

(D) $Q = \frac{q^N}{N}$

33. The reagent 'A' in the following reaction is



(A) CH_3I / Ag_2O

(B) $CH_3-C(=O)-O-C(=O)-CH_3$ / pyridine

(C) CH_3OH / H^+

(D) $CH_3-C(=O)-O-C(=O)-CH_3 / OH^-$

34. Which of the following reactions is an atom economy reaction ?

(A) Claisen condensation

(B) Friedel Crafts reaction

(C) Diels Alder reaction

(D) Perkin reaction

35. Which of the following solvents is an environmentally benign ?

(A) Acetone

(B) Acetic acid

(C) Water

(D) Tetrahydro furan

36. In the given nuclear fission reaction

$$^{235}_{92}u + {}^{1}_{0}n \longrightarrow {}^{144}_{56}Ba + X + 2\ {}^{1}_{0}n$$

indentify X from the following

(A) $^{92}_{36}Kr$

(B) $^{90}_{36}Kr$

(C) $^{91}_{35}Br$

(D) $^{89}_{35}Br$

37. Which among the following has a bond order equal to 1 ?

I. O_2^-

II. O_2^{2-}

III. O_2

IV. F_2

The correct combination is

(A) I, II

(B) I, IV

(C) II, IV

(D) III, IV

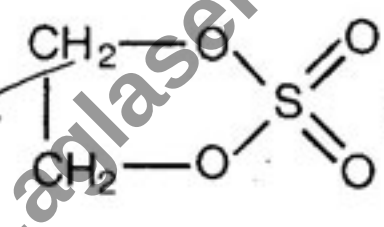
38. An alkaloid containing N-methylpiperidine moiety exhibits Narcotic analgesic activity is

(A) Atropine

(B) Nicotine

(C) Morphine

(D) Quinine

39.  exhibits in its NMR

(A) Two singlets

(B) Two doublets

(C) Two triplets

(D) One singlet

40. Camphor belongs to

(A) Acyclic monoterpene

(B) Monocyclic monoterpene

(C) Bicyclic monoterpene

(D) Acyclic sesquiterpene

41. The number of ESR lines obtained for hydrogen atom due to hyperfine coupling is

(A) 1

(B) 2

(C) 3

(D) 4

42. Which of the following is a hard acid-soft base pair ?

(A) La^{+3} and OH^-

(B) Co^{+2} and SO_3^{-2}

(C) Pt^{+2} and PO_4^{3-}

D) La^{+3} and CN^-

43. According to Debye-Huckel theory of strong electrolytes the electrophoretic effect which reduces the velocity of the ions is due to

(A) Interionic attraction

(B) Solvation of ions

(C) Ion pair formation

(D) Viscosity of the solvent

44. The rate constant of a diffusion controlled reaction (k_D) is related to the viscosity of the medium (η) in the following manner

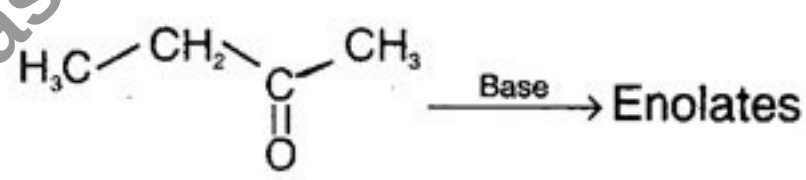
(A) $K_D \alpha \eta$

(B) $K_D \alpha \eta^{-1}$

(C) $K_D \alpha \eta^2$

(D) $K_D \alpha \eta^{-2}$

45. How many types of enolates are possible by treating ethylmethylketone with a base ?



(A) One

(B) Two

(C) Three

(D) Four

46. Indicate the types of pericyclic reactions in the following conversions.

7 – Dehydrochotesterol $\xrightarrow{h\nu}$ [X] $\xrightarrow{\Delta}$ Vitamin D

(A) Electrocyclic reactions

(B) Sigmatropic shifts

(C) Electrocyclic and sigmatropic shift

(D) Cycloadditions

47. Strongest super acid among the following is

(A) SbF_5 in HI

(B) SbF_5 in HF

(C) $SbCl_5$ in HI

(D) $SbCl_5$ in HCl

48. The coordination number of iron in cytochrome 'C' is

(A) 4

(B) 5

(C) 6

(D) 3

49. The correct statement regarding adsorption of gases on solid surfaces is

(A) Langmuir and BET equations are applicable to monolayer adsorption

(B) Langmuir and BET equations are applicable to multilayer adsorption

(C) Langmuir equation is applicable to monolayer adsorption and BET equation is applicable to multilayer adsorption

(D) Langmuir equation is applicable to multilayer adsorption and BET equation is applicable to monolayer adsorption

50. According to band theory of solids, the donor band in a n-type semiconductor is

(A) close to valence band of parent material

(B) close to conduction band of parent material

(C) mixed with valence band of parent material

(D) mixed with conduction band of parent material