Entrance Test for Enrollment in Ph.D. Programme
July 2017

Time: 120 Mins.   **Max. Marks: 120**

| Stream : **Applied Sciences** | Discipline : **Chemistry** | Set : **A** | Test ID : 61 |

Name :

Father's Name :

Roll Number :   Date :

Roll Number in words :

Signature of Candidate :

Signature of Invigilator :

IMPORTANT INSTRUCTIONS

- Do not Open seal before start of Exam.
- Fill all the information in various columns in capital letters, with blue/black ball point pen.
- Use of calculators is not allowed.
- All questions are compulsory. No negative marking for wrong answers.
- Each question has only right answer.
- Questions attempted with two or more options/answers will not be evaluated.
- Kindly bring any one of the original photo-identity proofs at the time of entrance test, like Voter ID Card, Driving License, PAN Card or Passport along with **ADMIT CARD.**
- Study the instructions carefully before the start of examination.
- The time duration for the test will be 120 minutes.
- You must report at examination centre 30 minutes prior to examination.
- Test will comprise of two sections. The Section-I will comprise of Research Methodology and section-II will be Subject specific. Each Section will comprise of 60 questions carrying each making total paper of 120 marks.
- **It will be compulsory for the candidate to secure minimum passing marks in each section (which amounts to be 50% i.e. 30 marks for the general category and 45% i.e. 27 for reserved categories in each section)**. The passing marks will be 50% of the total i.e. 60 marks for general category and 45% for reserved categories i.e. 54 marks.
- The questions paper will comprise of Multiple Choice Questions.
- Each question will have only one right answer.
- Blank, Cutting, Erasing, Half filling or Question attempted with two or more answers will not be evaluated
- There is no negative marking for wrong answers.
- OMR sheet should not be folded or crushed.
- Use only **BLACK BALL POINT PEN** to fill the ovals.
- Use of pencil is strictly prohibited.
- Ovals on **OMR sheet** should be darkened completely and properly filled.
- Cutting and erasing on **OMR sheet** is not allowed.
- Do not use any stray marks on the **OMR sheet**.
- Do not use marker or white fluid to hide the marks.
- Fill **ROLL NUMBER** and **TEST ID** carefully on the **OMR sheet.**
- Use of calculator is not allowed.
- Log tables may be provided for calculation work, if required.
- The medium of the examination is English only.
- No sheet will be provided for the rough work. Reverse side of the question paper can only be used for rough work.
- **Carrying mobile phones, electronic gadgets, notes or extra papers in examination hall is not allowed.**

Research Methodology

Section -I

1. Which of the following is the best way to test a hypothesis according to the hypothetico-deductive method?
    a. By finding evidence which supports the hypothesis.
    b. By repeating a study looking for consistency in outcomes.
    c. By rejecting the hypothesis.
    d. By looking for instances where the hypothesis fails.
2. Which of the following are the most similar?
    a. Ordinal, interval and ratio data
    b. Nominal, ratio, and interval data
    c. Nominal and ratio data
    d. Nominal, ordinal and ratio data
3. What sort of variable is dress size?
    a. Ordinal
    b. Ratio
    c. Nominal
    d. Dependent
4. What is deemed a good measure of the quality of a journal?
    a. The intake factor.
    b. The impact factor.
    c. The OPAC factor.
    d. The influence factor.
5. Variables in a cross-sectional design are:
    a. nominal data.
    b. a mixture of both score and nominal data.
    c. frequencies.
    d. score data
6. Studies which measure the same variables in the same cases over time are called:
    a. lagged.
    b. panel.
    c. cross-lagged.
    d. synchronous.
7. Response rate refers to:
    a. how confident you want to be about your results.
    b. how variable participants' responses are.
    c. the proportion of people who take part in a study.
    d. how big a population is.
8. The difference between the mean of a researcher's sample and the mean of the population of the sample is known as the:
    a. sampling error.
    b. significance level.
    c. confidence interval.
    d. standard deviation.
9. The purpose of research is:
    a. to extend the conceptual understanding of a topic.

    b.   that the empirical work should be testing a theory.

    c.   primarily to get more data.

    d.   to produce work of publishable quality.

10. Which of the following is the first step in starting the research process?

    a.   Searching sources of information to locate problem.

    b.   Survey of related literature

    c.   Identification of problem

    d.   Searching for solutions to the problem

11. Questionnaire is a

    a.   Research method

    b.   Measurement technique

    c.   Tool for data collection

    d.   Data analysis technique

12. Which of the following is not covered under Intellectual Property Rights ?

    a.   Copyrights

    b.   Patents

    c.   Trade Marks

    d.   Thesaurus

13. Field study is related to

    a.   real life situations

    b.   experimental situations

    c.   laboratory situations

    d.   none of the above

14. Which of the following is a non-probability sample ?

    a.   Quota sample

    b.   Simple random sample

    c.   Purposive sample

    d.   (a) and (c) both

15. Formulation of hypothesis may not be necessary in

    a.   survey studies

    b.   fact finding (historical) studies

    c.   normative studies

    d.   experimental studies

16. All are causes of non sampling errors except

    a.   faulty tools of measurement

    b.   inadequate sample

    c.   non response

    d.   defect in data collection

17. The review of the related study is important while undertaking a research because

    a.   it avoids repetition or duplication

    b.   it helps in understanding the gaps

    c.   it helps the researcher not to draw illogical conclusions

    d.   all of above

18. Of all of the steps in the research process, the one that typically takes the most time is

    a.   selecting a research method.

    b.   developing a hypothesis.

    c.   data collection.

    d.   formulating the problem.

19. A mean, median and mode are all examples of _____
    a. measures of correlation
    b. measures of enumeration
    c. measures of coefficients
    d. measures of central tendency
20. Research carried out to portray accurately the characteristics of a particular individual, situation or a group are termed as
    a. Exploratory
    b. Descriptive
    c. Diagnostic
    d. None of these
21. A _____ is conducted to detect weaknesses in research instrument's design
    a. Pilot study
    b. Questionnaire
    c. Interview
    d. Sampling
22. One of the important characteristics of a good research is that the purpose of the research is
    a. Clearly defined
    b. Vaguely defined
    c. Not defined
    d. All of the above
23. In order to deliver a good research, a researcher should confine the conclusions to those justified by
    a. The Data
    b. The Perception of Researcher
    c. The Intuition
    d. The Guide
24. The research plan should include
    a. Research objective
    b. Research Methods
    c. Sampling Plan
    d. All of these
25. Which of the following are excellent sources for research topics?
    a. Theory
    b. Personal experience
    c. Replication of prior research
    d. All of the above
26. A review of the literature should enable an investigator to do which of the following?
    a. Ascertain what is already known about a topic.
    b. Identify methodological strategies for designing the study.
    c. Provide the insight necessary to develop a logical framework into which the topic fits.
    d. All of the above.
27. The Internet has become an accepted source of information for educational research. Which of the following is NOT an indicator of the quality of information found on the Internet?
    a. The number of "hits" for the site
    b. The honesty with which information is reported and presented
    c. The authenticity of the information
    d. The lack of bias
28. A literature review should be characterized by all of the following EXCEPT

4

a.   summarize and report each article.

b.   use important topics as the organizing structure of the review.

c.   analyze all articles for similarities and differences related to major topics.

d.   discuss implications relative to the research problem.

29. Which of the following is the BEST hypothesis?

a.   Students taking formative quizzes will perform better on chapter exams than students not taking these quizzes.

b.   Taller students will have higher test scores than shorter students.

c.   Students taught in a cooperative group setting should do better than students in a traditional class.

d.   Students using laptops will do well.

30. Which of the following statistics is most closely related to the standard error of the mean?

a.   Mean

b.   Standard deviation

c.   Z score

d.   Correlation

31. A significant result of a chi square test of significance would suggest the researcher should

a.   accept the null hypothesis.

b.   reject the null hypothesis.

c.   reject the alternative hypothesis.

d.   replicate the study.

32. Ram has set a very conservative alpha level of .001 for his analysis. He is likely concerned about a

a.   Type I error.

b.   Type II error.

c.   standard error.

d.   test of significance.

33. Mr. Sham has identified two groups of students to participate in his study examining the effectiveness of using algebra tiles. One group will use these manipulatives while a second group will receive a traditional lecture approach. Which test should be used to test the differences between the mean scores for the two classes?

a.   t test for dependent samples

b.   t test for independent samples

c.   Chi square

d.   Scheffé post hoc comparison

34. Which of the following is a common post hoc test?

a.   Scheffé

b.   Tukey HSD

c.   Duncan's Multiple Range Test

d.   All of the above

35. Ms. Rani is making decisions to accept students into her college based on a prediction of a student's future performance derived from his or her high school GPA, ACT score, and college placement test score. Which statistical procedure did she use to develop this predictive process?

a.   ANOVA

b.   ANCOVA

c.   Multiple regression

d.   Chi square

36. Which section of a research report sets the stage for the report and indicates where in the report each component, tables, and figures can be found?

a.   Preliminary pages

    b.   Table of contents

    c.   Main body

    d.   Appendices

37. In which section is the researcher allowed greater flexibility to express opinions, discuss implications for educational practice, and suggest additional research?

    a.   Review of the literature

    b.   Significance of the study

    c.   Results

    d.   Discussion

38. An unhypothesized result represents a(n)

    a.   accepted null hypothesis.

    b.   rejected null hypothesis.

    c.   unintended result that appeared in the study.

    d.   statistical error.

39. The purpose of random sampling is to ensure

    a.   a sufficient sample size.

    b.   a clearly defined target population.

    c.   representativeness of the sample.

    d.   representation of specific subgroups in the population.

40. Which of the following is NOT a random sampling technique?

    a.   Purposive sampling

    b.   Stratified sampling

    c.   Cluster sampling

    d.   Systematic sampling

41. The logic of purposive sampling is

    a.   that a random sample can generalize to a population.

    b.   that a few information-rich participants studied in depth yield many insights about a topic.

    c.   to include all participants, even though they are not all relevant to the problem.

    d.   to use participants because the researcher has access to them.

42. Which of the following is a characteristic of a standardized test?

    a.   The administration of the test is controlled carefully to ensure that all examinees experience the same conditions.

    b.   The test is developed by experts to ensure it is technically sound.

    c.   The scores are interpreted in standard ways.

    d.   All of the above.

43. Which of the following is a characteristic of qualitative research?

    a.   It relies on disciplined inquiry.

    b.   It uses random sampling techniques.

    c.   It uses a static, fixed research design.

    d.   It is deductive in orientation

44. Memo writing helps accomplish all of the following EXCEPT

    a.   identify topics or issues for further exploration.

    b.   select appropriate participants.

    c.   identify areas that could provide focus for the formal data analysis.

    d.   provide opportunities to reflect on methodology.

45. Which of the following represents excellent advice for conducting an interview?

    a.   Listen more and talk less.

    b.   Don't interrupt.

    c.   Don't be judgmental about the interviewee's beliefs or views.

    d.   All of the above.

46. Which of the following types of items is likely to result in the most objective score?

    a.   Open-ended

    b.   Short answer

    c.   Multiple choice

    d.   Essay

47. Measures of variability indicate

    a.   the average score.

    b.   the central tendency of scores.

    c.   the extent to which scores differ from one another.

    d.   the relationships between variables.

48. Approximately what percentage of scores in a normal distribution fall between +1 and -1 standard deviations?

    a.   50

    b.   68

    c.   75

    d.   99

49. Mr. Ram has ranked the students in his class on the basis of their math scores. He wants to compare these ranks with the ranks of the same students in Ms.Rani's English class. Which correlation coefficient is appropriate for Mr. Ram to use?

    a.   Pearson r

    b.   Spearman rho

    c.   Mean

    d.   Quartile deviation

50. Primary data which is gathered by observing relevant actions and people is called

    a.   experimental research

    b.   ethnographic research

    c.   observational research

    d.   survey research

51. Idea generation by two or more people thinking as freely as possible is formally known as:

    a.   brainstorming.

    b.   the learning curve.

    c.   forced relationships.

    d.   clap-trapping.

52. Which ONE of these is an example of processed data?

    a.   Number of visitors to a store.

    b.   Tables from surveys.

    c.   Customer comments.

    d.   CCTV recordings of shopper visits.

53. Which ONE is an advantage of secondary data?

    a.   May be outdated.

    b.   May not be accurate.

    c.   Expensive.

    d.   Already exist.

54. With efficient IPR system, India becomes prosperous in terms of "Knowledge Economy", which is a boon towards the goal of VISION-____?

    a.   2020

b. 2030

c. 2040

d. 2050

55. The copyrights does not include rights in form of

a. news-paper items,

b. land ownership

c. story books,

d. poetry books,

56. In India, Patent rights are governed by

a. Patent Act, 1970

b. Patent Act, 1980

c. Patent Act, 1990

d. Patent Act, 1950

57. A mark shall not be registered as a trade mark if

a. It is of such nature as to deceive the public or cause confusion:

b. It contains or comprises of any matter likely to hurt the religious susceptibilities of any class or section of the citizens of India;

c. It comprises or contains scandalous or obscene matter

d. All of these

58. Computer programmes are protected under the

a. Copyright Act

b. Trademark Act

c. Patent Act

d. All of these

59. The general rule is that copyright lasts for

a. 45 Years

b. 50 Years

c. 55 Years

d. 60 Years

60. The existing legislation on industrial designs in India is contained in the New

a. Designs Act, 2000

b. Designs Act, 2009

c. Designs Act, 1995

d. Designs Act, 2015

61. In which one of the following species does the transition metal ion have d^3 electronic configuration?

    (a) $[Cr(NH_3)_6]^{3+}$
    (b) $[Co(OH_2)_6]^{2+}$
    (c) $[CoF_6]^{3-}$
    d) $[Fe(CN)_6]^{3-}$

62. Which of the following shows a charge transfer band?

    a) Lanthanum Nitrate
    b) Ceric ammonium nitrate
    c) Manganese (II) acetate
    d) Copper(II) sulphate pentahydrate

63. The ligand present in vitamin B_{12} is

    (a)   porphyrin
    (b)   corrin
    (c)   phthalocyanine
    (d)   Crown ether

64. Which of the following has the lowest melting point?
    (a)   LiCl
    (b)   NaCl
    (c)   KCl
    (d)   RbCl

65. To compare the electronic absorption spectra of three iron(II) complexes, you want to combine the three spectra in one plot. You should plot

    a).   Extinction coefficient against wavelength
    b).   Absorbance against wavelength
    c).   Absorbance against wavelength
    d).   Absorbance against wavenumber

66. The correct statement in the context of NMR spectroscopy is

    a). static magnetic field is used to induce transition between the spin states
    b). magnetization vector is perpendicular to the applied static magnetic field
    c). the static magnetic field is used to create population difference between the spin states
    d). static magnetic field induces spin-spin coupling

67. Values of I (natural abundance) for ^{11}B and ^{1}H are 3/2 (80%) and 1/2 (100%) respectively. The ^{11}B NMR spectrum of $NaBH_4$ show
    a).   a $1:1:1:1$ signal
    b).   a binomial quartet
    c).   a non-binomial 5-line signal
    d).   a binomial quintet.

68.   Consider the complex ion $[Mn(OH_2)_6]^{2+}$ with 5 unpaired electrons. Which response includes all the following statements that are **true**, and no false statements?

I. It is diamagnetic.
II. It is a low spin complex.
III. The metal ion is a d^5 ion.
IV. The ligands are weak field ligands.
V. It is octahedral.

a).   I, II
b).   III, IV, V
c).   I, IV
d).   II, V

69.   When Pt and Co are electrically connected, which one gets corroded?

(a) Pt
(b) Co
(c) None
(d) Can't decide

70.   Which name formula combination is NOT correct?

FORMULA	NAME
(a) $[Co(NH_3)_4(OH_2)I]SO_4$	tetraammineaquaiodocobalt(III) sulfate
(b) $K[Cr(NH_3)_2Cl_4]$	potassium diamminetetrachlorochromate(III)
(c) $[Mn(CN)_5]_2$	pentacyanomanganate(II) ion
(e) $[Ni(CO)_4]$	tetracarbonylnickel(0)

71.   In which mode of expression, the concentration of solution remains independent of temperature
a.   Molarity
b.   Normality
c.   Formality
d.   Molality

72.   The complex with spin only magnetic moment of approximately 4.9 B.M. is

a. $[Fe(H_2O)_6)]^{2+}$
b. $[Fe(CN)_6)]^{3-}$
c. $[Fe(CN)_6)]^{4-}$
d. $[Fe(H_2O)_6)]^{3+}$

73.   Which statement is incorrect about typical metal carbonyl complexes $M(CO)_n$
a).   They are likely to obey the 18-electron rule
b).   They contain π-acceptor ligands
c).   M is in a zero oxidation state
d).   They are likely to be paramagnetic

74.   Which of the following complexes does not obey the 18-electron rule

a). $[Rh(CO)_2I_2]^-$

10

b). $[Co(CO)_4]^-$

c). $[Mn(CO)_5]^-$

d). none of above

75. Among the following, both microwave and rotational Raman active molecule is

   a. CH_4
   b. N_2O
   c. C_2H_4
   d. CO_2

76. For Raman spectra, the molecule must have

   a. Isotropic polarisability
   b. anisotropic polarisability
   c. oscillating dipole moment
   d. all of above

77. In spectrochemical series which ligand produce strong field

   a. Cl^-
   b. H_2O
   c. OH^-
   d. CN^-

78. The symmetry point group of SF_4 is

   a. C_{2v}
   b. C_{3h}
   c. D_{4h}
   d. C_{4v}

79. The Two-line method, Source Modulation method and the Zeeman effect are important in atomic absorption spectroscopy because they:

   a) correct for absorbance from molecular species
   b) correct for the background created by the flame
   c) allow for the measurement of a small signal against a large background
   d) all of the above

80. The compound which behaves as acid in sulphuric acid (H_2SO_4) is

   a. HNO_3
   b. $HClO_4$
   c. HCl
   d. NH_3

81. The decay of radioactive sample is increased by increasing
   a. Temperature
   b. Pressure
   c. size of sample
   d. None of these

11

82. In the reaction shown below X and Y respectively are $Fe_3(CO)_{12}$

$$Fe_3(CO)_{12} \xrightarrow{Na} X \xrightarrow{CH_3COCl} Y$$
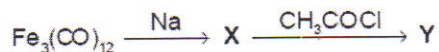
(a) $[Fe(CO)_4]^{2-}$; $[CH_3C(O)Mn(CO)_5]^-$
(b) $[Fe(CO)_4]^{2-}$; $[CH_3COMn(CO)_4]^-$
(c) $[Fe(CO)_5]^-$; $[ClFe(CO)_5]$
(d) $[Fe(CO)4]^{2-}$; $[ClMn(CO)_5]^-$

83. According to the transition state theory, the plot with slope equal to $\dfrac{-\Delta H^{\neq}}{R}$ is

a. $\ln k$ vs. T

b. $\ln\left(\dfrac{k}{T}\right)$ vs. T

c. $\ln\left(\dfrac{k}{T}\right)$ vs. $\dfrac{1}{T}$

d. None of above

84. The Freezing point of 1% solution of $Ca(NO_3)_2$ in water will be

a. below 0°C
b. 0°C
c. 1°C
d. None of above

85. For a reversible reaction if the concentrations of the reactants are doubled, equilibrium constant will be
a. doubled
b. halved
c. one fourth
d. the same

86. The temperature of gas is changed from 127°C to 527°C. The average kinetic energy of gas is
a). doubled
b). does not change
c). is halved
d). none of above

87. E^0 for $F_2 + 2e^- = 2F^-$ is 2.8V, E^0 for $1/2F_2 + e^- = F^-$ will be

a. 2.8V
b. 1.4V
c. -2.8V
d. none of above

88. Which of the following techniques will be used to distinguish between M-SCN and M-NCS binding modes

a. NMR

12

b. IR

c. ESR

d. Mass

89. Stability of lyophobic dispersions is determined by

   a). inter-particle electric double layer repulsion and intra-particle van der Waals attraction
   b).. inter-particle electric double layer attraction and intra-particle van der Waals repulsion
   c). inter-particle excluded volume repulsion and intra-particle van der Waals attraction
   d). inter-particle excluded volume attraction and intra-particle van der Waals repulsion

90. The illustrated wavefunction represents the state of the linear harmonic oscillator with n=
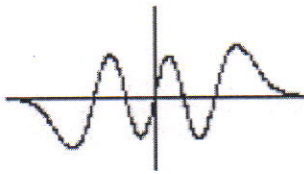
   a. 5
   b. 3
   c. 4
   d. None of above

91. The potential for a hydrogen electrode of pH =10 is

   a. 0.00V
   b. 0.591V
   c. -0.591V
   d. 0.0591V

92. Using the fundamental equation $dH = TdS + VdP$ the maxwell relation is

   $$a = \left(\frac{\partial T}{\partial P}\right)_S = \left(\frac{\partial V}{\partial S}\right)_P$$

   $$b = \left(\frac{\partial S}{\partial P}\right)_T = -\left(\frac{\partial V}{\partial T}\right)_P$$
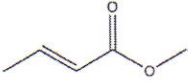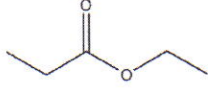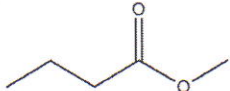
   $$c = \left(\frac{\partial T}{\partial V}\right)_S = \left(\frac{\partial P}{\partial S}\right)_T$$

   d= None of above

93. Which of the following is +ve sol
   a. Blood
   b. Clay soil
   c. smoke
   d. gelatin in acidic solution

13

94. If one mole of ammonia and one mole of hydrogen chloride are mixed in a closed container to form ammonium chloride gas, if Δu is change in internal energy, then
    a. $\Delta H > \Delta u$
    b. $\Delta H < \Delta u$
    c. $\Delta H = \Delta u$
    d. none of above

95. EPR spectroscopy is often used to investigate copper(II) complexes but not copper(I) complexes. This is because:

    a). Cu^{2+} has an s^1d^8 configuration but Cu^+ is d^{10}

    b). Cu^{2+} has a d^9 configuration but Cu^+ is s^1d^9

    c). Cu^{2+} has an s^2d^7 configuration but Cu+ is d^{10}

    d). Cu^{2+} has a d^9 configuration but Cu+ is d^{10}

96. In FTIR:

    a) S/N is proportional to the number of scans
    b) requires absorbance to observed by sequentially scanning through IR bandwidth
    c) both the sensitivity and resolution are increased compared to traditional IR
    d) FTIR is much slower than traditional IR

97. The mass spectrum of this substance shows fragment ions at m/z = 15, 43, 59, 87. What could be the identity of the substance?

    a.

    b.

    c.

    d.

98. The behavior of super-heated vapour is similar to that of
    a). Perfect gas
    b). Air
    c). Steam
    d). Ordinary gas

99. How many unpaired electrons are there in a strong field iron(II) octahedral complex?

    (a) 0
    (b) 1

14

(c) 2
(d) 4

100.   Which molecule absorbs at the longest wavelength?
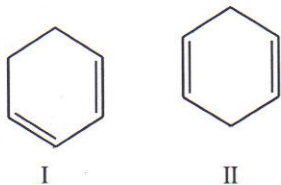
I   II
a). II
b). I
c). Both at same wavelength
d). they are UV Inactive

101.   Among the given compounds, the one which is least basic is

a   b.

c.   d.
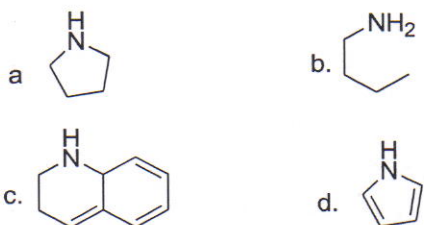
102.   Which of the following is aromatic?

a.

b.   HC

c.

d.
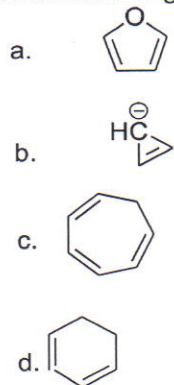
103.   The final product "B" formed in the following reaction is

a).   b).

c).   d). none of above

15
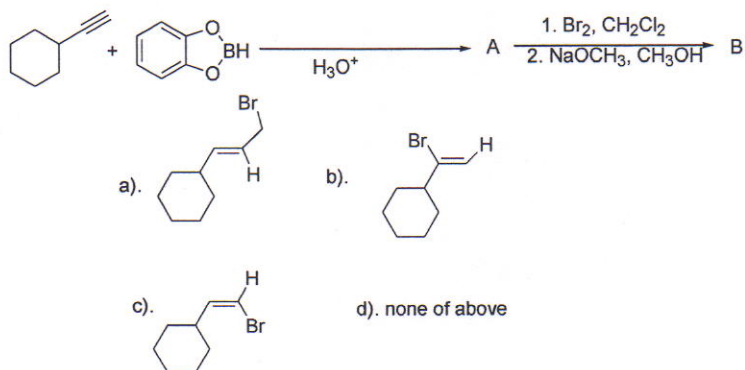
104. According to Wade's rules, the correct structural types of $[Co(\eta^5\text{-}C_5H_5)B_4H_8]$ and $[Mn(\eta^2\text{-}B_3H_8)(CO)_4]$ are

    a). *closo* and *nido*
    b). *nido* and *arachno*
    c). *closo* and *arachno*
    d). *nido* and *nido*

105. The major product formed in the following reaction is

  i. t-BuLi
  ii. ICH₂CH₂Cl

    a.
    b.
    c.
    d.

106. The correct structure of A and B in the following reactions is

    a)
    b)
    c)
    d)

107. Which of the following does not possess any element of symmetry

    a. Ethane
    b. (+) tartaric acid
    c. Carbon tetrachloride
    d. Mesotartaric acid

108. The relative rate of the solvolysis of iodides A-C are

A   B   C
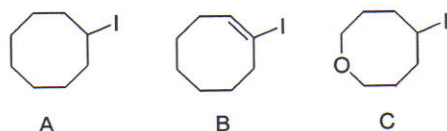
a). C>A>B
b). A>B>C
c). B>A>C
d). B>C>A

109. A suitable reagent for following transformation is
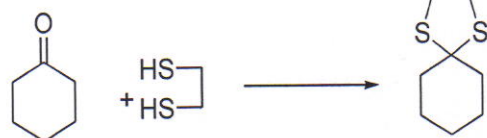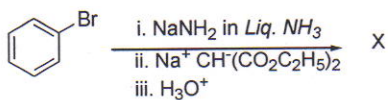

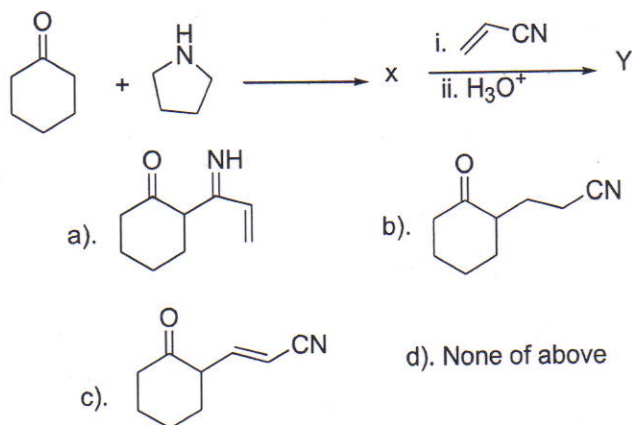a). $BF_3.Et_2O$
b). NaOEt
c). Tungstein Lamp
d). none of above

110. The major product formed in the following reaction is

i (+)DET
ii. $(CH_3CO)_2O$, Py

a).

b).

c).

d).
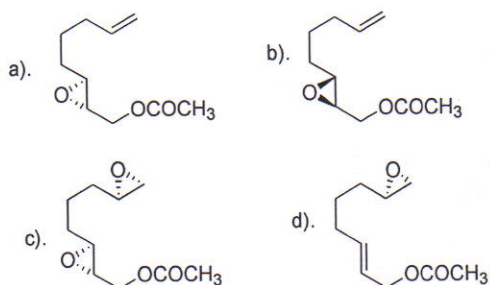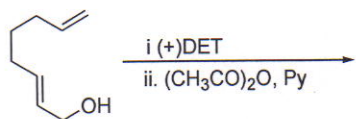
111. What is the structure of "X" in following reaction?

i. $NaNH_2$ in *Liq.* NH_3
ii. $Na^+ CH^-(CO_2C_2H_5)_2$
iii. H_3O^+

X

a).

b).

c).

d).

17
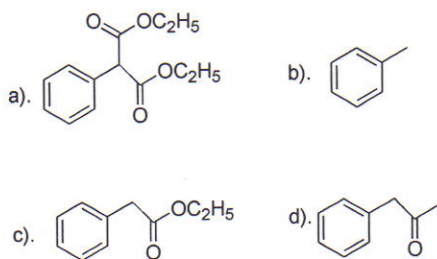
112. What is the structure of "Y" in following reaction?
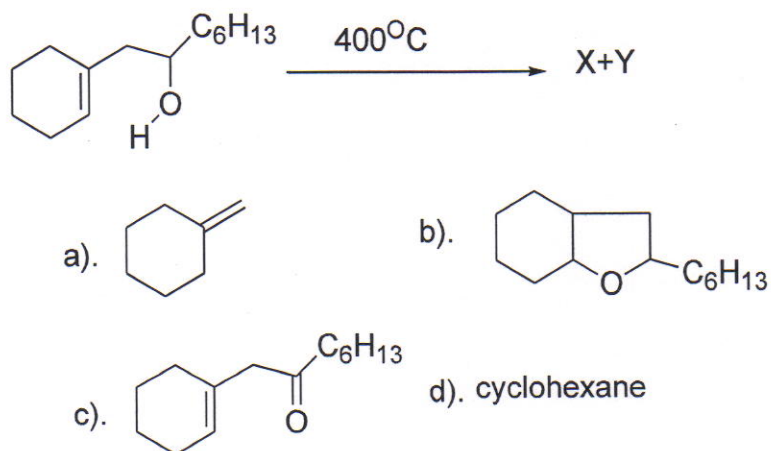

a).

b).

c).

d). None of above

113. Arbuzov reaction is
a). reaction of alkyl halides with trialkyl phosphite
b). reaction of alkyl halide with tributyltin hydride
c). reaction of alkyl halide with triphenylphosphine
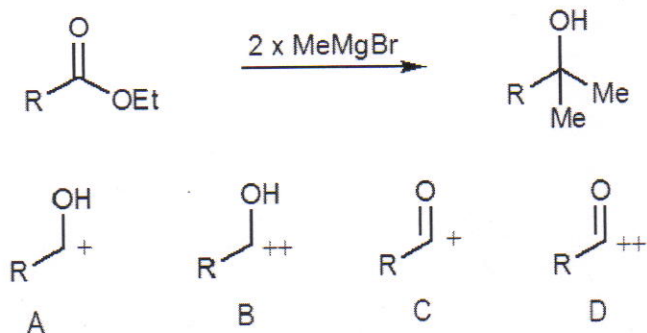d). reaction of alkyl halide with boronic esters

114. What is the structure of "Y" in following reaction?

i. C_6H_5SeOH, CH_2Cl_2
ii. $t-C_4H_9OOH$,

a).

b).

c).

d).
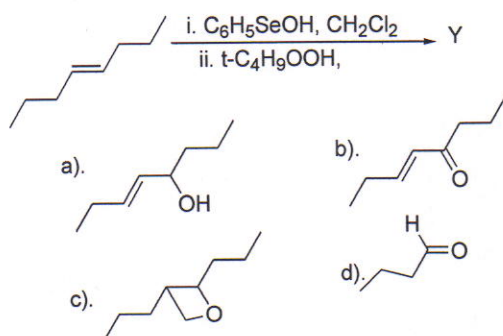
115. What is the structure of "X or Y" in following reaction

C_6H_{13} $400^\circ C$ X+Y

a).

b).

c).

d). cyclohexane

18

116. Which synthon (A-D) corresponds to the following reaction?

2 x MeMgBr

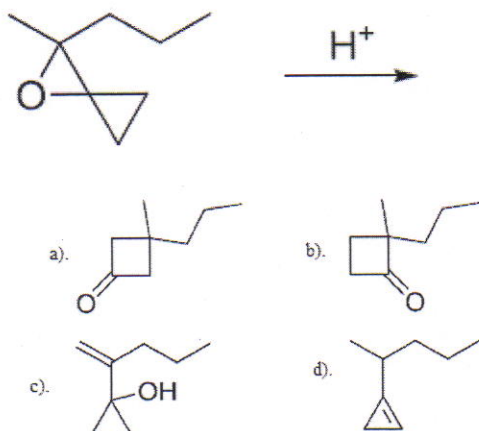A, B, C, D options with structures

117. Which of the following statements best describes retrosynthesis?

a) The reaction conditions required to convert the product of a reaction back to the original starting materials
b) A strategy used to design a synthesis of a target molecule by working back from the target to simple starting materials
c) The design of a synthetic scheme using cheap, traditional reagents, rather than expensive modern reagents
d) The design of reaction conditions such that an equilibrium reaction is pushed towards the products rather than the starting materials.
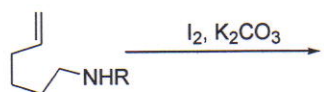
118. Which of the following synthons is an example of Umpulong
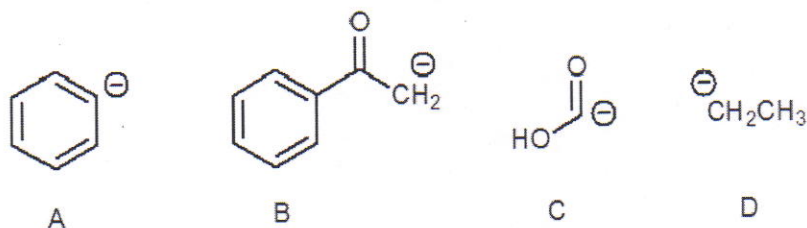
A   B   C   D

119. What is the product in the following case?

H+

a). b). c). d).

19

120. What is the product in the following case?

I_2, K_2CO_3

a).

b).

c).

d).