

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, TRIVANDRUM

ENTRANCE EXAMINATION: NOVEMBER, 2016

PROGRAMME: PhD – CHEMICAL SCIENCES STREAM

Duration: 120 Minutes

Total Marks: 100

(Select the most appropriate answer; Each question carries one mark; There is no negative marking)

- 1) A train running at the speed of 60 km/hr crosses a pole in 9 seconds. What is the length of the train?
a) 120 meters b) 180 meters c) 324 meters d) 150 meters
- 2) The angle of elevation of a ladder leaning against a wall is 60° and the foot of the ladder is 4.6 m away from the wall. The length of the ladder is:
a) 2.3 m b) 4.6 m c) 7.8 m d) 9.2 m
- 3) A sum of money at simple interest amounts to Rs. 815 in 3 years and to Rs. 854 in 4 years. The sum is:
a) Rs. 650/- b) Rs. 690/- c) Rs. 698/- d) Rs. 700/-
- 4) Alfred buys an old scooter for Rs. 4700 and spends Rs. 800 on its repairs. If he sells the scooter for Rs. 5800, his gain percent is:
a) 4.57% b) 5.45% c) 10% d) 12%
- 5) A fruit seller had some apples. He sells 40% apples and still has 420 apples. Originally, he had
a) 588 apples b) 600 apples c) 672 apples d) 700 apples
- 6) Today is Monday. After 61 days, it will be
a) Wednesday b) Saturday c) Tuesday d) Thursday
- 7) The average monthly income of P and Q is Rs. 5050. The average monthly income of Q and R is Rs. 6250 and the average monthly income of P and R is Rs. 5200. The monthly income of P in rupees is:
a) 3500 b) 4000 c) 4050 d) 5000
- 8) Which one of the following is not a prime number?
a) 31 b) 61 c) 71 d) 91
- 9) If $a - b = 3$ and $a^2 + b^2 = 29$, find the value of ab .
a) 10 b) 12 c) 15 d) 18

10) A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

- a) $10/21$ b) $11/21$ c) $2/7$ d) $5/7$

11) An accurate clock shows 8 o'clock in the morning. Through how many degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?

- a) 144° b) 150° c) 168° d) 180°

12) Find the statement that must be true according to the given information:

Sheela is twelve years old. For three years, she has been asking her parents for a dog. Her parents have told her that they believe a dog would not be happy in an apartment, but they have given her permission to have a bird. Sheela has not yet decided what kind of bird she would like to have.

- a) Sheela's parents like birds better than they like dogs
b) Sheela does not like birds.
c) Sheela and her parents live in an apartment
d) Sheela and her parents would like to move

13) Odometer is to mileage as compass is to

- a) Speed b) Hiking c) Needle d) Direction

14) Optimist is to *cheerful* as pessimist is to

- a) Gloomy b) Mean c) Petty d) Helpful

15) Statement: **Unemployment allowance should be given to all unemployed Indian youth above 18 years of age.**

Assumptions:

- I) There are unemployed youth in India who needs monetary support.
II) The government has sufficient funds to provide allowance to all unemployed youth.

- a) Only assumption I is implicit
b) Only assumption II is implicit
c) Either I or II is implicit
d) Neither I nor II is implicit

16) Statements: **All mangoes are golden in colour. No golden-coloured things are cheap.**

Conclusions:

- 1) All mangoes are cheap.
2) Golden-coloured mangoes are not cheap.

- a) Only conclusion I follows
b) Only conclusion II follows
c) Either I or II follows
d) Neither I nor II follows

17) Look at this series: 7, 10, 8, 11, 9, 12, What number should come next?

- a) 7 b) 10 c) 12 d) 13

18) The words in the bottom row are related in the same way as the words in the top row. For each item, find the word that completes the bottom row of words.

Candle Lamp Floodlight
Hut Cottage ???

- a) Tent b) City c) Dwelling d) House

19) Apple Fruit Supermarket
Novel Book ???

- a) Vegetable b) Magazine c) Bookstore d) Shopping

20) Here are some words translated from an artificial language.

gorblflur means fan belt

pixngorbl means ceiling fan

arthtusl means tile roof

Which word could mean "ceiling tile"?

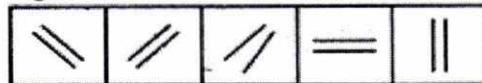
- a) gorbltusl b) flurgorbl c) arthflur d) pixnarth

21) A word is underlined followed by four answer choices. You will choose the word that is a necessary part of the underlined word

Book

- a) Fiction b) Pages c) Pictures d) Learning

22) Choose the figure which is different from the rest.



- (1) (2) (3) (4) (5)

- a) 1 b) 2 c) 3 d) 4

23) Choose the figure which is different from the rest.



- (1) (2) (3) (4) (5)

- a) 5 b) 2 c) 3 d) 1

24) Choose the alternative which closely resembles the mirror image of the given combination.

TARAIN1014A

(1) AƆ101NIARAL

(2) A101ƆNIARAT

(3) A101ƆTARAIN

(4) AƆ101NIARAT

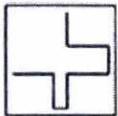
a) 1

b) 2

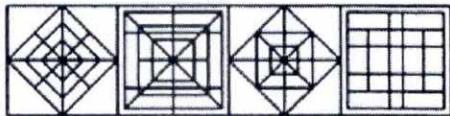
c) 3

d) 4

25) Find out the alternative figure which contains figure (X) as its part.



(X)



(1)

(2)

(3)

(4)

a) 1

b) 2

c) 3

d) 4

26) Identify the figure that completes the pattern



(X)



(1)



(2)



(3)



(4)

a) 1

b) 2

c) 3

d) 4

27) Find the correctly spelt word.

a) Efficient

b) Treatment

c) Beterment

d) Employd

28) Find the correctly spelt word.

a) Ommineous

b) Omineous

c) Ominous

d) Omenous

29) The study of ancient societies is known as

a) Anthropology

b) Archaeology

c) History

d) Ethnology

30) List of the business or subjects to be considered at a meeting is termed as

a) Schedule

b) Timetable

c) Agenda

d) Plan

31) Which of phrases given below each sentence should replace the phrase printed in *italics* type to make it grammatically correct?

The small child does whatever his father *was done*.

a) has done

b) did

c) does

d) had done

32) The man *to whom I sold* my house was a cheat.
a) to whom I sell b) to who I sell c) who was sold to d) to whom I sold

33) From the given alternatives, choose the one which best expresses the given sentence in Indirect/Direct speech.

"If you don't keep quiet I shall shoot you", he said to her in a calm voice.

- a) He warned her to shoot if she didn't keep quiet calmly.
- b) He said calmly that I shall shoot you if you don't be quiet.
- c) He warned her calmly that he would shoot her if she didn't keep quiet.
- d) Calmly he warned her that be quiet or else he will have to shoot her

34) Pick out the most effective word from the given words to fill in the blank to make the sentence meaningfully complete.

Fate smiles those who untiringly grapple with stark realities of life

- a) with b) over c) on d) round

35) If you smuggle goods into the country, they may be by the customs authority.

- a) Possessed b) Punished c) Confiscated d) Fined

36) Joule is the unit of

- a) Temperature b) Pressure c) Energy d) Heat

37) For which of the following disciplines is Nobel Prize awarded?

- a) Physics and Chemistry
- b) Physiology or Medicine
- c) Literature, Peace and Economics
- d) All of the above

38) Professor Amartya Sen is famous in which of the fields?

- a) Biochemistry b) Electronics c) Economics d) Geology

39) What is the name of the CalTech seismologist who invented the scale used to measure the magnitude of earthquakes?

- a) Charles Richter b) Hiram Walker c) Giuseppe Mercalli d) Joshua Rumble

40) Sometimes computers are connected to a UPS system. What does UPS mean?

- a) United Parcel Service
- b) Uniform Product Support
- c) Under Paneling Storage
- d) Uninterruptable Power Supply

- 41) Which of the following property does not have any unit?
a) Ionization Potential
b) Electronegativity
c) Atomic radii
d) electron affinity
- 42) The quantum number not obtained from the Schrodinger wave equation is
a) n b) l c) m d) s
- 43) A biological catalyst is
a) amino acid b) enzyme c) vitamin d) carbohydrate
- 44) Which of the following has the highest lattice energy?
a) CsI b) KBr c) NaCl d) LiF
- 45) Which of the following does not form metal carbonyl?
a) Mn b) Bi c) Cr d) Co
- 46) In S_N2 reaction, the product is
a) partly racemized
b) completely racemized
c) partly inverted
d) completely inverted
- 47) Which of the following reaction can take place in presence of UV light?
a) Wittig reaction
b) Fries rearrangement
c) Clemmenson reduction
d) Stobbe condensation
- 48) Free radicals are
a) negatively charged, paramagnetic
b) positively charged, paramagnetic
c) negatively charged, diamagnetic
d) neutral, paramagnetic
- 49) The most unstable conformation of cyclohexane is
a) chair b) half-chair c) twist-boat d) boat
- 50) The IUPAC name for urea is
a) diamide ketone
b) carbamide
c) amine formamide
d) diamine methanone

- 51) Pyridine reacts with HCl to form
a) Pyridinium chloride
b) 2-chloropyridine
c) 3-chloropyridine
d) All of these
- 52) Which of the following heterocyclic compounds is not aromatic?
a) Pyridine b) Pyrrole c) Furan d) Piperidine
- 53) An example of a thermosetting polymer is
a) Polyamide b) Polyethylene c) Phenol-Formaldehyde resin d) Polystyrene
- 54) Which of the following are used as PVC stabilizers?
a) Organolithium compounds
b) Organoaluminium compounds
c) Organotin compounds
d) Organotitanium compounds
- 55) Which of the following is the most reactive noble gas element?
a) Xe b) Ne c) Ar d) He
- 56) Which of the following species has intramolecular hydrogen bond?
a) Paranitro phenol
b) Orthonitro phenol
c) Phenol
d) Nitroethane
- 57) The coordination numbers of Ca^{2+} ion and F^- ion in CaF_2 crystal are respectively
a) 4 and 8 b) 8 and 4 c) 5 and 8 d) 4 and 6
- 58) The splitting of spectral lines when the source is placed in an electric field is known as
a) Stark effect b) Zeeman effect c) Compton effect d) Kerr effect
- 59) In Joule Thomson expansion,
a) $\Delta H = 0$ b) $\Delta S = 0$ c) $\Delta V = 0$ d) $\Delta G = 0$
- 60) The effect of a catalyst in a chemical reaction is to change the
a) equilibrium concentration
b) heat of reaction
c) activation energy
d) final products
- 61) If uranium (mass number 238 and atomic number 92) emits an alpha particle, the product respectively has mass number and atomic number
a) 236 and 92 b) 234 and 90 c) 238 and 90 d) 236 and 90

- 62) In a galvanic cell,
a) Cations move towards cathode and anions move towards anode
b) Cations move towards anode and anions towards cathode
c) Both cations move towards cathode
d) Both cations move towards anode
- 63) Which of the following *will not* undergo aldol condensation?
a) acetaldehyde
b) Propanaldehyde
c) Benzaldehyde
d) Trideuteroacetaldehyde
- 64) Amongst the following, the most basic compound is
a) Benzyl amine b) Aniline c) Acetanilide d) p-nitroaniline
- 65) Methylacetylene contains
a) 6 sigma bonds and 2 pi bonds
b) 3 sigma bonds and 2 pi bonds
c) 1 methyl group and 2 triple bonds
d) 1 sigma bond and 2 pi bonds
- 66) The compound that is not a Lewis acid is
a) BF_3 b) AlCl_3 c) BeCl_2 d) SnCl_4
- 67) Marshall's acid is
a) H_2SO_5 b) $\text{H}_2\text{S}_2\text{O}_5$ c) $\text{H}_2\text{S}_2\text{O}_7$ d) $\text{H}_2\text{S}_2\text{O}_8$
- 68) Mark-Howink-Sakurada Equation relates to determination of
a) Number average molecular weight of polymers
b) Weight average molecular weight of polymers
c) Viscosity average molecular weight of polymers
d) Z-average molecular weight of polymers
- 69) Which of the following element is most electropositive?
a) Na b) Mg c) Al d) Si
- 70) In the Victor Meyer test, blue colour is shown by
a) Primary alcohol
b) Secondary alcohol
c) Tertiary alcohol
d) Diol
- 71) Salicylic acid is produced when phenol in alcoholic KOH is treated with
a) Methyl chloride
b) Dichloromethane

- c) Chloroform
d) Carbon tetrachloride
- 72) The unit cell of graphite is
a) cubic b) tetragonal c) hexagonal d) orthorhombic
- 73) When a sugar solution is slowly frozen, the first solid which separates out is
a) ice
b) solid solution of sugar and ice
c) sugar
d) a compound formed from sugar and water
- 74) Wurtz reaction converts alkyl halide into alkane when it is made to react with
a) Na in alcohol
b) Na in dry ether
c) Zn in alcohol
d) Zn in dry ether
- 75) Two forms of D-glucopyranose are frequently called
a) enantiomers b) anomers c) diastereomers d) stereoisomers
- 76) T_g of a polymer refers to
a) Glass transition temperature
b) Melting temperature
c) Freezing temperature
d) Degradation temperature
- 77) Which of the following is the unit of radioactivity?
a) Joule b) Tesla c) Curie d) Newtons
- 78) The oxidation of SO_2 by O_2 to SO_3 is an exothermic reaction. Yield of SO_3 will be maximum if
a) Temperature is increased and pressure is kept constant
b) Temperature is reduced and pressure is increased
c) Both temperature and pressure are increased
d) Both temperature and pressure are reduced
- 79) Which of the following spectral series of hydrogen atom lies in the far IR region of electromagnetic radiation?
a) Lyman b) Balmer c) Paschen d) Pfund
- 80) Cinnabar is an ore of
a) Hg b) Cu c) Pb d) Zn
- 81) The process of making plastic tubes on a continuous stream is known as
a) Injection molding

- b) Calendering
- c) Extrusion
- d) Thermoforming

- 82) The type of hybridization of boron in diborane is
a) sp b) sp^2 c) sp^3 d) sp^3d^2
- 83) Which of the following is an organometallic compound?
a) Lithium methoxide
b) Lithium acetate
c) Lithium dimethylamide
d) Methyl lithium
- 84) The preparation of ethyl acetoacetate involves
a) Wittig reaction
b) Cannizzaro reaction
c) Reformatsky reaction
d) Claisen condensation
- 85) $[EDTA]^{4-}$ is a
a) monodentate ligand
b) bidentate ligand
c) quadridentate ligand
d) hexadentate ligand
- 86) Nylon is a
a) polyester b) polyamide c) polyurethane d) polyol
- 87) Dehydration of ethanol gives
a) Acetic acid b) Ethane c) Ethylene d) Acetylene
- 88) The principle involved in paper chromatography is
a) Adsorption b) Partition c) Solubility d) Volatility
- 89) Which of the following is a semiconductor?
a) C b) Pb c) Ge d) Sn
- 90) On electrolysis of dilute sulphuric acid using platinum electrodes, the product obtained at the anode will be
a) hydrogen b) oxygen c) hydrogen sulphide d) sulphur dioxide
- 91) A container contains 1 mole of gas at 1 atm pressure and 27°C while its volume is 24.6 liters. If its pressure is 10 atm and temperature 327°C , then new volume is
a) 2.56 liters b) 3,15 liters c) 4.92 liters d) 5.44 liters

- 92) Two elements have electronegativities 1.2 and 3.0. the bond formed between them is likely to be
a) Ionic b) Covalent c) Co-ordinate d) Metallic
- 93) The nobel prize in chemistry for the year 2016 has been awarded for
a) Design and synthesis of molecular machines
b) Discovery of nanoparticles
c) Synthesis of smart polymers
d) Revealing the genetic code of the brain
- 94) The thermogram in differential thermal analysis (DTA) is obtained by plotting
a) $\Delta w/\Delta t$ vs Temperature
b) ΔT vs Temperature
c) ΔH vs Temperature
d) Temperature vs Volume
- 95) A HCl solution having 5×10^{-8} M strength has a pH of
a) 8 b) 7 c) Between 6 & 7 d) Between 5 & 6
- 96) sp^3d^2 hybrid orbitals are
a) linear
b) pentagonal bipyramidal
c) trigonal bipyramidal
d) octahedral
- 97) A terpenoid used in the manufacture of celluloid and also a moth repellent is
a) Menthol b) Zingiberene c) Camphor d) Pinene
- 98) Wagner's reagent is
a) Potassium mercuric iodide
b) Iodine dissolved in KI
c) Potassium bismuth iodide
d) Picric acid solution
- 99) The maximum energy difference between the conformations of cyclohexane is between
a) half-chair and twist-boat
b) chair and boat
c) half-chair and boat
d) chair and half-chair
- 100) Limiting current in polarography depends on
a) residual current
b) diffusion current
c) Kinetic current
d) all the above

PhD Entrance Examination November 2016: Answer Key (Questions 1 to 40): General Aptitude

CHEMICAL SCIENCES (41-100) STREAM

1	D	35	C	69	A
2	D	36	C	70	B
3	C	37	D	71	D
4	B	38	C	72	C
5	D	39	A	73	A
6	B	40	D	74	B
7	B	41	B	75	B
8	D	42	D	76	A
9	A	43	B	77	C
10	A	44	A	78	B
11	D	45	B	79	D
12	C	46	D	80	A
13	D	47	B	81	C
14	A	48	D	82	C
15	A	49	B	83	D
16	B	50	B	84	D
17	B	51	A	85	D
18	D	52	A	86	B
19	C	53	C	87	C
20	D	54	C	88	B
21	B	55	A	89	C
22	C	56	B	90	B
23	B	57	B	91	C
24	D	58	A	92	A
25	D	59	A	93	A
26	C	60	C	94	B
27	A	61	B	95	C
28	C	62	A	96	D
29	B	63	C	97	C
30	C	64	A	98	B
31	C	65	A	99	D
32	D	66	C	100	D
33	C	67	D		
34	C	68	C		

Handwritten signature and date:
 3/11/2016