

PUNJAB PUBLIC SERVICE COMMISSION

Competitive Examination (August-2015) for Recruitment of Assistant Director
(Toxicology) in the Department of Home Affairs & Justice, Punjab

READ INSTRUCTIONS BEFORE FILLING ANY DETAILS OR ATTEMPTING TO ANSWER THE QUESTIONS.

Candidate's Name _____

Father's Name _____

Date of Birth
DD MM YYYY

Category Code*
(*as given in the admit card)

OMR Response Sheet No. _____

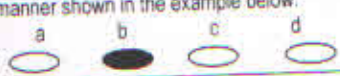

Roll No. _____

Candidate's Signature (Please sign in the box)

Booklet No.

000108

INSTRUCTIONS

- The candidate shall NOT open this booklet till the time told to do so by the Invigilation Staff. However, in the meantime, the candidate can read these instructions carefully and subsequently fill the appropriate columns given above in CAPITAL letters. The candidate may also fill the relevant columns (other than the columns related to marking responses to the questions) of the Optical Mark Reader(OMR) response sheet, supplied separately.
- Use only blue or black ball point pen to fill the relevant columns on this page. Use of fountain pen may leave smudges which may make the information given by the candidate here illegible.
- The candidate shall be liable for any adverse effect if the information given above is wrong or illegible.
- The candidate must fill all the columns given above on this page and sign at the appropriate place.
- Each candidate is required to attempt 100 questions in 120 minutes, except for visually impaired candidates, who would be given 20 minutes extra, by marking correct responses on the OMR sheet which would be supplied separately to the candidates.
- The candidate must write the following on the OMRs sheet:
(a) Serial number of OMR sheet supplied to him/her for marking the responses to the questions.
(b) Serial number of the question booklet
Failure to do so may lead to cancellation of candidature or any other action which the Commission may deem fit.
- The candidate should darken the appropriate response to the question by completely darkening the appropriate circle/oval according to his/her choice of response i.e. a, b, c or d in the manner shown in the example below.

- Partly darkening the circle/oval on the OMR response sheet or using other symbols such as tick mark or cross would not result in evaluation of the response as the OMR scanner can only interpret the answers by reading the darkened responses in the manner explained in preceding paragraph. Darkening more than one circle/oval as response to a question shall also be considered as wrong answer.
- The candidates shall be responsible to ensure that the responses are marked in correct manner and any adverse impact due to wrong marking of responses would be the responsibility of the respective candidate. The following are some of the examples of wrong marking of responses on the OMR response sheet.

- The candidates, when allowed to open the question paper booklet, are advised to check the booklet to confirm that the booklet has complete number of pages, the pages printed correctly and there are no blank pages. In case there is any such error in the question paper booklet then the candidate should immediately bring this fact to the notice of the invigilation Staff and obtain a booklet of the same series as this one.
- The serial number of the new booklet should be entered in the relevant column of the OMR. The candidate should request the invigilation Staff to authenticate the change in serial number of question booklet by obtaining the initials of the Staff on the corrected serial number of the question booklet.
- The question paper booklet has 17 pages.
- Each question shall carry three marks.
- There are four options for each question and the candidate has to mark the most appropriate answer on the OMR response sheet using blue or black ball point pen.
- There is no negative marking for wrong answers or questions not attempted by the candidate.

ASSISTANT DIRECTOR (TOXICOLOGY)

1. Benzene is similar to toluene:
 - (A) in its metabolism to redox active metabolite
 - (B) regarding covalent binding of its metabolites to proteins
 - (C) in its ability to produce CNS depression
 - (D) in its ability to produce acute myelogenous leukemia
2. Regarding 'Tests for Drugs' in Toxicology, which statement is FALSE?
 - (A) Bedside ECG and serum-Paracetamol are regarded as routine Toxicology screening test
 - (B) Fluorescence polarization immunoassay on urine or blood samples is used for 'Drug Screening'
 - (C) Gas chromatography/mass spectrometry is performed as 'Confirmatory test' on blood or urine samples
 - (D) Thin layer/paper chromatography, used on urine and blood samples assists in 'Drug Screening'
3. The most poisonous salt of mercury is:
 - (A) Chloride
 - (B) Chromate
 - (C) Cyanide
 - (D) Oxide
4. In chronic arsenic poisoning the following samples can be sent for laboratory examination, except:
 - (A) Nail clippings
 - (B) Hair samples
 - (C) Bone samples
 - (D) Blood sample
5. Apoplexy is the term used for:
 - (A) Cerebral concussion
 - (B) Cerebral anoxia
 - (C) Cerebral congestion
 - (D) None of the above
6. Which of the following poisons can be detected in the viscera in a decomposed body?
 - (A) Acetic acid
 - (B) Chloroform
 - (C) Organophosphorous
 - (D) Phosphorous

7. Smell of bitter almonds is seen in poisoning by:
- (A) Hydrocyanic acid
 - (B) Nitric acid
 - (C) Phosphorous
 - (D) Oxalic acid
8. Ophotoxemia refers to:
- (A) Organophosphorous poisoning
 - (B) Heavy metal poisoning
 - (C) Scorpion venom poisoning
 - (D) Snake venom poisoning
9. _____ is combined effect of two chemicals is greater than sum of effects of each.
- (A) Addition
 - (B) Synergism
 - (C) Potentiation
 - (D) Antagonism
10. In gas chromatography, the basis for separation of the components of the volatile material is difference in:
- (A) partition coefficients
 - (B) conductivity
 - (C) molecular weight
 - (D) molarity
11. What is the relationship between wavelength and wave number?
- (A) Wavenumber = $1 / \text{wavelength in centimeters}$
 - (B) Wavenumber - wavelength in nanometers = 1
 - (C) Wavelength in nanometers x wavenumber = 1
 - (D) None of the above
12. In the equation, $A = \epsilon bc$, which of the following is represented by " ϵ "?
- (A) Absorbivity
 - (B) Molar absorbivity
 - (C) Path length
 - (D) None of the above

13. UV-Vis spectroscopy of organic compounds is usually concerned with which electronic transition(s)?

- (A) $\sigma \rightarrow \sigma^*$
- (B) $n \rightarrow \sigma^*$
- (C) $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$
- (D) none of the above

14. Why are rotational transitions of little use to a spectroscopist?

- (A) Because the energy required to induce a rotational transition is so small that it cannot be measured
- (B) Because rotational transitions are extremely rare
- (C) Because, in liquids and solids, spectral lines corresponding to rotational transitions are broadened as the result of molecular collisions and other interactions
- (D) All of the above

15. For a typical adsorbent such as silica gel, the most popular pore diameters are:

- (A) 10 and 50 Å
- (B) 60 and 100 Å
- (C) 100 and 150 Å
- (D) 150 and 200 Å

16. What is shielding in NMR?

- (A) Using a curved piece of metal to block an opponents attack
- (B) Putting metal around an Rf source
- (C) When the magnetic moment of an atom blocks the full induced magnetic field from surrounding nuclei
- (D) Blocking parts of a molecule from Rf radiation

17. When placed in a magnetic field, all the random spins of the nuclei:

- (A) stop
- (B) reverse direction
- (C) align with the magnetic field
- (D) rotate to 90° away from the induced field

18. An FT-IR instrument record a signal in the:

- (A) time domain
- (B) frequency domain
- (C) both (a) and (b)
- (D) none of the above

19. Theoretical plates are used to:

- (A) estimate the efficiency of a column
- (B) determine the thickness of the stationary phase
- (C) measure the distribution of the analyte between mobile and stationary phases
- (D) None of the above

20. Which of the following technique provides a nondestructive method for identifying and quantifying trace elements:

- (A) Inductively coupled plasma emission spectrometry
- (B) Atomic absorption spectrometer
- (C) Neutron activation analysis
- (D) X-ray diffraction

21. Castor oil contain which of the following toxin substance:

- (A) Atropine
- (B) Strychnine
- (C) Ricin
- (D) Thebaine

22. Which one of the following is true concerning salicylate intoxication?

- (A) High blood levels cannot be removed by dialysis
- (B) If a respiratory alkalosis is present, do not administer intravenous bicarbonate
- (C) Salicylate intoxication causes both a metabolic acidosis and a metabolic alkalosis
- (D) Oil of wintergreen can cause salicylate poisoning

23. Technique in which anticoagulated blood is passed through a column containing activated charcoal or resin particles is referred to as:
- (A) Whole bowel irrigation
 - (B) Forced diuresis
 - (C) Hemodialysis
 - (D) Hemoperfusion
24. Which of the following substances is not easily adsorbed by activated charcoal?
- (A) Iron
 - (B) Ethanol
 - (C) Methanol
 - (D) All of the above
25. Which of the following is a type of Inhalational dosage form?
- (A) Aerosol
 - (B) Capsules
 - (C) Subcutaneous administration
 - (D) Tablet
26. Ionic compounds are easily soluble in:
- (A) Polar solvents
 - (B) Non-polar solvents
 - (C) Both polar and non-polar solvents
 - (D) None of the above
27. Which type of toxicologist is concerned with the use of toxicants by the public and in the workplace?
- (A) Descriptive toxicologist
 - (B) Mechanistic toxicologist
 - (C) Regulatory toxicologist
 - (D) Clinical toxicologist
28. Cherry red appearance is seen in poisoning with:
- (A) Atropine
 - (B) Cyanide
 - (C) Organophosphate
 - (D) Potassium permanganate

29. Which of the following is a rave drug:

- (A) Cannabis
- (B) Cocaine
- (C) Heroin
- (D) Ecstasy

30. The pupils of a patient would be pinpoint in poisoning with the following agents except:

- (A) Carbanates
- (B) Phenothiazines
- (C) Barbiturates
- (D) Opioids

31. The preferred chemical antidote in mineral acid poisoning is:

- (A) Magnesium oxide
- (B) Magnesium carbonate
- (C) Sodium bicarbonate
- (D) Sodium hydroxide

32. In _____ one substance is not toxic but when added to other toxic chemical it makes the combination more toxic.

- (A) Addition
- (B) Synergism
- (C) Potentiation
- (D) Antagonism

33. Which is the best definition of the term toxicant?

- (A) a chemical that causes adverse effects
- (B) a substance produces as a result of human activities
- (C) a branch of toxicology
- (D) an agent that neutralizes the effects of a poison.

34. The statement, "All substances are poisons; there is none which is not a poison. Only the dose determines that a thing is not a poison", is attributed to which of the following?

- (A) Hippocrates
- (B) Theophrastus
- (C) Mithridates
- (D) Paracelsus

35. In reverse phase chromatography, the stationary phase is made up of:

- (A) non-polar
- (B) polar
- (C) either non-polar or polar
- (D) none of the above

36. In the past, IR spectra had to be acquired one wavelength at a time, which took a long time. Today quick spectra is due to:

- (A) the Fourier Transform Algorithm allows us to scan all frequencies at once
- (B) light is faster today than it used to be
- (C) absence of broad spectrum of wavelength
- (D) none of the above

37. Why must the voltage supplied to a tungsten lamp be very stable?

- (A) Because if it wasn't, the lamp would burn out
- (B) Because amount of energy the lamp emits is proportional to the power of the operating voltage
- (C) Because the lamp will only function at a specific voltage
- (D) All of the above

38. Vibrational spectroscopy is:

- (A) a large mass on a weak spring
- (B) a flashlight through a prism and shake it
- (C) a class of spectroscopic techniques which analyzes molecular motions
- (D) an Infrared spectroscopy

39. HPLC stands for:

- (A) High Pressure Liquid Chromatography
- (B) High Performance Liquid Chromatography
- (C) both (A) and (B)
- (D) Highly Placed Liquid Chromatography

40. An isocratic elution in HPLC is one in which the composition of the solvent:
- (A) remains constant
 - (B) changes continuously
 - (C) changes in a series of steps
 - (D) none of the above
41. In normal phase HPLC, there is a:
- (A) non polar solvent/polar column
 - (B) polar solvent/non-polar column
 - (C) non polar solvent/non-polar column
 - (D) any of the above
42. Better understanding of the nuclei is possible:
- (A) with the help of wavelength spectrum
 - (B) with the help of frequencies ranges
 - (C) with the help of a mathematical translator called the fourier transfer algorithm
 - (D) none of the above
43. Which of the following is not used as detector in GC?
- (A) Infrared spectroscopy
 - (B) NMR
 - (C) Flame ionisation
 - (D) Electrical conductivity
44. X-ray diffraction can only be applied to:
- (A) Liquids
 - (B) Solid, crystalline materials
 - (C) Gaseous or vapor materials
 - (D) All of the above
45. Which of the following procedure is contraindicated for patients who have ingested strong acids and alkalis?
- (A) Emesis
 - (B) Gastric lavage
 - (C) Whole bowel Irrigation
 - (D) Both emesis and Gastric lavage

46. Which of the following technique is helpful in removing ethanol from body?
- (A) Dialysis
 - (B) Activated charcoal
 - (C) Diuresis
 - (D) Hemoperfusion
47. Which of the following chelating agent is recommended for acute Lead poisoning with signs of encephalopathy?
- (A) Succimer
 - (B) Penicillamine
 - (C) Dimercaprol
 - (D) Dimercaprol + Calcium EDTA
48. All of the following substances bind well to activated charcoal except:
- (A) thionamide
 - (B) atenolol
 - (C) cyanide
 - (D) benztropine
49. A drug that induces alterations in perception and mood (without either arousing or inhibiting brain activity) is known as:
- (A) a cutting agent
 - (B) a depressant
 - (C) an hallucinogen
 - (D) a stimulant
50. The most commonly used pyrethroid synergist is:
- (A) Silica
 - (B) piperonyl butoxide
 - (C) methyl butyl ether
 - (D) n-octyl bicycloheptene dicarboximide
51. Paraquat and diquat differ substantially in their:
- (A) metabolism to a free radical
 - (B) ability to initiate lipid peroxidation in vivo
 - (C) uptake by the lung
 - (D) generation of superoxide anion in vivo

52. Which is false regarding Paraquat poisoning?
- (A) Supplemental oxygen should be avoided
 - (B) It is associated with 'Paraquat tongue'
 - (C) A raised creatinine carries a poor prognosis
 - (D) Paraquat has an effect on the neuromuscular junction
53. Acetaminophen (paracetamol) can undergo all of the following biotransformation reactions except:
- (A) Deamination
 - (B) N-oxidation
 - (C) Glucuronidation
 - (D) Sulphation
54. A person was brought by police from the railway platform. He is talking irrelevant. He is having dry mouth with hot skin, dilated pupils, staggering gait and slurred speech. The most probable diagnosis is:
- (A) Alcohol intoxication
 - (B) Carbamates poisoning
 - (C) Organ phosphorous poisoning
 - (D) Dhatura poisoning
55. Regarding methanol poisoning:
Assertion: Administration of ethanol is one of the treatment modalities
Reason: Ethanol inhibits alcohol dehydrogenase
Please select the most correct option from the following:
- (A) Both assertion and reason are true, and the reason is the correct explanation for assertion
 - (B) Both assertion and reason are true, and the reason is not the correct explanation for assertion
 - (C) Assertion is true, but the reason is false
 - (D) Assertion is false, but the reason is true
56. Ion exchange chromatography is based on the:
- (A) electrostatic attraction
 - (B) electrical mobility of ionic species
 - (C) adsorption chromatography
 - (D) partition chromatography
57. Which of the statement about neutron activation analysis is incorrect?
- (A) No chemical preparation is required
 - (B) Small sample sizes 1-200mg is required
 - (C) It is non destructive techniques
 - (D) The sensitivity of method is independent of sample matrix

58. Which of the following components of a monochromator is the dispersing element?
- (A) The collimating lens
 - (B) The entrance slit
 - (C) The diffraction grating
 - (D) None of the above
59. Beer's Law states that:
- (A) absorbance is proportional to both the path length and concentration of the absorbing species
 - (B) absorbance is proportional to the log of the concentration of the absorbing species
 - (C) absorbance is equal to P_0 / P
 - (D) none of the above
60. Headspace analysis is carried out in order to:
- (A) analyse volatile compounds from solid or liquid samples
 - (B) determine the psychological state of the tutor
 - (C) analyse the column contents ahead of the sample
 - (D) determine non-volatiles
61. Which of the following information can be obtained from the mass spectrum?
- (A) The structure of a compound
 - (B) The empirical formula of a compound
 - (C) The relative molecular mass of a compound
 - (D) All of the above
62. What is the device that rotates rapidly and uses centrifugal force to separate substances of different densities?
- (A) Cyclone
 - (B) Centrifuge
 - (C) Impeller
 - (D) Both cyclone and centrifuge
63. Autoclave is a strong steel vessel that is used for which of the following process?
- (A) Pasteurization
 - (B) Sterilization
 - (C) Precipitation
 - (D) Heating
64. Which of the following is commonly known as ecstasy?
- (A) 3,4-methylenedioxyamphetamine (MDA)
 - (B) Amphetamine
 - (C) 3,4-methylenedioxymethamphetamine (MDMA)
 - (D) Methamphetamine

65. The effects of cocaine closely resemble to the effects caused by:
- (A) LSD
 - (B) Morphine
 - (C) Methamphetamine
 - (D) Methaqualone
66. In highly putrified bodies, larvae, maggots and other entomological samples for toxicological analysis should be preserved by:
- (A) Refrigeration
 - (B) Formalin
 - (C) Saturated salt solution
 - (D) Absolute alcohol
67. Neutron Activation Analysis is based on the theory that atoms will capture a neutron and become radioactive. What are atoms that contain extra neutrons called?
- (A) Isotopes
 - (B) Elements
 - (C) Allotropes
 - (D) Ions
68. HPLC methods include:
- (A) liquid/liquid (partition) chromatography
 - (B) liquid/solid (adsorption) chromatography
 - (C) ion exchange and size exclusion chromatography
 - (D) all of the above
69. The active components of cannabis responsible for its hallucinogenic properties are the tetrahydrocannabinols (THCs). Which of the following forms of cannabis has the highest concentration of THCs?
- (A) Cannabis oil
 - (B) Herbal cannabis
 - (C) Hashish
 - (D) Marijuana
70. The level of toxicity of Datura plant on the basis of increasing level is:
- (A) Root, Seeds, Fruit, Leaf
 - (B) Leaf, Root, Fruit, Seeds
 - (C) Fruit, Root, Seeds, Leaf
 - (D) Seeds, Leaf, Root, Fruit

71. In reversed phase HPLC, there is a:

- (A) non polar solvent/polar column
- (B) polar solvent/non-polar column
- (C) non polar solvent/non-polar column
- (D) polar solvent/polar column

72. Which of the following(s) is/are the advantage of HPLC over traditional LPLC (low-pressure liquid chromatography)?

- (A) Greater sensitivity and reusable columns
- (B) Ideal for ionic species and large molecules
- (C) Sample recovery
- (D) All of the above

73. Coupling causes the peaks in ^1H NMR spectra to be split into:

- (A) Two peaks
- (B) Multiple peaks equal to the number of hydrogens or surrounding atoms
- (C) Sample recovery
- (D) Multiple peaks equal to the number of hydrogen on surrounding atoms, plus one

74. What does the Michelson interferometer do?

- (A) Split a polychromatic beam of radiation into its component wavelengths
- (B) Selectively filter certain wavelengths from a beam of I.R. radiation
- (C) Modulate the I.R. signal at a lower frequency, so that it can be observed by a detector
- (D) None of the above

75. _____ is when two chemicals interfere in each other's action.

- (A) Addition
- (B) Synergism
- (C) Potentiation
- (D) Antagonism

76. An example of polychlorinated hydrocarbon is:

- (A) Parathion
- (B) Malathion
- (C) Diazinon
- (D) Endrin

77. In methyl alcohol poisoning, there is central nervous system depression, cardiac depression and optic nerve atrophy. These effects are produced due to the formation of :

- (A) Formaldehyde and formic acid
- (B) Acetaldehyde
- (C) Pyridine
- (D) Acetic acid

78. A 39-year-old carpenter has taken two bottles of liquor from the local shop. After about an hour, he develops confusion, vomiting and blurring of vision. He has been brought to the emergency department. He should be given which of the following antidotes:

- (A) Naloxone
- (B) Diazepam
- (C) Flumazenil
- (D) Ethyl alcohol

79. Aspirin:

- (A) Is hydrolysed to acetone and salicylate
- (B) Exhibits first order kinetics with elimination in low doses
- (C) Reversibly blocks the cyclooxygenase enzyme
- (D) Causes an immediate doubling of bleeding time

80. Estimation of plasma cholinesterase levels may be helpful in the management of which of the following poisonings?

- (A) Dhatura
- (B) Barbiturate
- (C) Organophosphorous
- (D) Opium

81. Which one of the following antidotes matches the underlying toxicity?

- (A) Benzodiazepines — naloxone (Narcan)
- (B) Narcotics — flumazenil (Romazicon)
- (C) Ethylene glycol — ethanol (booze)
- (D) Acetaminophen — fomepizole (4-methylpyrazole)

82. An isocratic elution in HPLC is one in which the composition of the solvent:

- (A) remains constant
- (B) changes continuously
- (C) changes in a series of steps
- (D) none of these

83. Regarding aspirin:

- (A) The average anti-inflammatory dose of aspirin is 0.6g up to 4 hourly
- (B) Aspirin's main side effect at usual doses is rash
- (C) Aspirin's antiplatelet effect lasts 8 – 10 days
- (D) At low toxic doses – respiratory acidosis may occur

84. Which one of the following is true concerning salicylate intoxication?
- (A) High blood levels cannot be removed by dialysis
 - (B) If a respiratory alkalosis is present, do not administer intravenous bicarbonate
 - (C) Salicylate intoxication causes both a metabolic acidosis and a metabolic alkalosis
 - (D) Oil of wintergreen can cause salicylate poisoning
85. Exposure to fumes of which of the following metals is most likely to cause acute chemical pneumonitis and pulmonary oedema?
- (A) lead
 - (B) zinc
 - (C) cadmium
 - (D) copper
86. Consumption of milk from goats which have grazed on lupine plants containing the alkaloid, anagrine, may cause:
- (A) birth defects when ingested by women during early pregnancy
 - (B) severe liver damage characterized by centrilobular necrosis
 - (C) dizziness, nausea, headaches and hallucinations
 - (D) numbness of the extremities
87. N-acetyl penicillamine is used in the treatment of poisoning by:
- (A) Mercury
 - (B) Lead
 - (C) Cadmium
 - (D) Arsenic
88. Ophotoxemia refers to:
- (A) Organophosphorous poisoning
 - (B) Heavy metal poisoning
 - (C) Scorpion venom poisoning
 - (D) Snake venom poisoning
89. The term 'controlled drug' is applied to:
- (A) any drug that is available only on prescription.
 - (B) Any prescription drug that is diverted to the black market for illegal usage.
 - (C) any drug that is subject to the Intoxicating Substance (Supply) Act 1985.
 - (D) any drug that is subject to the Misuse of Drugs Act 1971.

90. Which of the following pairs is false regarding Drugs and their appropriate antidote?

- (A) Beta blockers -Glucagon
- (B) Chloroquine – Diazepam
- (C) Isoniazid – Pralidoxime
- (D) Methanol-Ethanol

91. Regarding antimicrobial toxicity, the following are often fatal except:

- (A) Isoniazid
- (B) Neomycin
- (C) Chloroquine
- (D) Quinine

92. Each of the following solvents is paired with a correct target organ of toxicity except:

- (A)Methanol : retina
- (B)Ethylene glycol : kidney
- (C)Ethylene glycol monomethyl ether : kidney
- (D)Dichloromethane : central nervous system

93. Paraquat poisoning causes:

- (A) Renal failure
- (B) Cardiac failure
- (C) Respiratory failure
- (D) Multiorgan failure

94. Ecstasy toxicity causes:

- (A) Hyperreflexia
- (B) Trismus
- (C) Visual hallucinations
- (D) All of the above

95. All of the following are treatment options for toxic alcohol poisoning except:

- (A) Fomepizole
- (B) Hydroxycobalamin
- (C) Thiamine
- (D) Folic acid

96. If an individual previously exposed to a particular substance exhibits an enhanced immune response when he encounters it for a second time, this condition is known as:

- (A) accumulation
- (B) idiosyncrasy
- (C) sensitisation
- (D) tolerance

97. All of the following may cause metabolic acidosis except:

- (A) renal failure
- (B) salicylates
- (C) methanol
- (D) diuretics

98. No specific antidote is available for poisoning by:

- (A) sodium fluoroacetate
- (B) warfarin
- (C) chlorinated hydrocarbon insecticides
- (D) rotenone

99. People take Drugs for:

- (A) Relief from stress
- (B) Peer pressure
- (C) Recreation
- (D) All of above

100. In NMR, the amount of energy required to cause a particular nucleus to re-align depends on:

- (A) Field strength
- (B) Type of molecule
- (C) Inter molecular interactions
- (D) All of above
