QUESTION BANK (VETERINARY PHARMACOLOGY & TOXICOLOGY)

PAPER NO. 23

(General Toxicology)

I.NAME THE FOLLOWING:

1.A compound which undergoes sulfate conjugation. --(phenol to phenyl sulfate)

2.An anthelmintic causing jaundice .--(Phenothiazine)

3.An antidote for curare poisoning--(Neostigmine)

4.A source of boron toxicity in dogs.—(boric acid)

5.A snake which produce neurotoxic poison .-(Cobra/Krait)

6.Branches of toxicology depending on the organizations that are active in this field - (Environmental, Economic, Forensic toxicology)

7.Branches of toxicology- (clinical, chemical, forensic, industrial, veterinary)

8.Cytoplasmic protein in liver which will binds with lead.-(Metallothionin)

9.Disease caused by selenium deficiency in cattlee.-(White muscle disease)

10.Element present in xanthine oxidase.-(Molybdenum)

11.Element binds with catechol in the rumen.-(Molybdenum)

12.Evidences which helps in the diagnosis of poisoning –(symptomatic , circumstantial, pathological, and analytical)

13.Factors affecting the action of toxins – (dosage , age, sex, weight , species, route of entry, genetic factors, plane of nutrition)

14.Father of modern toxicology-(Orifila)

15.Fungal toxin causing haematuria. (-Bracken)

16.Group of insecticide causing salivation.-(Organochlorines , organophosphates)

17.Heavy metal which selectively deposit in bone tissue.-(Lead)

18.One element causing lameness in animals in chronic poisoning .-(Fluorine)

19.One example for glucuronide conjugation of chemical .-(Phenol to phenyl glucuronide)

20.One poison which can be absorbed even through intact skin.-(Nicotine)

21.Species in which ornithin conjugation is common.-(Birds)/ reptiles.)

22.The characteristic discolouration of teeth in fluorine poisoning.-(Mottled)

23.The important metabolic process undergoing by xenobiotic .-(oxidation, reduction, hydrolysis)

24.The synthetic reactions which biotransform the chemicals in the body.-(Oxidation, Reduction, Hydrolysis)

25.The types of poisoning. –(Acute, Subacute and Chronic)

26.Three major types of tolerance. –(Finate tolerance, negligible tolerance, Zero tolerance)

27.Three barriers for toxins in the body .-(Intestine, Placental, Blood brain)

28.Toxins produced by lower animals /frogs.—(Zoo toxins)

29 Two drugs used for doping to win in horses .-(Amphetamine, Steroids, Vitamins)

30.Two agents which impart cherry red colour to venous blood.-(Cyanide, Carbon monoxide)

31.Two amino acid used for the conjugation of toxin.-(Cysteine, Glycine, Ornithin, Glutamine)

32.Two condition in which mucous membrane become yellow in colour.-(phosphorus, copper toxicity, Jaundice)

33.Two industries causing fluorine contamination.-(Aluminium, tiles, clay, copper sulphate, super phosphate)

34.Two salts that hinder oxygen transport to tissues.-(Nitrate , chlorate)

35.Two poisons that selectively deposit in specific tissues.-(Fluorine, Lead, Iodine)

36.Two poisons accumulate at site other than their site of action.-(lead in bone, mercury in kidney)

37.Two toxin which denature enzymes.-(mercury, formaldehyde)

38.Two toxic condition in which blood will be dark chocolate in colour .-(nitrate, nitrite, chlorate)

39.Two toxic metals which will bind with the thiol groups .-(Arsenic, mercury, antimony, selenium, copper)

II.STATE TRUE OR FALSE:

1.Acidification of urine can enhance the excretion of organic bases.-(T)

2.Activation of carbon increases the surface area for adsorption.-(T)

3.A full report of the clinical and post mortem findings and instructions for poison to be tested must be given with the laboratory sample for toxicological analysis.-(T)

4.Alkalinisation of urine enhances the excretion of weak organic acids.-(T)

5.A sample of preservative used must accompany the preserved sample for lab. Test.-(T)

6.Amphetamine is deaminated to phenyl acetone.-(T)

7.Biotransformation of drugs can be inhibited by an experimental compound SKF 525A.-(T)

8.Biotransformation can be induced by hypnotics like barbiturates.-(T)

9.Bright red colour of mucous membrane indicate cyanide / carbon monoxide poisoning.-(T)

10.Conversion of acetanilide to paracetamol is a hydroxylation process.-(T)

11.Dark chocolate colour of mucous membrane indicate Nitrate, Nitrite and Chlorate poisoning.-(T)

12.Dealkylation is the process by which meperidine conversion to nor- meperidine.-(T)

13.Demulcents can be recommended in case of irritant poison.-(T)

14.Emetics are not advisable when stomach wall is weak.-(T)

15.Emetics are not advisable when patients are in hypnotic state.-(T)

16.Emetics are not recommended in case of narcotic chemical poisoning--(T)

17.For mechanical removal of toxins from the skin, detergents are the best.-(F)

18.Haemorrhage in the body muscles are indicative of Bracken, Sweet clover, or warfarin poisoning.-(T)

19.If some legal action is arising on the poisoning case , the sample for laboratory examination must be taken and sealed in the presence of a police personal.-(T)

20.In the order of increasing tolerance to fluorine, cattle—sheep—swine—rabbit—guinea pig—turkey—chicken.—(T)

21.In new borne animals the function of kidney and liver are not well developed.-(T)

22.Lethal dose 50 is higher than lethal dose. (F)

23.Orally penicillamine is having antibacterial activity .-(F)

24.Paul Ehrlich is considered as the father of modern toxicology.—(F)

25.Procaine is reduced to PABA and diethyl aminoethanol.-(T)

26.Specimen for laboratory analysis should never be dispatched without prior arrangement with the laboratory.-(T)

27.Supersaturated saline can be used as a preservative for sample for laboratory examination.-(T)

28.Tannic acid will precipitate the metals, metalloids and alkaloids.-(T)

29.Toxins can be removed from the stomach by gastric lavage, emetics and cathartics or physical removal.-(T)

30.The excretion of organic electrolytes can be enhanced by adjusting the pH of the urine.-(T)

31.The threshold of toxicity cannot be increased by the use of antidotes.-(T)

32.The gastro intestinal content can be removed by gastric lavage, emesis and cathartics.-(T)

33.Toad venom causes cardiac arrhythmia .-(T)

34.Volcanic eruption may cause acute fluorine poisoning.-(T)

35.Yellow colour to mucous membrane is seen in jaundice/ hepatic damage.-(T)

III.FILL UP THE BLANKS WITH MOST APPROPRIATE WORDS:

1.Acetaldehyde is …….. to ethyl alcohol (synthetic reaction).---(reduced)

2.ANTU is less toxic in an ……..stomach.-(empty)

3.Biotransformation of chemicals can be enhanced by sedatives like……and analgesics like ……..-(Barbiturate, phenyl butazone)

4.Chloral hydras is oxidized to ……..-(Trichloro acetic acid)

5.Chloral hydras is……to trichloroethanol.-(reduced)

6.Compounds are easily filtered via kidney if the molecular weight is below …….-(70000)

7.Conversion of non toxic compounds to toxic compounds by the body is called as .....-(Lethal synthesis)

8.Final proof of diagnosis of poisoning depends on the ……evidence.-(Analytical)

9.For preserving samples for laboratory examination …….containers are the best-(Glass)

10.For virtual removal of toxin from the stomach ……., ……, ……..can be used.-(Charcoal, kaolin, magnesium oxide)

11.Formaldehyde is ……..to methyl alcohol(synthetic reaction) .---(reduced)

12.For toxicological analysis at least ……..ml of blood must be sent to the lab.-(30)

13.Formalin is used as a tissue preservative only for ……examination.-(histopathological)

14.Highly ionized substances such as ……. acids are excreted unchanged .-(Organic))

15.Hydrocyanic acid inhibits the enzyme ……and produce toxicity.-(Cytochrome oxidase)

16.In alkali poisoning juice of ……/……..can be used as an antidote.-(lime/tamarind)

17.In birds and raptiles …….conjugation of toxin is s more.-(ornithin)

18.In ……. poisoning tarry blood exudates will ooze out from natural orifices.-(chlorate)

19.In most animals ……..and …….conjugation is utilized for biotransformation-(glucuronic, sulphate)

20.In man ……conjugation is seen more than sulphate conjugation-(glutamine)

21.Organophosphorus compounds inhibits ……enzyme.-(Cholinesterase)

22.Organs like …….. and ……have a high capacity to binds to chemicals and concentrate more toxicants.-(Liver and Kidney)

23.One teaspoon full of Sodium chloride in ……can act as an emetic.-(30 ml Luke warm water)

24.Plasma may fluoresce under ultra violet in lead poisoning because of the presence of excess ……..-(porphyrins)

25.Some toxins like ……achieved their highest concentration at their site of toxic action.-(Carbon monoxide)

26.The colour of the urine will be red in …….poisoning.-(Phenothiazine)

27.The LD 50 of super toxic chemicals are less than ……mg/kg .--(5.0)

28.The most important excretory channel in the body for toxins…….-(Kidney)

29.The proof of poisoning depends on many evidences . However, the final proof of diagnosis of poisoning depends on …….evidence.—(analytical)

30.The ratio LD 25 / ED 75 is called as …….-(therapeutic ratio)

31.The second best tissue preservative for laboratory examination is ……..-(Alcohol)

32.The safest tissue preservative for laboratory examination is …….-(Freezing)

33.Universal antidote mixture consist of ……, ……., ……..and ……

……. -- (charcoal, magnesium oxide, kaolin and tannic acid)

34.Venom of …….are having cardiotoxic glycosides.—(Toads)

35……is the study of malformations induced by the toxic agents during development between conception and birth.-(Teratogenicity)

36……is the term used to indicate lowest dose of a toxicant that produces toxic effect in animals.-(MLD)

37……is the study of malformations induced by the toxic agents during development between conception and birth.-(Teratogenicity)

IV.CHOOSE THE CORRECT ANSWER FROM THE GIVEN ONES:

1.All drug/ toxicants are biotransformed a) to facilitate storage in the body b) in an attempt to enhance efficiency c) to facilitate elimination generally d) in the same way in all species.—(C)

2.Amphetamine is detoxified by a) N-oxidation b) Reduction c) Deamination d) De alkylation .—(C)

3.Biotransformation of Nitrobenzene to Aniline is a a) nitroreduction b) azoreduction c) S-oxidation d) none of the above.-(A)

4.Conversion of acetanilide to paracetamol is by the following reaction. a) Oxidation b) Reduction c) Hydroxylation d) none of the above.-(A)

5.Conversion of Amphetamine to phenyl acetone is by one of the following reaction. a) reduction b) hydroxylation c) deamination d) none of the above.-(C)

6.Conversion of Meperidine to normeperidine is by one of the following reaction.a) dealkylation, b) reduction c) nitro reduction d) aromatic ring oxidation.-(A)

7.Conversion of Trimethylamine to trimethyl amine oxidase is by the following reaction.-a) deamination b) N-oxidation c) dealkylation d) S-oxidation. –(B)

8.Conversion of Chlorpromazine to chlorpromazine sulfoxide is by a) S-oxidation b) De alkylation c) Deamination d) reduction.-(A)

9.Depending on the physical and chemical nature the toxins are classified in to a) gaseous b) inorganic c)nitrogenous organic d) non nitrogenous organic e) all the above.-(E)

10.Drug allergy is caused a) by interaction between chemicals b) due to additive drug action c) by drug action as haptens d) by the antigenic incompetence --(C)

11.Following are the important physiological factors that control the absorption of poison is a) plane of nutrition b) Dosage c) Duration of exposure d)type of preparation e) all the above.-(E)

12.For laboratory test kidney and liver tissue must be at least a) 50—100gm, b) 25 gm, c) 500 gm d) 10 gm..—(A)

13.In case of inflammation of gastro intestinal mucosa the following protectives can be used a) Aluminium hydroxide gel, b) Kaolin c) Attapulgite d) all the above.-(D)

14.Incidence of poisoning is a) always related to circumstantial evidence b) to be decided by benefit to risk ratio c) based on the toxicity of the chemicals d) evident by the presence of the toxic chemical.-(D)

15.Metabolism of azobenzinil to aniline is an a) oxidation b) azoreduction c) nitroreduction d) S-oxidation.-(B)

16.Most toxic compounds act a) independent of the host biochemical pathways b) by interacting with host biochemical pathways c) by specific mechanism involving one system d) through receptors only --(B)

17.One of the following will become more toxic after biotransformation. a) Malathion b) DDT c) HCH d) Parathion –(D)

18.Some poisons are selectively deposited in bones.- a)Strontium, b) Calcium c) Phosphorus.-(A)

19.Suspected specimen sent for toxicant analysis a) requires screening for all known poisons b) given always conclusive evidence c) should have significant quantity of the toxicant d)serves no useful purpose at all. –(B)

20.Stage one metabolite is converted to water soluble compound by the following reaction. a) glucuronide b) Ethereal sulphate c) Glycine d) Acetylation e) all the above .-(E)

21.The main idea of treatment in suspected toxicity a) is to remove the toxicant b) is to neutralize the toxicant c) is to save the patient d) is to prevent further intoxication. –(C)

22.The minimum quantity of tissue samples required for toxicological analysis is a) 1 kg b) 550 gm c) 50—100gm d) 5—10gm.—(C)

23.Very toxic chemicals will have an LD 50 of a) less than 5 mg/kg b) 5 to 50 mg/kg c) 0.5 to 5.0 mg/kg d) none of the above.—(b)

V.MATCH THE FOLLOWING:

A	B
1. Morphine	Sodium acetate (9)

2.Dicoumarol	Ascorbic acid (18)
3.Lead salt	Nitrite and thiosulphate (6)
4.Arsenic	Atropine (8)
5.Iron salt	Nallorphine (1)
6.Cyanide	BAL (4)
7. Bromide	Demulcents (17)
8.Muscarine	Calcium (11)
9. Fluoroacetate	Di sodium calcium EDTA (3)
10.Alkaloids	Vitamin –K (2)
11. Fluoride	Cold water bag (16)
12.Organo phosphorus	Diazepam (14)
13.Mercury	Hot water bag (15)
14. Strychnine	Tannic acid (10)
15. Hypothermia	2 PAM (12)
16. Hyperthermia	Penicillamine (13)
17.Irritants	Chloride (7)
18. Methaemoglobinemia	Desferrioxamine. (5)

VI. DEFINE THE FOLLOWING:

1.Acute toxicity- Sudden violent syndrome caused by a single large dose of poison.

2.Acceptable daily intake: (ADI) it is the estimated amount of substances in food or drinking water that can be ingested daily over a life time by humans without any appreciable health risk. ADI is normally used for food additives (the term tolerable daily intake(TDI) is used for contaminants)

3.Bio magnification: (bio amplification) or biological magnification is the increasing concentration of a substance such as a toxic chemical in the tissues of tolerant organism at successively higher level in food chain. Eg.DDT in fishes.

4.Bioactivation : The conversion of an active compound to more active metabolites is called bio-activation. Eg. Conversion of malathion to malaoxon, acetonitrile to cyanide.

5.Developmental toxicology: deals with the study of harmful effect of chemicals and drugs on the development of organism (structural malformation, growth retardation, functional impairment and death)

6.Ecotoxicology: it is an area of environmental toxicology that deals with the effect of environmental pollutants on populations and communities of living organisms –mostly organisms other than humans.

7.Environmental toxicology: -Concerned with harmful effect of chemicals that are encountered by men incidentally because they are in the atmosphere, or occupational, recreational (cosmetics) or by ingesting food additives.

8.Economic toxicology. It deals with harmful effect of chemicals that are intentionally administered to biological tissue to achieve a specific effect that is to protect the economic species-concerned with development of new drugs food additives, pesticides etc.

9.Forensic toxicology: – study of medicolegal aspect-diagnosis, treatment, harmful effects of chemicals on humans and its legal implications.

10. LD50 is the quantity of toxin which causes death in 50% of the given population (homogenous group of cells, animals , plants or humans etc)

11.Margin of safety-- it is the magnitude of range of dose from a non effective dose to a lethal dose.

12.Maximum residue limit (maximum residue level) –maximum amount of pesticides or drug (veterinary drugs) that is legally permitted or recognized as acceptable in or on food commodities and animal feeds.

13.Maximum tolerated concentration (MTC) –highest concentration of a substance in the environmental medium that cause the toxic symptoms and no mortality in the test organism.

14.Maximum tolerated dose (MTD) –highest dose or amount of substance that causes the toxic effects but no mortality in the test organism.

15.Maximum allowable /admissible / acceptable concentration (MAC)-It is a regulatory value defining the upper limit of concentration of certain atmospheric contaminants allowed in the ambient air of the work place.

16.Occupational toxicology: deals with assessing the potential of adverse effect from chemicals in occupational environment and the recommendations of appropriate protective and precautionary measures

17.Poison: poison as any substance or energy which is taken internally in a very small dose or applied externally to a living body deprives the health or destroy life by its own inherent quality with out acting mechanically,

18.Selective toxicity – Toxicity produced by a chemical to one kind of living matter without harming another form of life even though the two may exist in intimate control.

19.Tolerance level / Maximum residue limit (MRL). Tolerance level is the maximum allowable level or concentration of drug / chemical in feed /food at a specific time of slaughter , harvesting, processing, storage and marketing up to the time of consumption.

20.Toxin – is a poison especially a protein or conjugated protein (organic origin) produced by living organism and stimulate the production of antitoxin.

21. Toxicology is the study of poison and their action on living cell , in detail- It is the study of poison which include the source, detection, identification, effect on body, detoxification, treatment and control.

22.Toxicovigilance: It deals with process of identification, investigation and evaluation of various toxic effects in the community with a view of taking measurers to reduce or control exposures involving the substances that produce these effects

23.Toxinology: deals with assessing the toxicity of substances of plant and animal origin and these produced by pathogenic bacteria.

24.Venom is a toxicant synthesized in a specialized gland and ejected by the process of biting or stings.

25.Veterinary toxicology : It deals with causes, diagnosis and management of established poisoning in domestic and wild animals.

26.Withdrawal time –(Depletion / clearance period) time required for the residue of toxicological concern to reach safe conc. as defined by tolerance.

27.Xenobiotic- Xenobiotics are foreign chemical entering in the body.

VII.ANSWER THE FOLLOWING:

1.Classify poison depending on the effect of poison on the body –Corrosive, irritant, narcotic.

2.Classify poison depending on physical state: solid eg.Strychnine, dust eg.Asbestose dust, liquid eg. Sulphuric acid, gaseous eg. Sulphurdioxide.

3.Classify poisoning depending on its use: herbicidal poison, insecticidal, depending on legal purpose: malicious, accidental,

4.Classify poison depending on the behavior during the separation procedures(on analysis) : volatile poison, nonvolatile organic, metallic, toxic anion, miscellaneous poison.

5.Classify toxicants: Different classifications are there- a) Depending on source- plant origin eg morphine, animal origin eg. snake venom, mineral origin eg.lead, synthetic origin eg. malathion. b) Depending on physical state- gaseous eg.sulphur dioxide, liquid eg. sulphuric acid, solids eg strychnine,

dust e. asbestose dust. c)Depending on target organs- neuro eg.organophosphorus , hepato eg. aflatoxin, nephro eg. occharotoxin, pulmo eg ANTU, haemotoxic eg. warfarin, dermototoxin eg. csoaltar compound. d) Depending on the chemical nature-inorganic- metals, acids, alkali and minerals. Organic-hydrocarbons-alcohol, aldehyde, glycoside, alkaloid etc.

6. How chemicals are classified depending on the degree of toxicity –(LD 50 oral dose in rats): a) Super toxic -- if the oral LD 50 in rat is less than 5mg.kg, eg. Strychnine b) Extremely toxic -- oral LD 50 in rat is between 5-50 mg/kg eg.opium. c) Very toxic ---- oral LD 50 in rat is between 50-500mg/kg, eg. Phenobarbitone. d) Moderately toxic ---oral LD 50 in rats is between 0.5 to 5 gm /kg. eg. Kerosine e) Slightly toxic ---- oral LD 50 in rat is between 5 to 15 gm/kg, eg. Ethanol f) Practically non toxic ---oral LD50 in rat is above 15 gm/kg eg. Lin seed oil

7.How poisons are classified? Depending on physical and chemical nature: gaseous, inorganic, nitrogenous organic, non nitrogenous organic. Depending on its use: herbicidal poison, insecticidal, Depending on legal purpose: malicious, accidental,

8.What are the evidences of diagnosis of poisoning?- Symptomatic , circumstantial, pathological, analytical;

9.What are pesticides ? classify with examples. Pesticides are agents which are used to kill pests attacking plants, grains, animals-to protect the economic species. This include 1.Herbicides-Defolient like 2-4 dichloro phenoxy acetic acid, Desiccant like Glyphosate 2) Fungicides: heavy metal fungicide like Copper sulphate , organic fungicides like Bavistin 3) insecticides –acaricides like Malathion, pyrethrums ,nematicides like Thimet.4) vertebrate control product, rodenticides like Warfarin, bird repellant explosives 5) biological agents like *Bacillus thuringiensis* to kill caterpillar 6) Miscellaneous class molluscicides like Copper sulphate, soil sterilant like methyl bromide, fumigants like Aluminium phosphide, lumbricides like O.P.compounds-Malathion.

10.What are the common causes of poisoning give eg. a) Naturally occurring hazard eg. Chronic Copper poisoning, contamination of water and pasture with this. b) Man made hazard.eg. contamination of pasture with fluorine from industries and poisoning due to use of this water and grass-- pesticide and herbicide contamination, Drug overdosing etc.

11.What are the conditions in which emetics are not recommended in the treatment of poisoning? Poisoning due to gasoline, kerosene , caustics and corrosives, convulsants or CNS stimulants-- ingestions of sharp objects like nails and metallic wire ---in comatose , unconscious or sedated patients-- in cardiac and respiratory disease-- in pregnancy there is chance of abortion-- In dehydrated and weak animals-- In rabbits, horse, ruminants and rodents.

12.What are the difference between Toxicity, Toxicosis and Toxicology? Toxicity is a state of being poisonous or the extent , quality or degree of being poisonous. Toxicosis is the condition or disease state that result from exposure to a toxicant, Toxicology is the study of toxins or poison

13.What are the main route of entry of poison in the body: a)Lung-an excellent channel for gases, solid and liquid particles which are in free state, aerosol, dust, metallic oxide, phosgene, carbon monoxide, sulfur dioxide etc. b)Gut-most usual route, mostly absorbed from small intestine, also from stomach and rumen. Full stomach delay the absorption-some times irritate and vomited out - mostly absorbed by simple diffusion-- some time by active process also. c) Skin-Unbroken skin is not a favorable channel-easily pass through broken skin- Some agents like Nicotine is absorbed even through intact skin in aqueous solution. Some chlorinated hydrocarbons in oil is easily absorbed eg. DDT, Carbon tetrachloride. Some war gases like sarin is also absorbed via skin.

14.What is LD 50 and margin of safety. LD50 is the quantity of toxin which causes death in 50% of the given population (homogenous group of cells, animals , plants or humans etc) Margin of safety- it is the magnitude of range of dose from a non effective dose to a lethal dose.

15.What is meant by regulatory toxicology-Deals with administrative functions concerned with development and interpretation of mandatory toxicological testing, controlling the use , distribution and availability of chemicals used commercially and therapeutically. Conduct of all the toxicological testing / as per OECD guidelines- Lab must be get accredited by OECD (Germany) / NABIL (India)–get GLP certification for the lab for each test.

16.What is meant by Tolerance level / Maximum residue limit (MRL)? Tolerance level is the maximum allowable level or concentration of drug / chemical in feed /food at a specific time of slaughter , harvesting, processing, storage and marketing up to the time of consumption. (tolerance level is never greater than permissible level. Three major type of tolerance finite tolerance , negligible tolerance, zero tolerance. Tolerance (mg/Kg)= ADI (acceptable daily intake) x 60 Kg (normal human body wt.)

Food factor x 1.5 Kg/ day (average total food/day)

(food factor ----referred contaminant material form what percentage of total food,

17.What is meant by Acceptable daily intake -(ADI): It is the daily intake of a drug or a chemical residue that during the entire life time of a person appears to be without appreciable risk to health on the basis of all the facts known at that time.(Generally 1/100 of “no effect dose” of the /chemical is taken as ADI value)

18.What is meant by Hazard? It is the likelyhood / probability of occurrence of toxic effect of a toxicant. The pattern of use of toxicant determins the hazard. Most toxic substances may be least hazardous (because the use is limited due to high toxicity) and least toxic chemical may be most hazardous (because of more use due to less toxicity). DDT is less toxic than HCN and so use is more and can be more hazardous. Toxicity is the potency of the agent to produce toxic action-may be less hazardous since it is less used because of toxicity.

19.What is meant by poison, toxin and venom: poison is any substances that causes deleterious effects in a living organism, Toxins is a poison that are produced by living organisms (plant, fungi, bacteria and

lower animals) in small quantities, venom is a toxicant synthesized in a specialized gland and envenomation is by the process of biting or stinging.

20.What is universal antidote: It is a formulation employed for the treatment of most oral poisoning--consist of 2 part activated charcoal (for adsorption) 1 part tannic acid (for precipitation) 1 part magnesium oxide(for loose motion) – rarely used now a days because it is nonspecific and not universal .

21.What will be the colour of the blood in poisoning due to following agents. cyanide, hydrogen sulphide, nitrate, chlorate. Cyanide poisoning—bright red, Hydrogen sulphide-dark red, Nitrate and chlorate —chocolasssste colour).

22.What will be the colour of the urine in poisoning due to following agents. Phenol, phenothiazine, picric acid, phenacetin.—the colour of the urine will be phenol—dark green, phenothiazine—red, picric acid—deep yellow, phenacetin—deep yellow.?

23.What is meant by lethal synthesis? The biotransformation of a harmless chemicals to a harmful chemical is called lethal synthesis. Eg. Biotransformation of parathion to a toxic compound paraoxon.

VIII.WRITE SHORT NOTES ON :

1.Analytical evidences for diagnosis of poisoning: gives final proof of poisoning-detection of significant amount of toxic agent in the specimen on analysis. While sending the samples for analysis –each organ must be in separate container with appropriate preservatives- take appropriate quantity of the specimen- make prior arrangement with labs- probable toxic materials to be seen -full written report of clinical finding- any legal action chances.

2. Circumstantial evidences for diagnosis of poisoning: deals under different headings -a) housing, food and water, environment and others. Housing- newly repaired house, newly painted area chances of licking the area , new furniture introduced, animals exposed to new equipment , inadequate ventilation, over crowding of animals, change in physiological response to external stimuli. Location of house/shed, chances of contamination of the pasture and water with industrial pollutant, ashes of waste wood preserved with arsenic. b) food and water- contamination of food with fungi, preservatives ,chances of contamination of water bodies by nearby pesticides industrial waste. C) environment- atmospheric pollution, industrial gas, vapour, dust- Poisonous plants and animals in the area. Others- smell in the area (pollution) colour of the urine, colour and consistacy of faeces .

3.Doping : Administration of any substance other than the normal nutrients to animals for the purpose of affecting its speed, stamina, courage, or conduct in race. It is an undesirable practice. Causes considerable damage to Jocky, horse become unmanageable , permanent impairment of reproductive system of female. False selection for breeding under doping. Different type of doping are there. a) doping to win b) doping to lose c) doping by accident d) therapeutic. Drugs which will enhance the racing performance –caffeine, amphetamine, hormones, anabolic steroids, drugs used to mask normal

illness- procaine, phenyl butazone, atropine, tranquilizers. Accidental feeding of certain substances which contain drugs eg.Coca husk. Administer depressants to fail others horse-it is an outside job. Saliva, urine, sweat, blood etc are tested for the drug metabolites to confirm doping.

4. Drug addiction and habituation: Drug addiction –state of periodic or chronic intoxication produced by repeated consumption of the drug-characterised by tendency to increase the dose ,compulsion to continue taking the drug-obtain it by any mean-psychological and a physical dependence on the effect. It is detrimental to the individual and society. If discontinued it produce withdrawal symptoms .eg.cocaine, opium. Habituation-A condition resulting from repeated administration of a drug –desire to continue taking the drug for the sense of well being- little or no tendency to increase the dose some degree of psychic dependence or the effect of the drug-absence of physical dependence-detrimental effect primarily to the individual-if discontinued nothing will happen to the system.

5. Effective dose 50 (ED 50) otherwise called as median effective dose, dose which is effective in 50% of the population or the dose which produce half (50%) of the maximal response. If the response is expressed as percent of maximal response and plotted against logarithm of the dose use to get a sigmoid curve instead of hyperbolic graded dose response curve

6. Evidences of diagnosis of poisoning- Include a)Symptomatic , b) circumstantial, c) pathological, d)analytical: a)Symptomatic evidence of diagnosis of poisoning –symptoms include abdominal pain , anemia, blindness, coma, cardiac arrhythmia, convulsion, diarrhea, dilatation of pupil, dyspnoea, excitement, haematuria, haemoglobinuria, jaundice, lameness, muscle tremor, paralysis, salivation, vomiting. b)Circumstantial evidence include-personal search of buildings, surrounding , housing, food, medicine, environment. c)Pathological evidences – discolouration of mucous membrane , yellow , cherry red, dark chocolate colour, odor of abdominal content, leasions, colour of feces, urine, haemorrhage, kidney damage. d)Analytical evidence- analysis of specimen will give confirmative diagnosis.

7.General line of treatment of poisoning: a) Prevent continued absorption of toxicants by giving emetics like ipecacuanha, apomorphine, copper sulphate and zinc sulphate-- gastric lavage with saline, potassium permanganate, Tr. iodine , tannic acid, and sodium bicarbonate---Cathartics like magnesium sulphate, Adsorbents like activated carbon (2.5 g/kg in 1:5 water administered with sodium sulphate to hasten the removal of complex from the G I tract), enema, cleaning of skin and hair and mucous membranes, eyes. Perform rumenotomy or gastrotomy to remove the toxins, dilution of the content to reduce the absorption rate. remove the animal from source. Use one or more treatment as per the requirements. b) Prevent the distribution of toxins to target site—Ion trapping by changing the pH excretion can be enhanced, enhance metabolic conversion of toxin. Alternate binding site -infusion of albumin in albumin binding agent, c) Complex formation to elevate threshold level of toxin –specific antidote. d) Provide symptomatic treatment .e) Specific treatment – use of specific pharmacological agents f) Enhance elimination, diuresis, change of pH of urine, dialysis

8.Hazard : it is a quantitative description of adverse effect resulting from a particular chemical or physical agent (with no regard to dose or exposure) The term hazard is related to the risk but it mainly

expressed likelihood or probability of danger. Highly toxic chemical are less hazardous because of its limited and careful use as it is highly toxic , less toxic chemical are more hazardous because of its wide spread and careless use as it is less toxic.

9.Lethal dose 50 (LD 50), median lethal dose (MLD) the dose that is lethal to 50% of a population exposed to a toxicant under defined condition. The LD 50 values does not pertain to the severity of clinical signs observed or the characteristic changes caused by the toxicant but depend only on the lethality produced by the toxicant .it is an important index to assess the toxicity of chemicals. For calculation of LD 50 it requires mortality of a large number of animals and it bears no relation to long term effects. It is not possible to know the minimal lethal dose 1 and maximal lethal dose 99.

10.Malicious poisoning- is a criminal killing of animals by administering certain toxic substances .generally motivated by ill- will or hatred against the animal or its owner -- mostly carried out by mixing certain toxic substances in the food or feed of animals or forceful administration of poison to animal or making injuries in the body. eg.Sui poisoning.

11.Mechanism of toxicity: Specific action of toxicants-- interact with certain specific macromolecules components in the body --alter the function of initial biochemical / physiological changes and modify response. These macromolecules can be receptors (. Eg. Neuro transmitter drugs / hormones) Ion channel mediated events (eg. Barbiturates , nicotine and chlorinated hydrocarbons) Enzyme mediated are common target of toxicants (eg. Organo phosphorus compound on cholinesterase, hydrocyanic acid on cytochrome oxidase, fluoroacetate on Co-enzyme A. Carrier molecule (eg.cocaine inhibition of nor adrenaline in to adrenergic presynaptic nerves, hemicholinium block choline carrier to block acetyl choline.

12.Mechanism of toxicity : Non specific action of toxicants—Interfere with body metabolism or synthesis like uncoupling of oxidative phosphorylation, inhibition of oxidative phosphorylation, inhibition of nucleic acid and protein synthesis eg.aflatoxin. interfere with fat metabolism eg carbon tetrachloride. Impairment of oxygen transport eg. Carbon monoxide, injury to blood and blood vessels eg. Warfarin/ altered calcium homeostasis by free radicals, immunomodulation eg. Mycotoxins, developmental defects eg. Carcinogenesis, deficiency on nutrients and co-factors, nonspecific action on enzymes and protein deposition in tissues and organs.

13.Packing and despatching of laboratory sample for examination: For lab. test at least the following quantities of organs must be despatched. Liver and kidney 50-100 gm., stomach content-250gm (with stomach wall).,rumen liquid-200ml (with rumen papillae)., blood -30ml urine- all., milk -50-100ml., faeces-50 gm., water-200ml. It must be dispatched immediately to the labs. in appropriate containers with preservatives to prevent decomposition. Each organs in separate container. Safe preservation is freezing, next safe is alcohol if not available use super saturated solution of saline. A sample of preservative also must be send separately. Formalin is used only for histopathological examination of tissues. It will fix the toxin to the tissues and difficult to extract. Glass containers are good. Polythene jars and bags are lighter and less fragile but they are permeable to many organic solvents and may

affect the result. the container should be sealed and pack properly and dispatch. If any legal action is arising it should be sealed in presence of a witness preferably a police personals.

14.Pathological evidences for diagnosis of poisoning: pathological findings, during post mortem which helps in the diagnosis of poisoning; discolouration of m.m. yellow in jaundice, cherry red in cyanide and carbon monoxide, dark chocolate in nitrate etc. – abnormal odor in the stomach -garlic odor in phosphorus, bitter almond in cyanide etc. abnormal material in the stomach content, colour of material copper give greenish blue colour, chromic compound yellow or orange colour, nitric acid and picric acid give yellow colour, sulphuric acid black colour-hepatic damage ,kidney damage, froath in the lungs, exudation as in ANTU poisoning haemorrhage etc should be noted- histo pathological examination also to be done- will give clues to diagnosis

15.Route of entry of poisons in the body: a)Lung-an excellent channel for gases, solid and liquid particles which are in free state, aerosol, dust, metallic oxide, phosgene, carbon monoxide, sulfur dioxide etc. b)Gut-most usual route, mostly absorbed from small intestine, also from stomach and rumen. Full stomach delay the absorption-some times irritate and vomited out - mostly absorbed by simple diffusion, some time by active process also. c) Skin-Unbroken skin is not a favorable channel-easily pass through broken skin- Some agents like Nicotine is absorbed even through intact skin in aqueous solution. Some chlorinated hydrocarbons in oil is easily absorbed eg. DDT, Carbon tetrachloride. Some war gases like sarin is also absorbed via skin.

16.Specific antidotes are agents used specifically for a particular poison ,they actually block the response(directly antagonize the system affected by the toxicity (muscarine X atropine)/neutralize the toxin (acids X alkali) precipitate/chelate/detoxify/elevate the threshold at which produce toxicity. Eg.Heavymetals X BAL, EDTA, iron salt X desferrioxamine, Cyanide X nitrite and thiosulphate, bromide X chloride, dicumarol X vit. K, morphine X naloxon , nalorphine, fluoride , oxalates X calcium, lead X calcium sodium EDTA, mercury X Penicillamine.

17.Specimen for laboratory examination: Final proof of poisoning lies in the detection of significant quantity of toxic agent in the body. When a specimen is dispatched to a lab. the following points must be remembered. a) specimen should never be dispatched without prior arrangement with the lab. b) a full written report of the clinical and post mortem findings and instruction for the poison for which tests are to be done. Lab. Should also be warned of the likelyhood of any legal action arising out of this case. While sending the samples at least the following quantities of organs must there. Liver and kidney 50-100 gm., stomach content-250gm.,rumen liquid-200ml., blood -30ml urine- all., milk -50-100ml., faeces-50 gm., water-200ml.

18.Symptomatic evidence of diagnosis of poisoning –symptoms include abdominal pain , anemia, blindness, coma, cardiac arrhythmia, convulsion, diarrhea, dilatation of pupil, dyspnoea, excitement, haematuria, haemoglobinuria, jaundice, lameness, muscle tremor, paralysis, salivation, vomiting. Circumstantial evidence include-personal search of buildings, surrounding , housing, food, medicine, environment. Pathological evidences – discolouration of mucous membrane , yellow , cherry red, dark

chocolate colour, odor of abdominal content, lesions, colour of faeces, urine, haemorrhage, kidney damage. Analytical evidence- analysis of specimen will give confirmative diagnosis

19. Circumstantial evidences of diagnosis of poisoning: Circumstances under which toxicity occurs-deals under 4 headings-Housing, food, medicine, Environment a)Housing-personal search of the building and surroundings-newly painted area, paint tins, loose roofing sheet, new furniture- equipment etc. b)Food- change in diet, abnormalities in feed , new feeds and fodder provided, c) medicine – food additives, drugs used d) environmental –odour of breath, colour of urine, factories nearby, discarded batteries, environmental pollution. plastic bags etc.

20.Universal antidote- it is a mixture drugs consisting of activated charcoal (2 part) magnesium oxide (1 part) kaolin (1part) and tannic acid (1part) administered orally in the form of mixture in water. . It is used for the virtual removal of a wide range of toxins from the stomach. Activated carbon is a very good adsorbent ,adsorb heavy metals, toxins, gases, bacteria etc. remove through feces thereby preventing absorption. -activation increase the adsorbing area. Tannic acid precipitate metals, metalloids, and alkaloids .kaolin is also an adsorbent, magnesium oxide neutralize acids. Not effective in all cases of poisoning.

IX. WRITE ESSAYS ON:

1.Explain in detail the different metabolic pathways involved in the biotransformation of toxins.
2.Explain the evidences to be searched for the diagnosis of poisoning.
3.Explain the mode of action of poisons and factors modifying the action.
4.Explain the general line of treatment of poisoning.
5.What are the mechanism of action of poisons?
6.What are the circumstantial evidences to be searched for the diagnosis of poisoning?
7.Explain in detail packing and dispatching of laboratory samples for examination.
8.What is meant by chelating agents, explain with examples, How it will help in the treatment of poisoning?
9.Explain the Symptomatic diagnosis of poisoning.

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