QUESTION BANK VETERINARY PHARMACOLOGY AND TOXICOLOGY

PAPER NO - 28

ZOO TOXINS,ENVIRONMENT ….

I. Name the following:

1.A haemotoxic snake.-(Viper, Rattle)

2.A lung irritant gas.--(Chlorine, Phosgene)

3.A lacrimator gas.-(Chloroacetophenone)

4.A nettle gas.-(Dichloroformoxime)

5.A systemic poisonous gas.-(Cyanogen bromide)

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

7.A vesicant mustard -(Dichloroethyl sulphide)

8.Few non enzymatic protein in snake venom. Neurotoxin, haemotoxin, cytotoxin, agglutinin. Histamine)

9.Funnel webbed spider.-(Atrax robustus)

10.One haemotoxic poisonous snake.-(Viper)

11.One spider causing poisoning.—(Black widow spider, Funnel webbed spider)

12.One vesicant gas.-(Nitrogen mustard)

13.One nitrogen mustard.-(Mustin)

14.One arsenical mustard.-(Lewisite)

15.One sternutator/ sneezing gas.-(Adamsite)

16.Proteolytic enzymes in snake venom.- (Collagenase, ophio oxidase, ribonuclease, haemolysin))

17.Radioactive particles causing toxicity--(Alpha, Beta, and Gama)

18.The most poisonous snake .-(Sea snake)

19.Toxin present in puffer fish.-(Tetradotoxin)

20.Toxic principles present in toad venom.-(Bufotoxin, Bufotanin)

21.Toxic principle present in Bee venom.-(Apamine, melittin)

22.Two viperin snake.-(Viper, Rattlesnake)

23.The unit of radio active energy.-(Rad)

24.The natural source of radiation injury. –(Cosmic rays from space, radioactive materials)

25.Three poisonous snake in our area.-(Cobra, Krait, Viper, Coral, King cobra)

26.Three non nutritive sweeteners.—(Saccharin, Sod. cyclamate, Aspartame)

27.Three non poisonous snakes.—(Rat snake, Python, sand boa)

28.Two 'bone seekers'-(Barium 140, Strontium 89, strontium 90)

29.Two drugs which enhances the racing performance in horses .-(Amphetamine, Anabolic steroids)

30.Two elapidae snakes-(Cobra, Coral, Krait)

31.Two nerve gases.-(Soman, Sarin, Taban)

32.Two viperine snakes.-(Viper, Rattle snake)

33.Two venom causing convulsion.-(Snake venom and Toad venom)

II. State true or false:

1.Acreolein is the gas formed by oxidation of glycerol.--(T)

2.Adamsite causes sneezing.--(T)

3.Alpha latrotoxin is a toxic factor in spider venom.--(T)

4.Amaranth a food colouring agent induce malignant tumours.—(T)

5.Among domestic animals Horse is highly susceptible to snake envenamation.--(T)

6.Among domestic animals cats are least susceptible to snake envenamation.--(T)

7.Among cobra and krait venom, cobra venom is less poisonous.--(T)

8.Animals with thick hair coat will be more affected by radiation injury.—(F)

9.Beta rays have more penetrating power than gama rays.--(F)

10.Barium 140 causes irradiation of bone.--(T)

11.Bees sting is acidic and hence dilute ammonia can give some relief.-(T)

12.Botulinum toxin prevent the synthesis of acetyl choline.-(T)

13.Bufotoxin is a cardio active principle present in toad venom.-(T)

14.Carbon monoxide give chocolate colour to blood.-(F)

15.Carbon monoxide is less dense than air .—(T)

16.Chloroacetophenone is a lacrimator used for riot control.-(T)

17.Ciguatera toxin is produced by certain fishes.(F)

18.Ciguatera toxin is produced by certain microalgae.-(T)

19.Ciguatera toxin affect the Sodium channels and can cause hot cold reversal.-(T)

20.Ciguatera fish poisoning is due to the intake toxins produced by micro algae *Gambierdiscus toxicus* harboring by fishes —(T)

21.Ciguatoxin is a heat labile toxin and so it can be destroyed by cooking—(F)

22.Coral snake belongs to Elapidae family.-(T)

23.Cobra venom is mainly neurotoxic and causes death by respiratory paralysis.—(T)

24.Cobra is an Elapidae snake which are neurotoxic.-(T)

25.Day old ducklings are comparatively resistant to aflatoxin.-(F)

26.Deposition of fall out on the skin can leads to severe burns mainly from the local effects of Beta radiation.-(T)

27.Dichloroformoxime is used as a harassing agent.-(T)

28.Early somatic effect of ionizing radiation causes G.I.injury in few hours.-(T)

29.Early somatic injury due to radiation is caused by 100—500 rad. Units.-(T)

30.Elapin snakes must close the lower jaw before they inject the venom.—(T)

31.Horses are the most susceptible species to snake venom.-(T)

32.Horses are highly susceptible to toxic effects of ionophore antibiotic Monensin.—(T)

33.Ice packs are contra indicated at the site of viper bite .-(T)

34. In case of Viper bite tourniquet is not recommended .-(T)

35.Irradiation of thyroid destroy thyroid tumour.-(T)

36.Ixodidae toxin decreases the release of acetyl choline from presynaptic motor nerve terminals.-(T)

37.King cobra is a viperine snake.-(F)

38.Krait belongs to Elapidae family .-(T)

39.Lime juice can be used to treat alkali intoxication.-(T)

40.Lime water can be used to treat alkali intoxication.-(F)

41.Lime water can be used to treat acid intoxication.-(T)

42.Methyl anthranilate is a flavoring agents having grape like flavors.—(T)

43.Mydriasis is noticed in animals in snake envenamation.-(T)

44.Numbness of lips , tongue and extremities can be caused by eating puffer fish.-(T)

45.Over heated non stick saucepan release a toxic gas.-(T)

46.Peroxyacetyl nitrate contribute significantly to the phenomenon of photochemical smog.-(T)

47.Potassium permanganate crystals should not be used in the snake bite wound.-(T)

48.Propyl gallate is an antioxidant added to food.—(T)

49.Rattle snake is a viperine snake which is haemotoxic.-(T)

50.Rat snake belongs to viperine family.-(F)

51.Safrole is a flavoring agents with a characteristic " Candy- shop" aroma and is used as a food additive.—(T)

52.Saw scaled viper is poisonous and Russels viper is non poisonous .-(F)

53.Scombroid poisoning is due to the growth of a particular bacteria in fishes.—(T)

54.Sea snake venom is less toxic than botulinum toxin.-(T)

55.Sodium Alumino silicate is an anti caking agent added to food.—(T)

56.Sodium benzoate is commonly used as a food preservative.—(T)

57.Sodium cyclamate is more sweeter than Saccharin.—(F)

58.Spider venom causes massive release of acetyl choline.-(T)

59.Spider venom is more toxic than rattle snake venome.-(T)

60.Tetradotoxin from puffer fish is a neurotoxin blocking central and peripheral neurotransmission.-(T)

61.Tetradotoxin will act by blocking sodium channels.-(T)

62.The biological effects produced due to radiation include somatic and genetic.-(T)

63.The effect of inhaled radioactive particle is only confined to lung.-(F)

64.The most poisonous among common snake is sea snake.-(T)

65.The pre-synaptic neurotoxin in the venom of banded krait is Beta- bungarotoxin.—(T)

66.The radiation dose to tissues is expressed in the unit "Gray" .—(T)

67.The venom of banded kraits contain pre-synaptic neurotoxin.—(T)

68.The toxic principles present in marine toad venom is Bufotoxin, Bufotanins and Bufogenins .-(T)

69.Tissue with high rate of cell turnover like intestinal epithelium and haematopoietic system are highly sensitive to radiations .—(T)

70.Total dissolved solid content of 1000 mg/lit. of drinking water poses little or no hazard to livestock and poultry.-(T)

71. Venom of sea snakes contain post synaptic neurotoxins .—(T)

72.Viper venom is mainly neurotoxic in action.—(F)

73.Viperine snakes can inject venom without closing the lower jaw.—(T)

74.Viperine snake venom is haemotoxic and death is due to haemorrhage and cardiac arrest.-(T)

75.Wasp sting is alkaline hence vinegar can neutralize it and can give some relief.-(T)

III. Fill up the blanks with most appropriate words:

1.Among the following , saccharin , sod. cyclamate and aspartate , ……..is the sweetest one .—(saccharin)

2.Because of the fibrinolytic action of viper venom it is having ……..action on blood .-(anticoagulant)

3.Bee sting is……in pH and Wasp sting is ……..in pH.-(acidic, basic)

4.By oxidation of glycerol burning fat will produce a toxic gas……..-(Acreolein)

5.Burning coal produce a highly toxic gas …… .-(Carbon monoxide)

6.Carbon monoxide convert haemoglobin to ……..which can not carry oxygen-(Carboxy haemoglobin)

7.Carboxy haemoglobin gives ……to blood and bright pink colour to mucous membrane.-(cherry red colour)

8.Carbonyl chloride is otherwise called as……..-(Phosgene)

9.Carbonyl chloride is having the smell of ……(Mouldy hay)

10.Cherry red or pink colour of blood is seen in .....poisoning.—(carbon monoxide/ cyanide)

11.Depletion of ……. layer in the atmosphere enhances exposure to solar radiations .—(Ozone)

12.Elapidae snake venom is ……..toxic and death is due to respiratory failure.-(neuro)

13.Eventhough, nitrogen mustard gas is a vesicant it is used therapeutically in the treatment of ……. ……..-(cancer)

14.Monosodium glutamate is a food additive marketed as a …….for food.—(flavor enhancer)

15.The blood will be dark red in colour in toxicity due to …….—(hydrogen sulphide)

16.The LD 50 of sea snake venom is ……..mg/kg i/v.-(0.01mg)

17.Tourniquet is not recommended in…….bite.—(viper)

18.Venom from .....are cardiotoxic glycosides.-(Toads)

19……is a nettle gas.-(dichloro formoxime)

20……..can be applied in bee sting to neutralize the sting which give relief.-(dilute ammonia, soap solution)

IV.Match the following;

A	B
1. Nitric acid	Crotoxin----10
2. Sulphuric acid	Beta bungarotoxin---9
3. Acetic acid	Black widow spider----12
4. Krait	Bone seekers---18
5. Viperidae	Tetradotoxin----16
6.Rattle snake	Funnel webbed spider---13
7. Cobra	Bufogenin---14
8. Carbolic acid	Neurotoxic----4,7
9. Sea snakes	Hot cold reversal---17

10.Rattle snake	yellow coloured mucous membrane---1
11.Tiger snake	Charring of mucous membrane---2
12. Latrodectus mactaus	Haemotoxin---5,6
13. Atrax robustus	Apamine and melittin---15
14. Toad venom	Characterestic smell to vomitus---3
15. Bee venom	Notexin---11
16. Puffer fish	Elapidae----4,7
17. Ciguatera	Triangular head---5
18.Barium 140	Hood with spectacle mark outside—7
	Wash the area with alcohol--8

V. Choose the correct answer from the given ones.

1.Following agents can cause radiation injury a)Cosmic rays from space b) Exposure to nuclear weapon c) Radio active waste from nuclear energy operation d) all the above.—(D)

2.Following toxic principles are present in snake venom. a) Ophio –oxidase b) proteolytic enzymes c) Hyaluronidase d) Deoxy ribo nuclease e) all the above.—(E)

3.Following are bone seekers except a) Strontium 89 b) Barium 140 c) Plutonium d) X-ray.-(D)

4.Following areas of the body are most sensitive to photosensitization when exposed to light. a) Nose b)Face c) Udder d) Groin e) all the above .-(E)

5.Fumigents are used to control a) insects b) soil nematods c) rodents d) all the above .-(D)

6.Irradiation of the Gut generally happen due to contamination of food mainly by a) Alpha particle b) Gama particle c) Beta particle d) none of the above.-(C)

7.Marine toad venom contain a) bufotoxin b) bufotanin c) Bufogenins d) all the above.-(D)

8.Nuclear explosion causes a) local fall out b) tropo spheric fall out c) stratospheric fall out d) all the above –(D)

9.Paralytic shell fish poisoning is caused by a) Dioxins B) Scombroid c) Soxitoxins.—(C)

10.Snake venom contain a) neurotoxic factors b) haemotoxic factors c) local toxic factors d) all the above –(D)

11.Snake venom contain a) anticoagulant factors b) pro coagulant factors c) haemolytic factors d) all the above.—(D)

12.Some of the poisonous fishes are listed below a) Shell fish b)Sting fish c) Puffer fish d) all the above.-(D)

13.Some of the following can cause radiation injury a) Cosmic rays from space b) Exposure to nuclear weapons c) Radio active waste from nuclear energy operation d) all the above-(D)

14.The following snakes belongs to the family of Elapidae except a) Rattle b) Cobra c) Coral snakes d) Krait.—(A)

15.The term used to described malicious poisoning in animals with *Abrus precatorius* is a)Alkali poisoning b) Salt poisoning c) Sui poisoning.-(C)

16.The following snakes are poisonous except a) Cobra b) krait c) viper d) Python.(D)

17.The following snakes are non poisonous except a) Python b) Sand boa c) Viper d) Rat snakes.—(C)

18.The following snakes belongs to the family Elapidae except a) Rattle b) Cobra c) Coral snake d) Krait.—(A)

19.The toxicity of carbon monoxide is mainly due to the following action a) combined with haemoglobin to form carboxy haemoglobin and reduce its oxygen carrying capacity. b) combine with myoglobin and reduce its oxygen storage capacity. c) combine with cytochrome oxidase and inhibits cellular respiration d) all the above.—(D)

20.Viper venom contain a) haemotoxin b) Cyto toxin c) Agglutinins d) all the above .—(D)

VI. Answer the following:

1.Classify the following gases as , lacrimators, systemic poison, sternutators,lung irritant vesicant, nerve gas. Gases are cynogen bromide, carbonyl chloride, chloracetophenone, adamsite, lewisite, soman. 1.Cyanogen bromide—systemic poison 2. Carbonyl chloride-Lung irritant 3.Chloracetophenone-Lacrimatore. 4.Adamsite—Sternutators .5.Lewisite—Vesicant 6. Soman—Nerve gas.

2.Classify poisonous animals with one eg. each: a) poisonous insects- bees, wasps, ants b) poisonous arachnids- spider ,scorpion, ticks. c) poisonous amphibians- marine toads d) poisonous reptiles- snakes, lizards e) poisonous fishes- scromboid , ciguatera.

3.What are non ionizing radiations? Any type of electromagnetic radiation that does not carry enough energy to ionize atoms or molecules . Non ionizing radiation is thought to be essentially harmless below the levels that causes heating-- visible light, near u/v rays ,infra red , microwave and radio wave.

4.What are the differences between venomous and poisonous animals? Venomous animals produce venom in specialized glands or cells and deliver it by bites, sting, spitting. Poisonous animals possess a toxin in their tissues which is toxic to other animals when consumed.

5.What are the supportive therapy in snake bite? The animal should be kept calm and quiet, tranquilization in horse may be required- the bitten limb should be immobilized to retard absorption of poison- irrigate with water - application of tourniquet above the site of bite in case of elapin , but not in case of viperine envenomation .Incision and suction at the site of bite with cupping devices with in one hour by an expert may give protection in some case – fluid therapy- lactated ringer solution to control shock. Rapidly acting corticosteroids may be useful to control tissue damage .

6.What are the toxic principles in snake venom ? The main toxic principles are Collagenase, Lipase, Hyaluronidase , acetyl choline esterase, ophio oxidase, ribonuclease, phospholipase, haemolysin))

7.What will be the colour of venous blood in toxicity due to the following agents. Carbon monoxide, nitrite, cyanide, hydrogen sulphide. 1.Carbonmonoxide—Cherry red colour. 2.Nitrite---Chocolate colour. 3. Cyanide---bright red 4.Hydrogen sulphide---Dark red.

8.What are the sources of man made radiation injury: Nuclear explosion, nuclear wepons, radioactive waste from nuclear energy operation, use of radioactive materials for diagnostic therapy.

9.What are the sources of radiation injury? 1) Natural sources such as cosmic rays from space, disintegration of radioactive elements in earth's crust and naturally occurring radio active materials in the environment may give rise to the external or internal irradiation of animal body. 2) Man made-nuclear weapons are very rich source of radiation. In the immediate vicinity of a nuclear explosion the radiation effect is very less, other areas the effect is wide spread and long lasting due to fall out is seen. (local fall out, tropospheric fall out, stratospheric fall out). Nuclear power plant – coolant water used in the plant is radioactive and represent a hazard if released in to the environment . Industrial – radio isotopes and devices used in industry for various purpose . Radio active waste- faulty storage due to carelessness. Diagnostic therapeutic uses X-ray and radioactive isotopes in therapy.

VII. Write short notes on:

1.Black widow spider as a zoo toxin: It is most toxic among poisonous spiders. Females are 1- 1.5 inches in size .The females eats the male immediately after mating-that is why the name "widow". Its venom contains biologically active compounds like alpha latrotoxin, neurotoxin, lipoproteins, hyaluronidase, protease, haemolysin etc. The systemic reaction is mainly due to neurotoxin, it acts on neuro muscular junction- release acetyl choline causing painful cramping of all large muscles . Symptoms include pain at the site of bite, restlessness, vomition, muscle cramps, shallow and irregular respiration, tonic and clonic convulsions, death from resp. and cardiac failure. Treatment- specific antivenin, muscle relaxant (methocarbamol), analgesics (meperidine), sedatives (diazepam), atropine , corticosteroids, antihistamines and resp. stimulants.

2.Carbon monoxide toxicity: Carbon monoxide is produced mainly by incomplete combustion of hydrocarbon fuels, volcanic eruption, gun powder explosion, industries, automobiles, incinerators, furnaces etc. On inhalation it combines with haemoglobin to form carboxy haemoglobin and reduce the oxygen carrying capacity. b) combines with myoglobin and reduce its oxygen storing capacity c) combines with cytochrome oxidase and inhibits its action. It also cause lipid peroxidation, demylination and oedema in CNS . Symptoms –characteristic hypoxia, drowsiness, weakness, incordination, increase respiration and pulse, involuntary urination and defecation, unconsciousness, may produce myocardial ischemia, atrial fibrillation, pneumonia, pulmonary oedema, hypoglycaemia, muscle necrosis, acute renal failure, visual and auditory problem, give cherry red colour to venous blood. Treatment: oxygen is the specific antagonist, artificial respiration, supportive therapy- blood transfusions, mannitol , glucose, cortico steroids, antibiotics- correct hypotension and acidosis.

3.Clinical signs of Elapins envenomation:(Cobra) It is neurotoxin, animal become restless, excited, later depressed, pain and swelling is less –little discolouration of area, systemic neurological signs predominate- muscular weakness developing in to paralysis- swallowing become difficult the viscid saliva and food collected in the mouth –aspiration pneumonia. In case of krait attack- violent abdominal pain and convulsions may precede death. In calves effects of the neurotoxins are manifested by marked pupillary dilation. excitement, incordination, convulsion and paralysis. In dogs salivation, vomition, defecation, tremors, convulsions, death due to respiratory paralysis in 6 hours.

4.Clinical signs of Viperine envenomation: Viper venom is haemotoxic,Typical viper bites are characterized by severe local tissue damage and pain at the site- spreads rapidly, restlessness, excitement, incordination, lameness, swelling and discolouration of tissues with in minutes, dark bloody fluid may ooze from the fang wounds ,conjunctiva and mouth. Heamatemesis, haematuria, haemorrhage in peripheral tissue- skin become cold, pupil dilate, do no respond to external stimuli like pinching and pricking, unconsciousness, respiratory paralysis, kidney and heart failure and collapse. In small animals- vomition, hypotension, tachycardia, pulmonary oedema, salivation, diarrhea, convulsion, renal failure, shock. If animal survive for few days extensive local suppuration gangrene and sloughing , death in such case is from septicemia,

5.Clinical signs of Radiation injury: Non genetic effect –high dose cause death from neurological damage, reduced doses cause Gastro intestinal injury and damage to haemopoietic system. The symptoms include. Neurological signs -- depression or enhanced motor activity ,incordination, respiratory depression, convulsion, cerebral oedema , coma and death. Gastro intestinal symptoms -- anorexia, nausea, vomition, diarrhea, weight loss, dehydration, ulceration of mouth, haemorrhages and bacteraemia. Haemopoietic symptoms-- destruction of erythrocyte and leucocytes, petechial haemorrhages of skin, anaemia fever sweating and fatigue. Sub lethal dose produce carcinoma, partial body irradiation produce oedema of skin, falling of hairs, fibrosis, reduce fertility in males and females, ulceration of mouth, throat, damage to salivary glands, stomach glands, pneumonitis, ulceration of lungs. Damage to spinal cord , demylination and delayed necrosis of neurons. Endocrine dysfunction, shrinkage of kidney, urinary obstruction, damage to bone marrow , cateract etc. Genetic change include mutation and chromosomal aberrations

6. Chlorine as a toxic gas: Chlorine is a poisonous gas used for industrial purpose, war gas, antiseptic and disinfectant, water purification, cleaning products etc. Produce toxicity by accidental release from industries, use as a war gas, careless use by individuals. It can enter in the body by inhalation, ingestion or topical. On entering the body it react with antioxidents and produce hypochlorus and hydrochlorus acid – react with functional groups of protein such as cysteine and methionine producing chloramines . The symptoms include difficulty in respiration, irritant cough, burning sensation in the mouth, throat pain, stomach pain, blood in faeces, low B.P. fluid in the lungs, change in blood pH. Irritation in eyes, blurry vision burning sensation on skin etc. Treatment include –remove the source or remove the patient from the contaminated environment and inhale fresh air –wash the topical area of exposure with soap and water, flush the eye with water, drink milk and water, administer activated charcoal, give fluids,-other symptomatic therapy.

7. Delayed radiation injury: Local irradiation of skin-- fall out on skin leads to burns, oedema, cell destruction of epidermis, follicle and sebaceous glands- contamination of food by Beta particle and consumption leads to ulceration, anorexia, diarrhoea, reduce WBC and death. Irradiation of bones by bone seekers(isotopes of strontium-89,90. Barium 140) - act on bone marrow causes anemia, leucopenia and tumor. Irradiation of lungs-smaller particle enter in the alveoli- engulf by phagocytes – migrates in to lymphatic system. Large particles enter in to bronchi removed by ciliary action then swallowed –causes acute toxicity mainly by plutonium =. (LD 50 is 50 micro gram/kg)

8.Dioxin: Is a group of toxic chemicals -- mainly three groups a) chlorinated dibenzo paradioxin b) chlorinated dibenzo furans 3) polychlorinated diphenyl . They looks like white crystalline needles- breakdown slowly -half life is 9 to 15 years- found in the environment – accumulate in food chain mainly in fatty tissue of animals. It is a contaminant found in the production of some chlorinated organic compounds , combustion /incineration of waste, plastics, burning fuels, forest fire etc. More than 90 % human exposure is through food -dairy products, shell fishes. High exposure result in skin lesions- altered liver function- causes cancer, reproductive defects, developmental problems, suppress immune response and interfere with hormones. Non specific symptoms include fatigue, malaise,confusion and visual disturbances, nausea, vomition, abdominal pain, headache. Treatment is symptomatic.

9. Fish poisoning: The poisonous fishes are shell fish , puffer fish, sting fish and tetradotoxin fish, ingestion of these cause toxicosis. Puffer fishes and related ones are neurotoxic – block the neurotransmission by blocking sodium channels. Symptoms include numbness of lips, tongue, nausea, vomition, muscular paralysis of extrimities, unconsciousness and death. Ciguatera- a fish born disease by eating fishes that harbor a particular algae having toxic principles. (0.1 microgram can cause illness in humans). Block sodium channels . Gastro intestinal symptoms followed by nervous symptoms- sensation reversal (Hot-Cold) symptoms last for weeks or months rarely lethal. Scrombroid fish- particular bacteria harboring in these fishes cause allergic symptoms.

10.Honey bee and wasp sting toxicity: The sting of these flying insects have venom sac- insert their sting in to the skin. The venom contain histamine, serotonin, kinin, hualuronidase, phospholipase, formic acid formaldehyde, in addition to apamin and melitin. In mild case of attack there will be localised pain, urticaria, irritation, itching. In severe case (multiple sting) vasodilation, hypotension, broncho constriction, inflammation, oedema, later haemolysis ,renal failure , anaphylactic shock. Treatment-

remove the sting with a blunt objects, wash well with soap and water, application of ice reduce swelling, application of weak sol of ammonia or sod bicarbonate in case of bee sting ,wasp sting is basic hence apply vinager, application of antihistamine cream, give analgesics and corticosteroids, antihistamines, adrenalin etc.

11. Ionizing radiation: Alpha , Beta and Gama particles of radiation. Sources are cosmic rays from space, naturally occurring radio active material, nuclear weapons(Local fall out, Tropospheric and Stratospheric fall out) radio active waste from nuclear energy operation- diagnostic therapy eg. X-ray. Somatic effect will be early of delayed. Genetic effect is mutation or cancer. Early effect by several thousand rad (unit of radiation) G.I. injury in few hours subside and end fatally. Lesser amount-G.I. disturbances, subside , slow blood change, haemorrhage, increase susceptibility to infection and death. Delayed changes after months or years- local tissue changes, leukemia, teratogenicity, opacity of the eye. Local irradiation of skin leads to severe burns (deposition of fall out) edema-cell destruction in epidermis, destruction of follicle and sebaceous glands- wool give some protection to the skin. Irradiation of gut, bone, lung and thyroid can also occurs.

12.Irradiation of lungs: Any organs can be affected by radioactive materials-irradiation of lungs can be caused by inhalation of radioactive particles- lodge in the lungs- insoluble particles may remain there for long time . In higher dose the earliest signs of radiation injury to the lungs are oedema, change in blood circulation followed by pneumonitis with in 1-3 months . In upper respiratory tract ulceration atrophy and fibrosis. There is no specific therapy- symptomatic and supportive therapy-antibiotics, fluids and electrolyte- corticosteroids and antihistaminic creams-bone marrow replacement etc. can be tried.

13.Mechanism of toxicity, symptoms and treatment of ionophore antibiotic in horse: Ionophores are fermentation product of Streptomyces species, mostly used as growth promoters and anticoccedial drugs. Some species like horse is highly susceptible to the toxic action. It binds with sodium, potassium and calcium ions and form lipophylic complex- excess entry of cations in to cell – interfere with ATP hydrolysis reduce energy production. Intracellular overload of calcium in cardiac and skeletal muscles, acidosis and potassium loss initial positive ionotrophy and subsequent negative ionotrophy , skeletal muscle contractility leading to death. Acidosis and potassium loss. Clinical signs include anorexia, depression, watery diarrhea, colic , sweating, ataxia, dyspnoea, renal damage , death due to cardio vascular collapse, or slow recovery with cardiac damage. No specific treatment-- activated charcoal, saline cathartic and other supportive therapy is recommended.

14.Nitrogen oxide gas as a toxicant: It is a mixture of oxides of nitrogen (nitrogen dioxide(NO_2), nitrogen tetroxide (N_2O_4), nitric oxide (NO). inhalation of NO_2 from silo with nitrogen rich fodder cause “silo fillers disease” in workers. Nitrogen oxide gases are formed from nitrogen and oxygen during high temperature combustion, microbial digestion of organic matter, seen produced from automobiles, thermal power plant, boilers, kerosene lamp, burning industrial waste etc. It dissolve in atmospheric moisture to give acid rain damaging forage and ecosystem. When inhaled produce nitric acid in the respiratory tract , irritate the lungs and lesions are produced . Initiate free radical generation in bronchioles, vitamin E deficiency, produce nitrosyl haemoglobin which is oxidized to methaemoglobin, alter immune functions. Clinical signs include coughing, choking ,wheezing , panting, irregular

respiration, reddening of mucous membranes, lachrymation, salivation, dehydration, cyanosis and dyspnoea. No specific treatment- give only symptomatic therapy-oxygen, artificial respiration, corticosteroids.

15.Ozone as a pollutant: Ozone is a natural component of the earths stratosphere-helps in the absorption of harmful u.v light preventing it from reaching the earth . In the environment it is a pollutant produced naturally and man made source. When inhaled cause damage to the lungs- low amount can cause chest pain, when deep breath is taken chest tightness- coughing, wheezing, shortness of breath ,throat irritation, worsen chronic respiratory disease, such as asthma- may recover from low level exposure – but high level is more damaging recovery is less certain. No specific treatment. Vitamin-E is beneficial in chronic exposure, Budisonide has been shown to reduce inflammatory response.

16.Phosgene as a toxic gas: (carbonyl chloride) a highly toxic gas used in organic synthesis, manufacture of dyes, pharmaceuticals, herbicides and insecticides. On entering the body produce coughing, difficulty in breathing, pulmonary oedema, burning in the throat, irritation in the eyes, watery eyes, blurred vision, nausea, vomition, on the skin it produce leasions similar to frost bite or burns. Delayed toxicity (after 48 hours) coughing, difficulty in breathing, pulmonary oedema, low B.P. heart failure. In chronic case chronic bronchitis and emphysema. Treatment : remove the animal from the source, if body is exposed wash with soap and water , wash the eyes with water for 10-15 min. If ingest do not induce vomition.

17.Scorpions as a poisonous arachnids: scorpions tail contain stinging apparatus and venom gland. The venom contain varying amount of neurotoxin, cardiotoxin, nephrotoxin, heamolysin, agglutinins, coagulins, phospholipase, hyaluronidase, histamine, serotonin and cytokins. Causes excess release of various neurotransmitters causing autonomic, neuromuscular overexcitation followed by inhibition. The symptoms include local numbness, hyperesthesia, skin discolouration, salivation, tachycardia, hypertension, muscle spasms, blurred vision, convulsions and death from resp. and cardiac failure. Treatment- specific antivenin, cold compresses can be applied, atropine sulphate, calcium gluconate and first aids to wounds

18.Specific therapy of snake bite: Specific therapy is anti venin, mono valent or poly valent. If snake is known mono valent is preferred- the dose depends on the severity of the bite- administer as soon as possible after bite. After injection change in immune reactions may be seen in some patients- if possible pre test is preferred- in case of reaction 0.5 to 1ml 1:1000 adrenalin can be administered . Some amount of antivenin may be injected in to tissues around the site of bite and the remainder is given by i/v route.

19.Sources of radiation injury: Alpha, Beta and Gama rays causes toxic reactions. The sources are Cosmic rays from space- Naturally occurring radio active materials- Explosion of nuclear wepons(man made) local fall out, trophospheric fall out, stratospheric fall out) radio active waste arising from nuclear energy operation- diagnostic therapy-X-Ray radiation.

20.Somatic injury by radiation: Early somatic injury by several thousand Rad (above 7000)the CNS is primarily affected. 500 to 7000 Rad- G.I. injury in few hours, subside and end fatally. 100 to 500 Rad-

G.I.disturbances-subside- slow blood change-RBC, WBC, and platelets reduce, haemorrhage increase susceptibility to infection, usually recover in several months/ or survive for 4 weeks- hair shedding, skin ulceration, cataract.

21.Sulphur dioxide as a toxic gas: It is an industrial atmospheric effluents- react with water in the air to form sulphur trioxide . Heavy smog contain sulphur dioxide, sulphur trioxide with sulphuric acid and other pollutants. It is an important air pollutant and is the primary agent in acid rain. Produced by burning coal and petroleum, eruption of volcanos, forest fires, manufacturing of sulphuric acid, petrolium industry and paper industry. Toxicity is mainly due to the formation of sulphurous and sulphuric acid on contact with moist mucosa. Produce metabolic acidosis, disorder of protein and carbohydrate metabolism, Vitamin B and C deficiency , inhibition of oxidase, damage haemopoisis. Externally irritate the skin, irritation and reddening of mucous membrane of conjunctiva, upper respiratory tract, lachrymation, salivation, coughing, irregular respiration, dyspnoea, broncho constriction, pulmonary oedema, haemorrhage .no specific treatment – give symptomatic treatment.

22.Toad venom- all toads belong to the genus buffo are toxic. Toad venom is a thick creamy white highly irritant substance secreted by the glands located dorsal and posterior to the eyes and other dorsal structures. The venom of marine toad is highly poisonous and harmful when ingested by small animals. venom contain a number of chemicals including cardioactive glycoside bufogenins and bufotoxins, catecholamines, tryptamines, cholesterol, ergosterols etc. Small dogs may die following one exposure. Inhibit sod. Pot. ATP ase, hyperkalemia, Profuse froathy salivation, vigorous head shaking, retching, arrhythmia, dyspnoea, diarrhea, incordination, convulsion, prostration, death. Treatment only symptomatic- remove the sticky materials from the mouth – wash with water- orally activated charcoal, osmotic cathartics, atropine , propranolol etc. may be helpful.

23.The toxic factors in snake venom and their important actions . A number of enzymatic and non enzymatic proteins are present- the toxic factors vary between groups. a) Proteolytic enzymes(proteases) digest tissue –anticoagulation events. b) Hyaluronidase- dissolve intercellular cement substance of connective tissue- helps in the rapid spread of venom. c) Phosphodiesterase -interfere with cardiac function , reduce blood pressure. d) ATP ase -metabolise ATP and disrupt energy metabolism. e) Acetyl cholinesterase- hydrolyse ach.- interfere with neurotransmission- loss of control of muscles. f) Phospholipase A,B,C, hydrolyse phospholipids- haemolytic and myotoxic – contribute to cardiotoxicity. g) Lipase – causes hydrolyses of lipids- destroying membranes. h) Collagenase – digest collagen. i) Ribonuclease and deoxy ribonuclease – acts on RNA and DNA j) Ophio oxidase – causes autolysis and putrifaction. k) Thrombin like enzymes- fibrinogen – clot formation. l) L-amino acid oxidase. Several low mol.wt. peptides or poly peptides with non enzymatic activity which include neurotoxins, cytolisin, myotoxins, and toxalbumins are also seen in snake venom .Other components like lipids, steroids, glycoproteins, amines,metals etc are also present.

24.Treatment of snake bite: Keep patient at rest, apply a tourniquet proximal to the site of bite –not too tight, release for few seconds at an interval of 10 min. Not recommended in case of viper bite. Clean the wound with soap and water-suction of the wound by cupping-apply ice pack at the site of bite-not recommended in case of viper bite. Polyvalent antivenin local and systemic- fluid therapy,

haemodialysis, adrenalin 1: 1000, 0.5 1ml i/m to block anaphylaxis. Blood transfusion-analgesics –broad spectrum antibiotics. In Horse emergency tracheotomy if site of bite is near throat region.

VIII.Write Essays on:

1.Explain in detail Air pollutants and their effect on animals.

2.Explain the symptoms and treatment of snake bite in animals.

3.What is envenomation? Explain the symptoms, pathogenesis and treatment of viper bite in small animals.

4.What is the difference between venomous and Poisonous animals, explain the symptoms and treatment of cobra attack in animals.

5. Ionizing radiation injury in animals:

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