Question bank- paper No.13

Fluids and electrolytes

I.NAME THE FOLLOWING:

1.An angiotensin II blocker.-(Valsarton)

2. Abnormal water losses from the body .—(diarrhoea, vomiting, bleeding)

3.Natural plasma volume expanders--(Blood, plasma, serum, plasma protein, washed RBC)

4.One abnormal water gain in the body. –(parenteral administration of fluids)

5.One plasma volume expander of plant origin.-(acacia, pectin, dextran)

6.Synthetic plasma volume expanders.—(Dextran, heta starch,degraded gelatine, poly vinyl pyrolidone)

7.The least dangerous route of fluid administration.—(oral)

8.Two natural plasma volume expanders of animal origin.-(plasma, serum , blood)

II.FILL UP THE BLANKS WITH MOST APPROPERIATE WORDS:

1.An animal undergone anaesthesia require .....water than an un anaesthetised one.—(more)

2.Cerebrospinal fluid and ……are examples for transcellular fluid.-(aqueous humor)

3.Digitalis glycosides cause accumulation of .....ions intracellularly.-(sodium)

4.Dextran can be given at a dose of .....ml/kg/24 hours.-(20)

5.The quantity of electrolytes like calcium and magnesium in the body fluids are expressed in…..……(millimoles /Lit.)

6.Excessive sweating can cause more ..... loss than sodium loss.—(water)

7.Even though, acute fluid imbalance will respond to acute fluid therapy chronic imbalance will respond only to .....than fluid therapy.---(Special diets)

8.Excess potassium administration will block .....exchange.-(Sodium hydrogen exchange)

9.Fatty animals require .....water than thin animals.—(more)

10.For correction of prolonged shock in animals .....times of its normal blood volume is required.-(1 .5 to 2 . 5)

11.From a healthy animal we can remove .....ml /kg of blood without any deleterious effect.-(10)

12.Haemolysis will ..... the serum potassium level.-(increase)

13.Heterologous transfusion of plasma will retain it in the vascular space up to .....% only..-(50)

14.Isotonic saline means .....% sodium chloride in water.-(0.9%)

15.In case of divalent ion 1mM is equal to ……m Eq._(two)

16.In the kidney ……% of the filtered solute and osmotic ally proportionate amount of water is reabsorbed in the proximal tubule .-(60-65)

17.In bovines grain overloading will result in severe dehydration and metabolic ……-(acidosis)

18.In animals kept purely on carbohydrate diet the total sodium content in the body is .....-(conserved)

19.In stored blood the plasma potassium concentration will be .....-(more)

20.If the dehydration is above .....percent all the signs of circulatory collapse can be seen.-(twelve)

21.In acute shock there will be at least .....percent dehydration.—(fifteen)

22.If renal function is not established after 4 hours or more during the administration of fluids the rate of injection of fluid must be reduced to .....ml/ kg/ hour.---(2)

23.Plasma protein .....percentage is osmotically same as body fluids.-(5)

24.Plasma constitute about ……percent of body weight.-(5%)

25.Since skin is a vast water reservoir of the body we can measure the degree of dehydration by observing the ..... and .....of the skin.—(turger and elasticity)

26.Sodium stored in .....tissue will act as a body reserve.—(bone)

27.Sodium acid phosphate increases the solubility of .....in the urine.-(calcium)

28.Sodium lactate is metabolised to .....in the liver.-(bicarbonate)

29.Spironolactone interfere with the activity of .....in males.-(Testosterone)

30.The first ACE inhibitors introduced in therapy is .....(Captopril)

31.The pH of the stored blood will be ..... –(low)

32.The water content of the animal body is .....Percent of the body weight.—(50—60)

33.The water turnover in a mature animal is .....ml/kg/day. —(65)

34.The water turnover in an immature animal is.....ml/kg/day –(130)

35.The water turnover in a lactating animal is.....ml/kg/day –(130)

36.The original action discovered of ADH was .....action.-(Vasopressar)

37.The rate of injection of blood in large animal is .....ml/kg /hr.-(40—60)

38.The rate of injection of blood in small animal is.....ml/kg/hr.-(5-10)

39.The water requirement of a healthy dog weighing 20 kg is .....ml—(20 x 65 =1300 ml)

40.The intracellular and extra cellular fluid in the body is in the ratio of .....—(2:1)

41.The interstitial fluid and plasma in the body is in ..... ratio of.-(3:1)

42.The water content of the skin is approximately .....% and that is why it is considered as the water reservoir of the body --(70)

43.The most common blood groupings in dogs is .....-(A+ve and A –ve)

44.There is no evidence of clinical dehydration if the water loss is below .....Percent—(4)

45.To calculate the water requirement of a dehydrated animal the dehydration loss and additional loss if any must be added to .....water requirement.—(normal)

46.The safe speed of fluid injection in a dehydrated large animals is .....ml/kg/hour.—(15—30)

47.The safe speed of fluid injection in a dehydrated small animals is .....ml/kg/hour.—(50—100)

48.....system in the body is one immediately affected by a sudden decrease in blood sodium level.-(CNS)

III.STATE TRUE OR FALSE

1.About 98 % calcium in the body is with bone structures.-(T)

2.Alkalosis will produce tetany in hypocalcemic state .-(T)

3.Alkaline solutions are not advisable along with parenteral calcium injection.-(T)

4.Aluminium containing antacids will reduce phosphorus absorption.-(T)

5.A rise in intracellular sodium cause activation of Na+ K+ ATPase .-(T)

6.As plasma pH increases ionised calcium level in the plasma decrease.-(T)

7.Blood with heparin can be stored for days before transfusion.-(F)

8.Blood with heparin can not be stored for more than few hours.-(T)

9.Blood for transfusion is collected in ACD solution (Acid citric, sodium citrate and dextrose)-(T)

10.Blood collecting bottle should not be kept in the refrigerator before collection ,this is to prevent haemolysis.-(F)

11.Blood collecting bottle should be kept in the refrigerator before collection , this is to prevent haemolysis.-(T)

12.Boric acid will increase the solubility of calcium gluconate in water.-(T)

13.Calcium chloride can provide 3 times as much calcium as calcium gluconate.-(T)

14.Calcium is essential for the normal secretion of neurotransmitters.-(T)

15.Calcium gluconate is preferred over calcium chloride as injection because calcium gluconate is less irritant.-(T)

16.Calcium lactate and calcium sodium lactate are used in conjunction with vit. D .for the treatment of rickets .(T)

17.Degree of enopthlmos is considered a very useful parameter in assessment of dehydration in large animals.-(T)

18.Carbonic anhydrase inhibition causes reduction of tension in the eye in glaucoma.-(T)

19.Carbonic anhydrase inhibition causes reduction in cerebrospinal fluid pressure.-(T)

20.Carbonic anhydrase inhibition causes reduction in epileptic seizures .-(T)

21.CNS symptoms are more in respiratory acidosis than alkalosis.(T)

22.Cross matching is necessary for plasma transfusion.-(F)

23.Cross matching is not necessary for plasma protein transfusion.-(T)

24.Despeciated bovine serum can be used in many species without any reaction .(T)

25.Dehydration increases the release of anti diuretic hormone.-(T)

26.Dextran is a polysaccharide from bacterial fermentation of sucrose of sugar beat-(T)

27.Dextran improves microcirculation.-(T)

28.Dextran will not interfere with blood grouping and cross matching –(F)

29.Dextran in very small dose will act as an antigen.-(T)

30.Dextran in high doses causes immunological paralysis –(T)

31.DEA (dog erythrocyte antigen) type 1 dogs should not be selected as a donor for blood transfusion.-(T)

32.Dextran 40 is a high molecular weight dextran.-(F)

33.Dextrose injection cause a fall in serum potassium level.-(T)

34.Dichlorphenamide is a carbonic anhydrase inhibitor –(T)

35.Dissociable substance like sodium chloride one mole yield 2 osmole in solution.-(T)

36.First transfusion of incompatible blood seldom cause severe illness or death in Horse Subsequent injection causes severe illness.-(T)

37.For mammals isotonic solutions equal approximately 300 m.osmol.-(T)

38.For non dissociable substance 1 osmole contain 1 mole of substance.-(T)

39.Five % dextrose/ 0.9% sodium chloride/ 1.3% sodium bicarbonate is isotonic.-(T)

40.Furosemide can be recommended in the treatment of hypercalcemia as it stimulate the excretion of calcium and magnesium.-(T)

41.Free water loss by kidney represent water excreted unaccompanied by solute .-(T)

42.Glycerine is an osmotic diuretic agent for reducing intra ocular pressure in glaucoma.-(T)

43Glycerine can be used orally for short term reduction of intraocular pressure.-(T)

44.Gluconate is metabolized to bicarbonate widely in the body.-(T)

45.Hypokalemia with thiazides can be reduced by combined use of spironolactone.-(T)

46.Hetastarch is a synthetic polymer which can be used as a plasma volume expander –(T)

47.High molecular weight dextran available is dextran 150 –(T)

48.High speed intravenous injection of potassium may cause cardiac arrest.-(T)

49.Hundred gram carbohydrate on oxidation give 55 gram water—(T)

50.Hypocalcemia make the membrane more excitable and stimulate musclular activity.-(T)

51.Hypocalcemia may produce muscle fasciculation and tetany.-(T)

52.Homologous transfusion of plasma will retain it in the vascular space up to 100%.-(T)

53.In large animals 10 gauge needle must be used for blood collection from jugular vein.-(T)

54.If cross matching of blood is impossible it is safer to use donors from different breeds or blood lines.-(T)

55.In dogs 8 types of isoantibidies numbered from DEA 1-8 has been identified.-(T)

56.In dogs DEA type one (dog erythrocyte antibody) will cause most severe reaction .-(T)

57.In heterologus transfusion of plasma antihistamine can help to retain the plasma in the system.-(T)

58.If the measured gap between the eye ball and orbit is less than 0.5 cm. is correlated with 9 - 10% dehydration in neonatal calves.-(T)

59.If the measured gap between the eye ball and orbit is greater than 0.5 cm. is correlated with 11-12 % dehydration in neonatal calves.-(T)

60.In severe hyper magnaesemia administration of calcium i/v is recommended.-(T)

61.Increase circulating level of glucose as in diabetes mellitus can cause reduction in sodium level.-(T)

62.Increase of circulating glucose level by 100 mg/dL of blood causes a decrease in sodium level by 1.6 mEq/Lit.-(T)

63.In case of univalent ion 1mM is equal to 1m Eq.—(T)

64.Increase circulating level of glucose as in diabetes mellitus causes a reduction in sodium level –(T)

65.In alkalosis there is not enough hydrogen for Na+ H+ exchange , hence sodium is exchanged with potassium and potassium goes to urine.-(T)

66.In hyper ventilation there is a chance of excess sodium in the system.-(T)

67.In hyper natremia estimation of serum sodium will give a correct figure of sodium level.-(F)

68.Insulin injection reduces the serum level of Potassium.—(T)

69.In hypo magnesemia there will be hyper excitability of reflexes.-(T)

70.In hyper magnesemia , Glucose along with Insulin administration shift magnesium in to the intracellular space and serum magnesium level is reduced. (T)

71.In cardiac arrest in respiratory acidosis fast injection of sodium bicarbonate is recommended .-(T)

72.In toxicity with bicarbonate re breathing expired air will help in the treatment.-(T)

73.Luminar chloride concentration in is the rate limiting step in sodium chloride entry in to cell from kidney tubule.-(T)

74.Lactate is converted in to bicarbonate inside the body.-(T)

75.Lactate and acetate are metabolized to bicarbonate in the liver.-(T)

76.Lactate ringer solution contain sodium lactate in ringer solution.-(T)

77.Lung oedema can cause metabolic acidosis.-(T)

78.Magnesium ion is more in ICF.—(T)

79.Mannitol is a polyhydroxy aliphatic alcohol and is an osmotic diuretic.-(T)

80.Mannitol is an osmotic diuretic.—(T)

81.Mannitol is used to promote diuresis in patients with anurea secondary to renal disease.-(T)

82.Most electrolyte concentrations in the body fluids are expressed in m Eq /Lit.—(T)

83.Normally calcium ion is more in ECF.—(T)

84.Osmotic diuretics inhibits passive re absorption water in those segment of nephrone which are freely permeable to water, proximal tubule, descending limb of loop of henly and distal tubule.-(T)

85.Osmolarity refers to the number of osmole /Lit. of solution.-(T)

86.Osmolality indicate the number of osmoles /Kg . of solvent.-(T)

87.Parentral solution of calcium should not be mixed with any alkaline solution-(T)

89.Parathyroid hormone is required to augment Atrial Natriuretic Peptide (ANP)secretion.-(T)

89.Parathyroid hormone has no role in the fluid homeostasis.-(F)

90.Plasma can be given at the rate of 2-5 ml/kg rapidly and 5-20ml /kg slowly.-(T)

91.Potassium solution must be given very slowly because high potassium concentration may cause cardiac arrest.-(T)

92.Polyvinyl pyrolidone will interfere with grouping and cross matching –(T)

93.Ringer solution contain chloride salt of sodium, potassium and calcium .-(T)

94.Respiratory regulation of acid base balance is faster than renal regulation.-(T)

95.RBC drawn in to glycerol and frozen at minus 80 degree centigrade can be stored for years.-(T)

96.Spironolactone as such is the actual antagonist of Aldosterone.-(F)

97.Sodium citrate is an anticoagulant externally .-(T)

98..Sodium lactate is metabolised to bicarbonate in the liver in 2 hours.-(T)

99.Sodium acetate is metabolized to bicarbonate throughout the body especially by the muscles.-(T)

100.Sodium acetate can induce vasodilatation which may be detrimental when it is administered intra venously to patients in shock.-(T)

101.Sodium acetate is metabolised to bicarbonate outside the liver.-(T)

102.Sodium acetate is not recommended in patients with keto-acidosis since acetate can form ketone bodies.—(T)

103.Sodium acetate can be used as an alkaliniser even in case of liver damage.-(T)

104.Sodium lactate is not advisable as an alkalinizing agent in patients with lactic acidosis.—(T)

105.Sodium bicarbonate injection should be given very slowly .-(T)

106.Sodium bicarbonate can promote the excretion of weak organic acids like salicylic acid.-(T)

107.Sodium bicarbonate is used in barbiturate toxicity.-(T)

108.Sodium bicarbonate is used to treat haemolytic reaction –(T)

109.Sodium bicarbonate is contraindicated in hypocalcemia .-(T)

110.Sodium bicarbonate can be autoclaved without loss of activity.-(F)

111.Sodium sulphate can be used to treat hypercalcemia.-(T)

112.Spironolactone can antagonize the K+ loss induced by other diuretic.-(T)

113.Sodium sulphate will enhance the excretion of divalent cation.-(T)

114.The source of degraded gelatine is bone and skin of animals.-(T)

115.The water loss is more affected by hypo or hyper tonicity of blood.-(T)

116.The most important side effect of ammonium chloride as a urinary acidifier is development of metabolic acidosis.-(T)

117.The concentration of potassium is more in ECF.—(F)

118.The collecting duct of nephron will response to vasopressin.(T)

119.The osmotic pressure in solution is dependent on the number of particles in solution and not on the molecular weight.-(T)

120.The obligatory water loss by kidney represent essential water excretion to remove the renal solute .-(T)

121.The water balance in the body is maintained by continuous water intake and excretion. —(T))

122.The sodium concentration in the ECF is more than in ICF.—(T)

123.The most abundant anion in ECF is HPO4-(F)

124.Urea is an osmotic diuretic .-(T)

125.Urinary acidifiers are contraindicated in hyperkalemia.-(T)

126.Washed RBC will reduce the reaction while transfusing .-(T)

IV.CHOOSE THE CORRECT ANSWERS :

1.An alkaline urine and a decreased rate of aqueous humor formation in glaucoma is produced by a) ethacrynic acid b) dichlorphenamide c) mannitol d) triamterene.-(b)

2.Boric acid is added with calcium gluconate in the preparation of calcium borogluconate. a) to provide H+ concentration b) to increase the solubility of calcium gluconate in water c) to reduce the toxicity of the calcium gluconate d) all the above.-(b)

3.Calcium chloride solution is less preferred than calcium borogluconate for replacement therapy because a) calcium chloride is highly irritant b) calcium chloride is less water soluble c) less calcium in calcium chloride d) none of the above.-(a)

4.Diarrhoea is more serious in young ones because a) water turnover is less b) water turnover is more c) water turnover is normal as in adults d) none of the above.-(b)

5.Dehydration is more serious in young ones. a) since they are small in size b) since water turnover is more c) since they take only less water d) none of the above.-(b)

6.Even though, the electrolyte concentration differs in ICF and ECF the .....is the same in ICF and ECF. a) Sodium b) Potassium c) Osmotic pressure, d) none of the above.—(c)

7.Fluid therapy is indicated in a) dehydration b) acid-base disturbance or electrolyte imbalance c) nutritional problems d) loss of body fluids e) all the above.—(e)

8.Following drugs are systemic alkalinizes a) sodium bicarbonate b) magnesium carbonate c) bismuth carbonate d) all the above --(a)

9.From a healthy animal we can remove .....ml of blood /kg. body weight with out any harm. a) 100 ml b) 50 ml c) 20 ml d) none of the above.-(d)

10.Fatty animals require .....water than thin animals. a) more b) less c) same –(a)

11.Hypercalcemia may be seen in a) hyper vitaminosis D b) hyper parathyroidism c) Acidosis d)adrenal insufficiency e) all the above.-(e)

12.Hypokalemia can be produced due to a) dietary deficiency b) G. I. loss via diarrhoea c) protein catabolism d) all the above.-(d)

13.Hypokalemia is termed when serum potassium level is below a) 3m.eq/lit b) 10 m.eq/lit c) 15m.eq/lit d) 20 m.eq/lit.—(a)

14.Hypo magnesemia can be caused by a) diarrhoea b) vomition c) hyper vitaminosis –D d) all the above .—(d)

15.Hyper calcemia can be caused by a) hyper parathyroidism b) hypo parathyroidsm c) excess calcium intake d) none of the above.-(a)

16.Hyper phosphatemia can occur in a) renal dysfunction b) hypoparathyroidism c) both the above d) none of the above –(c)

17.In keto – acidosis potassium lost in the urine a) serum potassium remain constant b) serum potassium is reduced c) heart rate is suppressed d) none of the above --(a)

18.In diabetes insipides thiazides a) reduces the urine volume b) increases the volume of urine c) no action on volume d) increase uric acid excretion –(a)

19.Interstitial fluid and plasma has almost same composition except in a) protein content b) sodium content c) potassium content d) none of the above.—(a)

20.In parenteral nutrition as a source of lipid the following agents can be used a) soybean oil b) safflower oil c) glycerin d) all the above.-(d)

21.Lung oedema causes a) metabolic acidosis b) metabolic alkalosis c) non anion gap acidosis d) none of the above.—(a)

22.In presence of renal disease, hyperkalemia may occur after administration of a) mannitol b) triamterene c) furosemide d) chlorothiazide.-(b)

23.Metabolic acidosis can be treated with a) sodium bicarbonate b)sodium lactate c) sodium gluconate d) all the above.—(d)

24.Metabolic water is more from a) carbohydrate b) protein c) fat d) none of the above.-(c)

25.Mercurial diuretics will produce a) metabolic alkalosis b) refractorinus c) interference in sodium reabsorption d) all the above.-(d)

26.On oxidation of 100 gm fat in the body will give ...gm water. a) 100 b) 80 c) 107 d) 110.--(c)

27.On oxidation of 100 gm protein in the body gives .....gm water. a) 40 b) 60 c) 80 d) 100)—(a)

28.Over dosage of magnesium salt causes a) CNS depression b) respiratory depression c) neuro muscular blocking action d) all the above.-(d)

29.Plasma can be stored up to .....period under frozen condition without significant deterioration. a) 2 years b) 10 days c) 3 month d) none of the above—(a)

30.Potassium solution a) must be given very slowly b) highly irritant ,should not give peri- vascularly c) dilute with large volume of parenteral solution d) all the above.-(d)

31.Parathormone a) stimulate renal absorption of calcium b) suppress bone formation and mineralisation c) increase bone resorption of calcium d) all the above.-(d)

32.Sodium acetate is metabolised to bicarbonate a) outside the liver b) in the liver c) in the kidney d) none of the above.-(a)

33.The body water content of animal species vary from 55-60% b) 70—80% c) 75—80% d) none of the above –(a)

34.The water excretion via kidney in normal case is about .....percent. a) 40--50 b) 50—60 c) 60—70. —(c)

35.The interstitial fluid and plasma has the same composition except its .....content. a) protein b) potassium c) sodium d)magnesium.—(a)

36.The interstitial fluid makes ...% of ECF a) 15 b) 75 c) 80 d) none of the above.—(b)

37.The interstitial fluid and plasma is in the ..... ratio a) 3:1 b) 2:1 c) 1:1 d) 1:2 --(a)

38.The intracellular and extracellular fluid is in the ..... ratio . a) 2:1 b) 1:1 c) 1:2 .---(a)

39.The interstitial fluid makes .....percent of ECF a) 15 % b) 75 % c) 5% d) none of the above –(b)

40.The most abundant intracellular cation is a) sodium b) potassium c) calcium d) magnesium—(b)

41.The most abundant extracellular cation is a) Na b) K c) Mg d) Ca .-(a)

42.The most important buffer system in the body is a) plasma protein b) oxy and reduced haemoglobine c) bicarbonate carbonic acid d) acid phosphate ester.—(c)

43.The normal water content in the body of different species of animal is 55-60% b) 80-90 % c) 70 -75% d) none of the above.—(a)

44.The natural plasma volume expanders are a) blood b)plasma c) de-speciated bovine serum d)all the above.(d)

45.The potassium content of ICF is.....m. eq./lit. a) 150ml b) 130 c) 143 d) None of the above ,-(a)

46.The potassium content of ECF is a) 150 meq/lit b) 140 meq/lit c) 4 meq/lit d) 40 meq/lit.—(c)

47.The turger of ……is noted to get an idea of the level of dehydration. a) skin b) mucous membrane c) mouth d) conjunctiva -(a)

48.The recommended rate of transfusion of blood in small animal is .....ml/kg/hr a) 2-5 ml b) 40-50ml c) 5-10 ml d) none of the above.-(c)

49.The threshold voltage of slow channel action potential is a) -45 to -55 mv b) -20 to -40mv c) -30 mv d) none of the above.-(a)

50.The sodium content of extracellular fluid is .....m. eq./lit. A) 143 b) 150 c) 130 d) none of the above.—(b)

51.The turger of .....is noted to get a rough idea of dehydration of body a) skin b) mucous membrane c) mouth d) conjunctiva .-(a)

52.The water turn over in a mature normal animal is …….ml/kg/day a) 70 ml b) 100 c) 80 d) none of the above –(d)

53.The water turnover in an adult healthy animal is……..ml/kg/day a) 130 b) 65 c) 50 d) 140.—(b)

54.The water turnover in lactating cow is a) 130 ml/kg/day b) 65 ml/kg/day c) 80 ml/kg/day d) 160 ml/kg/day --(a)

55.The water turn over in kids is ……ml/kg/day a)130 b) 65 c) 80 d) 100—(a)

56.The water requirement of different animals vary. A) fatty animals require more water than thin and muscular animals b) fatty animals require less water than thin and muscular animals c) equal in both case.—(b)

57.The water turnover in immature animal is a) 60 ml/kg/day b) 100 ml/kg/day c) 50 ml/kg /day d) none of the above.-(d)

58.The safe speed of fluid injection in large animal with dehydration is .....ml/kg/hour. a) 40-50 b) 15--30 c) 150 d) none of the above.—(b)

59.The rate of injection of blood in large animal is.....ml/kg/hr. a) 40-60 ml b) 20-30 c) 60-80 d) 100.-(a)

60.Tromethamine is a sodium free organic amine a) used to correct alkalosis b) correct plasma volume c) both the above d) none of the above

61.Uric acid excretion can be enhanced by a) furosemide b) caffeine c) tienilic acid d) all the above --(c)

62.Vomition causes a) metabolic alkalosis b) metabolic acidosis c) non anion gap acidosis d) none of the above –(a)

63.Which of the following solutions on administration has the shortest duration of action as plasma volume expander a) 6% heta starch b) 6% dextran 70 c) 10% dextran 40 d) 55 oxypoly gelatine –(c)

64.The best prediction of degree of dehydration can be made in young calves by assessing a) enophthalmos b) skin elasticity on neck and thorax c) plasma protein concentration d) all the above.-(d)

V.CHOOSE THE CORRECT ANSWER AND GIVE YOUR EXPLANATION.

1 -which of the following statement regarding sodium bicarbonate as an alkalinising agent is correct? A) it is an indirect alkalinising agent. B) it can be autoclaved for sterilisation without losing its alkalinizing ability. C) it does not alkalinise well in combined metabolic and respiratory acidosis. D) it does not interfere with milk digestion in calves when administered orally.

The answer is C. Sodium bicarbonate is a direct alkalinising agent that neutralise H+. However, in combined metabolic and respiratory acidosis excess of CO2 and carbonic acid interfere with the reaction between HCO3- and H+. Therefore, for the treatment of this situation ,one must treat respiratory acidosis immediately. Sodium bicarbonate cannot be autoclaved for sterilisation, since heat will convert this chemical to sodium carbonate and loose its alkalinising ability. Sodium bicarbonate will decrease gastric acidity that is important for milk clot formation and digestion.

2. which of the following statement regarding route of administration for fluid therapy is correct? A) the oral route cause more adverse effect than most other routes. B) the rectal route may be useful when IV route access is impossible. C) KCl in the concentration of 30 mEq/L is best given IV if parenteral administration is necessary. D) the SC route is versatile in dogs and cats because it can be used to administer a large amount of isotonic , hypertonic or hypotonic solution.

The answer is B. The rectal route may be an alternative when IV access is unobtainable, for example , during shock. In fact , the rectal route has been considered as a viable route for treating hypovolemic shock . However, one must recognize the fact that the rectal route may cause erratic absorption, and it cannot be used in the presence of diarrhoea. The oral route cause fewer adverse effect than most of other routes. KCL at high concentrations is not safe when given IV. The SC route is not versatile and only isotonic solution should be administered by this route.

3. Which of the following statement regarding hypokalemia is correct. A) it is usually accompanied by academia. B) one of the cause is hypoaldosteronism. C) in an acute case ,an animal with plasma K+ concentration of 3.5 mEq/L or less requires KCL treatment. D) there is usually an increase in the amplitude of QRS and P wave in ECG.

The answer is D. In hypokalemia , because of higher resting potential and myocardial Ca++ concentrations, there is an increase in the amplitude of QRS and P waves. Hypokalemia is usually accompanied by metabolic alkalosis . one of the cause of hypo kalemia is hyper aldosteronism, which increases the excretion of K+ and H+ in the urine. in acute hypokalemia , an animal with plasma K+ concentration below 2.5 mEq/L needs to be treated with a K+ solution.

4.How much of a 50% glucose solution would be needed to meet the daily maintenance requirement of a 10 kg adult dog who is off feed and recumbent? A) 25 ml. B) 45 ml. C) 90 ml. D) 185 ml. E) 370 ml.

The answer is D. The maintenance calorie requirement for a 10 .0 kg dog is 10x 30+ 70= 370 kcal. Each gram glucose can generate 4 kcal, 92.5 g of glucose can generate 370 kcal. 185 ml of 50% glucose has 92.5 g glucose in the solution.

5. How much of an 8.5% of amino acid solution should be given on daily basis to a 10 kg adult dog who is off feed and recumbent . it is decided to perform TPN?(total parenteral nutrition) A) 22mL. B) 55mL. C) 110mL. D) 220 mL. E) 550 mL

The answer is D. The aminoacid requirement in dog that needs parenteral nutrition is 40-50 mg/kcl/day. Since this is a small size dog , it should receive only 50mg/kcl/day. The calori requirement is 370 kcl , and thus 50mg x 370 =18500 mg of amino acid. The 8.5 % aminoacid solution contains 8.5 g/100 mL. Thus , 218 mL of the 8.5% solution will provide 18.5 g aminoacid.

6.which of the following statement regarding sodium acetate as an alkalinising agent is false? A) acetate can cause vasodilatation, which is detrimental to patients in shock. B) acetate can be metabolised in to bicarbonate throughout the body. C) acetate is contraindicated in the treatment of lactic acidosis. D) acetate is more efficient than lactate in forming sodium bicarbonate.

The answer is C. Sodium acetate is contraindicated in the treatment of ketoacidosis , but not lactic acidosis. Acetate can be used to form ketone bodies.

7. Which of the following sodium acetate solution is isotonic ? the molecular weight of this chemical is 82. A) 0.31 % B) 0.62 % C) 1.23 % D) 2.46 % E) 4.92 %.

The answer is C. Since sodium acetate dissociate into two particle (Na and acetate) in water, 150 mM of sodium acetate solution is isotonic . A total of 150 mM of sodium acetate = 150 mmol/L=150 x 82 mg.L=12300mg/L=12.3g/L=1.23 g/100ml.=1.23%

8. Which of the following statement is false with regard to special problems in fluid therapy? A) severe K+ deficit is usually seen in anorectic cattle B) hypertonic dehydration is usually seen in a patient with burns. C) metabolic acidosis is usually associated with grain overload in cattle. D) patients may have volume overload and hypertension during postsurgical period.

The answer is B. Patients with burns will have loss of hypertonic or isotonic body fluid by the time they receive treatment. As a result of loss they would have hypotonic but not hypertonic dehydration.

9. which of the following colloid solutions has the shortest duration of action? A) 6% hetastarch B) 6% dextran 70. C) 10% dextran 40. D) 5% oxypolygelatin.

The answer is C. Dextran 40 solution has a shorter duration of action as a plasma expander than dextran 70, hetastarch ,and oxypolygelatin solutions . Dextran 40 solution contains dextran molecules at 40 kDa, which can leave the vascular space more effectively than other colloids by penetrating through the capillaries.

10.In case of severe generalised edema , which of the following fluid compartments is increased in

volume? A) intracellular B) interstitial C) transcellular D) plasma.

The answer is B. Generalised edema results from the accumulation of fluid in the interstitial space . in severe oedema this compartment may nearly double in volume. Intracellular , transcellular and plasma volumes are minimally affected.

11.Hypoalbuminemia underlies the oedema arising from all of the following Except A) hepatic disease. B) congestive heart failure. C) renal disease. D) protein-losing enteropathy.

The answer is B. Renal disease and protein losing enteropathy result in loss of plasma proteins and plasma protein synthesis by the liver in decreased in hepatic disease. these conditions results in hypoalbuminemia, decreased plasma oncotic pressure, and transudation of fluid from blood vessels to the interstitial space. Plasma albumin concentrations are not changed in congestive heart failure.

12. Intravenous mannitol (5%) would be indicated in all of the following clinical situations except A) oliguria arising from traumatic shock. B) ingestion of toxic amount of cleaning solution containing potassium oxalate.C) generalised oedema arising from congestive heart failure.D)increased intraocular pressure of narrow angle glaucoma.

The answer is C. Osmotic diuretics produce an initial increase in blood volume which can cause decompensation in patients with congestive heart failure. In addition they are not effective in generalized edematous status because their saluretic action is weak. They are effective in oliguria, forced dieresis in case of poisoning, cerebral oedema, and glaucoma.

13. Fluid and electrolyte imbalance leading to dehydration, muscle weakness, hypokalemia, and CNS depression may result from high or prolonged dosage with A) chlorothiazide. B) amiloride C) furosemide D) theophylline.

The answer is C. The toxic effects of loop diuretics such as furosemide are an extension of their therapeutic effects. Their potent diuretic action may deplete the body water and electrolytes and leads to dehydration, hypokalemia, muscle weakness, and CNS depression if administered in high or prolonged dosage. These adverse effects are less likely to occur with less potent diuretics such as chlorothiazide , amiloride or theophylline.

VI. ANSWER THE FOLLOWING:

1.Calculate the water and major electrolyte requirement of a horse weighing 400 kg, lost 20kg. weight by two weeks.

Out of 20 kg lost 60% will be water ie.12 lit (8 lit.ICF and 4 lit.ECF,since it is in2:1 ratio)

ICF is 8 lit(pot. 150 meq/lit) - total potassium lost 150x8==1200 meq.

ECF 4 lit(sodium 140meq/lit) –total sodium lost 140x4= 560meq.

Water requirement. Weight of horse at present 380kg (400-20)

water turn over 65ml/kg/day so requirement per day 380x65=25000ml (25 lit)

dehydration loss 12 lit (60% of 20 kg)

hence total water requirement 25+12=37 lit.

1200 meq potassium and 560 meq. sodium also must be given

2.What are the Indications for plasma volume expanders. –(haemorrhage, shock, anemia, burns, coagulation abnormality, specific and non specific anti bodies)

3. For correction of prolonged shock 1.5 to 2.5 times of its normal blood volume is required .Why? In prolonged shock the capacity of the blood vascular system will be increased, because of dilatation of blood vessels.

4.What are the indications of plasma protein administration ? (hypoproteinemia , shock due to burns, trauma, surgery.)

5. How can you de-speciated bovine serum?-collect the blood from the slaughter house animal-separate the serum-pasteurise to precipitate globulin and haemolysin-thus remove the species specific characters.

6. Why sodium bicarbonate is contra indicated in hypocalcemia? In hypo calcemia alkalosis will produce tetany. Sodium bicarbonate is a systemic alkaliniser. that is the reason why bicarbonate is contra indicated,

7 .Hypokalemia increase excitability of cardiac muscle How? Hypokalemia causes a poor exchange with intracellular Na by Na+ K+ ATP ase resulting in retention of Na+ in myocardium. Increase myocardial Na+ concentration promote Ca++ influx via Na+ -Ca2+ antiport, increase myocardial Ca2+ concentration increases myocardial contractility.

8.In dogs cross matching of blood is of limited value Why? It is of limited value because an incompatible recipient will not be detected unless it or the donor have an incompatible blood transfusion previously. Incompatibility cause destruction of transfused cell in 7-10 days following therapy.

9.What are the types of dehydration? 1.Hypertonic dehydration-attributed to loss of pure water or hypotonic fluid -respiratory loss during high temperature b) Isotonic dehydration temperature-loss of isotonic body fluid –only seen in acute case ,since with some water replacement isotonic become

hypotonic. C) Hypertonic dehydration- loss of hypertonic fluid or decrease in water intake(lack of water) as in disorder of mouth, CNS disturbance , diabetes insipidus.

10..How Gastro Intestinal stasis leads to metabolic alkalosis? Sodium bicarbonate and hydrochloric acid are produced in the parietal cell of the stomach . once being made sodium bicarbonate is diffused in to ECF and hydrochloric acid is released in to gastric lumen.(carbonic acid + sodium chloride gives sodium bicarbonate + hydrochloric acid) hydrochloric acid is then absorbed from the small intestine. Gastro intestinal stasis will prevent /delay the absorption of hydrochloric acid in to the circulation. Thereby resulting in metabolic alkalosis.

11.How does urea poisoning leads to metabolic alkalosis? Urea cycle release ammonia which combines with hydrochloric acid(strong acid) to form ammonium chloride (weak acid) Alkalosis become apparent when a large amount of hydrochloric acid is converted in to ammonium chloride.

12.Classify the following drugs according to their site of action in the kidney tubule.

A.Carbonicanhydrase inhibitors-acetazolamide, osmotic agent manitol, xanthenes-aminophylline.----(proximal convoluted tubule)

B. loop diuretic –furosemide.---(ascending loop of henle)

C. thiazides-hydrochlorothiazide---(Earlydistal convoluted tubule)

D. potassium sparing diuretics-triamterene, spironolactone—(late distal tubule and collecting duct)

13.Artificial plasma volume expanders-these are high molecular weight synthetic colloidal substances which attract and hold water in the vascular space –expand the plasma volume-exert oncotic pressure similar to plasma protein cannot enhance the oxygen carrying capacity of blood. They are freely available - - have no risk of disease transmission as natural expanders. Useful in patients having hypo volumic shock Eg. Dextran 40, 70. Hexastarch, gelatin, polyvinyl pyrrolidone.

14.What are the important signs of incompatible blood transfusion reaction in dogs? Urticaria, hyper salivation, muscle tremors, tachycardia, nausea, vomition, restlessness, jaundice, dyspnoea, haemoglobinuria, pyrexia, facial oedema, tachypnoea, convulsion etc.

VII.WRITE SHORT NOTES

1.ANION GAP : it is the difference between the quantities of unmeasured cation and un measured anions in the blood. Major UAs include phosphate ,sulphate and organic acids (lactate, citrate, ketones) The major UCs include calcium and magnesium. Total cations equals total anions. If measured anion (Cl and HCo3) is substracted from measured cations (Na and K) we will get anion gap (UC- UA). Na + K + UC = Cl + HCO3 + UA. Anion gap = UC-UA = (Na + K) – (Cl + HCo3).

2.CROSS MATCHING OF BLOOD IN DOGS: mix one drop of donor cell suspension + 2 drops of receipent serum and vice-versa. Incubate for 5-8 min. At 37 degree centigrade in a water bath .Centrifuge at 1000 rpm for 1 min.suspend by shaking . strong agglutination is seen macroscopically in positive cases. Express as strong, weak and negative.

3.HYPERTONIC DEHYDRATION: Is a condition in which water loss occur with little or no electrolyte losses results in enhanced serum sodium concentration and ECF osmolality and shrinkage of cells. This usually occurs in excessive sweating , panting, hyperventilation, water restriction, fever, ketoacidosis, hot environment and ADH deficiency. Treatment is with hypotonic fluid.(water without electrolyte , 5% dextrose sol).

4.HYPONATREMIA: Condetion in which serum sodium con. is less than normal (< 140 meq/lit in dogs) under normal condition kidney regulate sodium loss from the body. Hyponatremia develops when the patient is unable to excrete ingested water or when urinary and insensible fluid loss have a combined osmolality greater than that of ingested . Hyponatraemia may be a) Hypovolaemic, b) Hypervolaemic and normovolaemic. a)Hyponatraemia with volume depletion-both water and sodium levels are low –loss of sodium containing fluids-eg. Diuretics, diarrhea, vomition, excess sweating etc. b)Hyper volaemic- excess water dilute the sodium concentration eg.nephritis syndrome, CHF c)Normal volume occur as result of primary polydipsia, administration of hypotonic fluids, antidiuretic drugs.

5.HYPER NATREMIA: Serum sodium con. More than normal (>155 m.eq/lit. in dogs) water loss in excess than sodium or ingestion/ administration of sodium containing fluids. It can be with a) increased ECF, b) Normal ECF c) Decreased ECF. Excess ECF-occur due to excess intake of salt in feed or ingestion of sea water. B) decreased ECF – seen in diarrhea, vomition, diabetes mellitus, hypertonic salt solutions, loop diuretics, profuse sweating , burns etc. c) normal ECF – seen in pituitary diabetes insipidus, hot and dry climate , thyrotoxicosis, limited access to water as in CNS depression or inability to drink water.

6.HYPER KALEMIA: A condition when serum potassium concentration is more than normal (> 6 m.eq/lit) –may occur due to increased intake, decreased excretion or shift from cells to ECF, addisons disease, acute renal failure, acidosis, some drug may cause this, excessive tissue destruction may release K in to blood. Causes weak action potential results in muscle weakness(inability to stand and walk, tremors and brady cardia. Treatment- correct the underlying cause, withhold potassium rich food and administer K free fluids, use of thiazides and loop diuretics, use of ion exchange resins, peritoneal / haemodialysis.

7.HYPO CALCEMIA :Total serum calcium below 10-11 mg/dl in dogs. The homeostasis of calcium is regulated mainly by parathyroid hormone, calcium and vitamin D. hypocalcaemia is caused by puerperal tetany, hypo-parathyroidism, ethylene glycol intoxication, inappropriate administration of hypertonic phosphate enema, when mammary secretion exceeds animals requirement for calcium, diet high in oxalate .Symptoms include short period of excitement, muscle tremors and stiff gait followed by muscle weakness leading to sternal recumbency. Treatment – calcium borogluconate/ calcium gluconate i/v.

8.HYPO MAGNESEMIA:The normal plasma level of Mg++ is 1.5 to 2.5 meq/lit.Hypomagnesaemia is seen occasionally in animal fed on pasture with heavy fertilizer application containing nitrogen and potash, exposure to adverse winter, renal and G.I.losses starvation, mal absorption, hypo-parathyroidism. Symptoms include CNS hyper irritability , ataxia, excitability and collapse with titanic convulsion of limbs and neck. Treatment include parenteral administration of magnesium .

9.ISOTONIC DEHYDRATION: Is a condition in which water loss are associated with proportionate losses of electrolyte .(Acute diarrhea, heavy sweating in horse, inappropriate diuretic administration) The plasma sodium concentration remain in normal limit. Animal exhibit decrease in plasma and ECF volume with clinical signs of inadequate circulating fluid volume and deficiency of sodium. Treatment is with isotonic saline solution or balanced isotonic electrolyte solution.

10.KETOACIDOSIS: Metabolic acidosis is associated with ketonemia and ketonuria occurs when rate of formation is greater than their use. Mostly occurs in diabetes mellitus and starvation. Excess acetyl coenzyme A from fatty acid or pyruvate oxidation is diverted primarily in the liver to produce ketone bodies- transported to blood- utilized for energy purpose. In diabetes lack of insulin stimulate lypolysis- increase fatty aceyl coA converted to ketones-elivate in the blood(production is greater than utilization) acidosis. Administration of insulin is treatment of choice.

11.LACTATE RINGER SOLUTION: (Sodium lactate, Hartmann's solution) is ringer solution added with sodium lactate(lactate will convert to bicarbonate).If bicarbonate is added it will be cleaved and inactivated. It is an ideal replacement fluid for plasma .may be used for volume expansion, all types of shock(except cardiogenic) metabolic acidosis . not good for long term therapy .

12.METABOLIC ALKALOSIS: Excess loss of H+ (Vomition) or excessive administration of HCO3 , excessaive renal H+ loss by mineralo corticoid, loop diuretics, excess lactate administration. Clinical signs include slow and shallow breathing , tetany, convulsion, muscular hyperactivity. Compensatory mechanism by reducing the alveolar ventilation, renal compensation also starts- both are inadequate. Treatment by correcting the primary cause –administration of electrolytes and acidifying agents like ammonium chloride.

13.METABOLIC ACIDOSIS: a decrease in blood bicarbonate concentration –more common in small animals- .lactic acidosis, ketoacidosis, diabetes mellitus, diarrhoea, ingestion of salicylates, methanol, ethylene glycol. Hyperpnea and CNS depression. -directly depress cardiac contractility .compensatory mechanism is by hyperventilation starts immediately by the body, compensatory mechanism by kidney starts slowly , treatment is by correction of primary cause.

14.MANNITOL: It is a non electrolyte –pharmacologically inert six carbon sugar alcohol-freely filtered at glomeruli and negligible reabsorption –used as an osmotic diuretic- it stimulate the urinary excretion of all cations and anions. It also enhances the excretion of urea and uric acid. It increases the renal blood flow. It reduce intra ocular pressure and CSF pressure-has to be given intravenously only –less than 10% only is metabolized and the rest is excreted unchanged. It may precipitate pulmonary oedema, nausea and vomition- used in anurea secondary to renal failure, to reduce intracranial pressure in cerebral oedema and cerebral trauma. Used to reduce intra ocular pressure in glaucoma.

15.REGULATION OF ACID BASE BALANCE BY KIDNEY AND LUNGS: lung control acid base balance by controlling the carbondioxide concentration in the ECF. Increase ventilation eliminate carbondioxide from the ECF. Which by mass action reduce H+ concentration and vice versa. The respiratory regulation is rapid and more powerful than other buffers in ECF. The renal control is slow but important – by excreting either acidic or basic urine kidney control the acid base balance. When there is a reduction of H+ in the ECF (alkalosis) kidney enhances excretion of HCO3- by reducing the reabsorption of filtered HCO3 which increases the H+ concentration in ECF to normal -

on the other hand if there is excess H+ in ECF (acidosis) kidney reabsorb all the filtered HCO3 and also produce new HCO3. In addition excess H+ is exchanged with Na+ in the renal tubule excreting H+ . Thus H+ concentration is adjusted.

16.RESPIRATORY ALKALOSIS: A reduction in H+ con. In blood as a result of hyper ventilation-increase elimination of carbondioxide. Causes-excitement, fear, pain, stimulation of respiration, stimulation of ventilation by various causes. Signs include parasthesia, hyperpnoea, hyperactivity tendon reflex, Stimulation of CNS, signs of hypocalcemia. Immediate compensation is by efflux of H+ from cells in to ECF. When they react with HCO3 produce buffering action. Reduce HCO3 re absorption by the kidney. Treatment is correction of primary cause.

17.RESPIRATORY ACIDOSIS: Acidosis is accumulation of H+ in the blood (arterial blood pH falls below 7.35) occurs due to depression of respiration(hypoventilation)-causes accumulation of carbondioxide in the body. Which increase H2 Co3 subsequently more H+. The increase co2 causes a fall in the normal 20:1, HCO3: H2 Co3 ratio. Very rarely only seen in animals in inappropriate ventilation in anaesthesia, pneumonia, asthma, pneumo thorax, chronic obstructive lung disease, resp. centre paralysis, tetanus, head injury etc. clinical signs include vasodilatation, anxiety, depression, altered CNS function, tachycardia, sweating, bright red m.m., elevated body temperature. Normally compensatory mechanism by the kidney causes the excretion of H+. Treatment is by correcting the causes

18.HYPO KALEMIA: a condition when serum K+ con. Is less than normal (<3.5meq./lit) – due to inadequate K intake, dilution of blood potassium due to inappropriate fluid therapy, excess loss by G I tract(vomotion, diarrhea), certain diuretics, excessive mineralocorticoids, intracellular movement of K+ in acute alkalosis or treatment with insulin , glucose and sodium bicarbonate infusion.It results in decrease ICF volume , altered intracellular pH, modified pot. Dependent reactions, altered action potential. Clinically muscular weakness, ileus, cardiac arrhythmia, renal dysfunction is noticed . treatment is replacement of potassium parenterally/ orally

IX.WRITE ESSAYS ON:

1.Explain Plasma volume expanders.

2.What is the electrolyte composition of the body? Explain sodium metabolism and treatment of hyper natremia.

3.What are the principles to be remembered while giving fluid therapy ? What is meant by water turnover, how it is related with fluid therapy? Calculate the fluid requirement of a lactating cow weighing 150 Kg. With 4% dehydration.

4.Explain the role of rennin angiotensin system in the homeostasis of blood pressure, give examples of hypotensive agents acting via this mechanism

5.Explain sodium metabolism in animals how will you treat hyper natremia?

6.Explain potassium metabolism in animals how will you treat hypo kalemia ?