Question bank, paper-9
Respiratory systemm

I.Name the following :

1.An anodyne expectorant.—(Camphorated Tr. of Opium)

2.Agents which directly suppress the cough centre.—(Antitussive/-Codeine)

3.A dithiol derivative mucolytic agent.-(Erdosteine)

4.A sigma receptor antagonist.-(Rimeazole)

5.A nasal decongestant –(Phenylephrine)

6.Most potent antitussive alkaloid present in opium.-(Morphine)

7.Nonadrenergic noncholinergic nervous system supplied to bronchial muscles .-(Purinergic)

8.One plant which is highly effective in respiratory tract affections.—(*Adhatoda vasica*)

9.One mucolytic agent.—(Sodium acetyl cysteine)

10.One natural muscarinic receptor antagonist used as a bronchodilator.-(Atropine)

11.One synthetic muscarinic receptor antagonist .-(Ipratropium, glycopyrronium)

12.One competitive antagonist at the leukotriene D4 receptor, which can be used as bronchodilator.—(Acolade)

13.One wood tar derivative stimulant expectorant—(Creosote)

14.One volatile oil having stimulant expectorant action.—(Eucalyptus)

15.Plant from which balsam of tolu is obtained.-(*Myroxylon balsamum)/ Toluifera balsamum*)

16.Plant from which balsam of peru is obtained.-*(Myroxylon balsamum pereirae*)

17..Plant from which Benzoin is obtained from (*Styrax benzoin*)

18..Three mucolytic expectorants.-(bromhexine, ambroxol, acetyl cysteine, dornase alfa)

19.Three H1 antihistaminic that has decongestant action in the respiratory tract.—(Diphenhydramine, Dimenhydramine, Chlorpheneramine)

20.Three sympathomimetic drugs with decongestant action in the respiratory tract.—(Ephedrine, Pseudo ephedrine, Phenylephrine)

21.Three saline expectorant –(Ammonium chloride, Ammonium carbonate, Potassium iodide)

22.Three nauseant expectorant.—(Ipecacu, Squill, Balsam of tolu)

23.Three membrane shrinking drugs.—(Phenylephrine, Oxymetazoline, Xylometazoline, Naphazoline)

24.Three enzymes which liquefy mucopurulant secretion of respiratory tract.—(Pancreatic dornase, Trypsin, Streptokinase)

25.Three liquid volatile oils.—(Ol.Eucalyptus, Ol. Turpentine, Ol. Anisi)

26.Three non-opioids used as anti- tussives—(Dextromethorphen, Noscapine, Pholcodine)

27.Three opioid antitussive –(Codeine, Hydrocodone, Butorphanol.)

28.Three solid volatile oils.—(Camphor, Menthol, Thymol)

29.Two Leukotrine receptor antagonist used for the treatment of respiratory affections. –(Zafirlukast, Zileuton, Montelukast.)

30.Two exogenous surfactant used in respiratory tract.—(Beractant , Calfactant)

31.Two locally acting anti-tussives .—(Demulcents, Honey, Syrup)

32.Two narcotic anti-tussive.—(Codeine sulphate, Noscapine)

33.Two quarterinary ammonium compound having bronchodilator action.—(Glycopyrrolate, Ipratropium)

34.Two stimulant expectorant.—(Creosote, Eucalyptus)

35.Two codeine derivative used to reduce cough.—(Dihydrocodeine, Pholcodeine, Codoxime)

36.Two non narcotic anti- tussive.—(Dextromethorphan, Butorphanol.)

37.Two sedative expectorant,--(Saline expectorant like potassium iodide, Demulcents like honey)

38.Two antihistaminic with anti- tussive action.—(Diphenhydramine hydro chloride, Pheneramine maleate, Trimeprazine tartrate)

39.Two enzymes used as mucolytic agent.-(Trypsin, streptokinase, streptodornase)

40.The active ingredient of Dristan—(phenylephrine.)

41.The active ingredient of Vallergan.—(Trimeprazine tartrate)

42.The mucolytic agent in Dornavac.—(Pancreatic dornase)

43.The active mucolytic agent present in mucomyst.—(Sodium acetyl cystein)

44.The active ingredient of Benadryl.—(Diphenhydramine)

45.The active constituent in Solvin/ Bisolvin tablets.—(Bromhexine)

46.The inflammatory conditions of respiratory system.— (Pneumonia, Bronchitis, Trachitis and Laryngitis)

47.The major class of expectorants.—(Sedative, Anodyne, Stimulant , Miscellaneous)

48.The active principle present in *Adhatoda vasica*.—(Adhatodic acid and Vasicine)

49.The other name for expectorants.-(Mucokinetics)

II.Fill up the blanks with appropriate words:

1.As a bronchodilator the preferred route for isoprenaline and hexoprenalin is ……..
—(inhalation)

2.Active ingredient of Ifiral.—(Chromolyn sodium)

3.Ambroxol is a metabolite of …….. and is having mucolytic action.—(Bromhexine)

4.Anti- tussive action of noscapine is primarily mediated by its ……..receptor agonistic activity.-(Sigma)

5.Benzoin is obtained from the plant ……—(S*tyrax benzoin*)

6.Bromhexine is a mucolytic agent synthetically derived from alkaloid vasicine from ……—(.*Adhatoda vasica*.)

7.Clenbuterol is acting as a β_2 agonist by stimulating the production of……--(cAMP)

8.Clenbuterol granules can be incorporated in the horse feed to prevent chronic ……bronchitis—(allergic)

9.Chronic use of corticosteroids cause reduced disease ……—(resistance)

10.Chronic use of Beta adrenergic agonist for bronchodilation results in refractoriness due to ……of Beta receptors.-(down regulation)

11.Camphorated tincture of opium acts as anti tussive by reflex action via ……tract.—(G.I)

12.Expectorants are otherwise known as ……—(Mucokinetics)

13.Guaiacol is obtained by the fractional distillation of ……—(Creosote*)*

14.It is better to give potassium iodide in the ……stage of bronchitis.—(later)

15.Ipecacuanha is obtained from the plant ……—(*Cephaelis ipecacuanha)*

16.In respiratory affections volatile oils are administered as ……—(inhalation)

17.In cattle ammonium chloride can be used at the rate of ……gm orally.—(15—30)

18.In cattle potassium iodide can be given at a rate of ……gm orally.—(8—15)

19.In early stages of inflammation of respiratory tract the cough will be ……type —(Harsh and dry/non productive)

20.Ipecacu is obtained from ……plant.-(*Cephalis ipecacuanha*)

21.N-acetyl cysteine is administered intravenously for the treatment of ……overdose.-(paracetamol)

22.Oxymetazoline is having ……action on the nasal mucous membrane.-(decongestant)

23.Stretching of .....mucous membrane with forceps stimulate respiration.—(anal)

24.Sedative expectorants include saline expectorant and .....expectorant..—(Nauseant)

25.Tiotropium is a congener of .....having long lasting broncho dilatation.—(Ipratropium)

26.Turpentine is obtained from the tree .....(*Pinus palustries*)

27.The active principle present in Ipecacu is .....alkaloid.—(Emetine)

28.The active ingredient of Isuprel is .....—(Isoprenaline)

29.Theophylline preparations are not advisable orally because it is not .....soluble.-(water)

30.The active ingredient of Alupent is .....—(Orciprenaline)

31.The active ingredient of Ventolin is .....—(Salbutamol)

32.The former name of Guaifenesin is .....—(Glyceryl guaiacolate)

33.The two class of centrally acting anti tussives are.....and .....(narcotic and non narcotic)

34.Vasicine is having bronchial .....action.—(antispasmodic)

35.....expectorant used to stimulate or promote repair of chronic inflammatory process and stimulate the respiratory tract secretion--- (Stimulant)

36.....are not advisable when cough is productive.—(Antitussives)

37.....gas induce hyperaemia of the bronchial mucosa results in viscous secretion.—(Carbondioxide)

38.....percent carbon dioxide has been recommended as an efficient expectorant.-(5%)

39.....is one of the metabolite of codeine with very powerful cough suppressant action.-(Morphine)

III.State true or false.

1.Acetyl cysteine is a mucolytic agent .—(T)

2.Acetyl cysteine is contra indicated with penicillin and tetracycline.—(T)

3.Acetyl cysteine is contraindicated in peptic ulcer.—(T)

4.Acetyl cysteine when exposed to rubber will release hydrogen sulphide.-(T)

5.Accolade is a leukotriene receptor antagonist it can be used as a bronchodilator.—(T)

6.Atropine sulphate can be used in chronic emphysema in horse.—(T)

7.Ammonium salts irritate the gastric mucosa which reflexily increase bronchial secretion, it directly irritate tracheo-bronchial glands also.-(T)

8.All animal species do not respond to expectorant equally.—(T)

9.Benzonatate is a synthetic locally acting anti tussive.—(T)

10.Benzonatate depress the afferent sensors of cough reflex and pulmonary stretch receptors.—(T)

11.Bromhexine is a mucolytic agent.—(T)

12.Bromhexine is recommended in dogs to reduce cough at a dose rate of 1mg/kg body weight orally BID—(T)

13.Butorphanol is four times more anti tussive than morphine.—(T)

14.Clenbuterol is a specific β_2 stimulant used mainly for the control of bronchospasm in horse.—(T)

15.Camphorated tincture of opium stimulate the respiratory tract secretion.—(T)

16.Camphorated tincture of opium is a powerful anti tussive agent.—(T)

17.Carbon dioxided 5% inhalation will increase the secretion of the respiratory tract.—(T)

18.Clenbuterol is not approved in horse as a bronchodilator.-(F)

19.Carbocysteine is a derivative of L-cysteine with mucolytic action.—(T)

20.Cromoglycate and nedocromil prevent the release of inflammatory mediators from mast cells.—(T)

21.Cyclic GMP is a potent vascular smooth muscle relaxant.—(T)

22.Cyproheptadine is an antihistaminic with 5HT antagonist action , useful in the treatment of feline asthma.—(T)

23.Codeine can be used as an anti-tussive in dogs at a rate of 0.5 -- 2.0mg/kg orally TID.—(T)

24.Cough can be called as subacute cough if it persist for 3 to 8 weeks.-(T)

25.Demulcent expectorant will suppress the afferent impulse from pharyngeal mucosa.—(T)

26.Dembrexine is a mucolytic expectorant used primarily in equines.-(T)

27.Demulcent expectorant must be given repeatedly.—(T)

28.Dextromethorphan and butorphanol are non narcotic anti-tussive.-(T)

29.Dropropizine and levodropropizine are examples for peripherally acting cough suppressants.-(T)

30.During recovery stage of bronchitis excess of mucous and tissue debris partially blocks the airway and stimulate cough with each respiratory movement.—(T)

31.Excess ammonium chloride may cause lung oedema.—(T)

32.Endosteine is having mucolytic and free radical scavenging activity.-(T)

33.Fluticasone is an inhalant glucocorticoid that is being used more frequently in animals.—(T)

34.Guaiacol is the active principle in wood creosote.-(T)

35.Guaifenesin directly stimulates respiratory secretion.-(T)

36.Glucocorticoids can be given in allergic type of summer cough in dogs.—(T)

37.Guaiacol and guaiphenesin act via trachea bronchial glands.—(T)

38.Glycyrrhiza is a demulcent expectorant.—(T)

39.Glycyrrhiza powder can be given at rate of 30—50gm in cattle.—(T)

40.Glycopyrolate is a synthetic quarterinary ammonium compound having bronchodilator action.—(T)

41.Ipecacu at sub emetic dose will produce expectorant action.—(T)

42.Ipecac increase respiratory tract secretion by reflex action via vagus.-(T)

43.Ipratropium bromide is a synthetic anti cholinergic drug having similar action as atropine on respiratory tract.-(T)

44.Isoprinaline shows more duration of action than orciprinaline via oral route.-(F)

45.Levorphanol d- isomer is known as Dextromethorphan .—(T)

46.Leukotrienes are potent broncho constrictors.—(T)

47.Leukotrienes (LT C_4, LT D_4 and LT E_4), the inflammatory mediators are 100 to 1000 times more active than histamine as a broncho constrictor .-(T)

48.Morphine and its derivatives are narcotic anti-tussive.—(T)

49.Morphine is more powerful than codeine as an anti-tussive.—(T)

50.N-acetyl cysteine breaks the disulfide bonds within the mucus molecules and decrease the viscosity.—(T)

51.N-acetyl cysteine serves as a precursor of glutathione a scavenger of free oxygen radical.-(T)

52.N-acetyl cysteine will react with rubber, copper, stainless steel, and plastic.-(T)

53.N-acetyl cysteine is used for the prevention of radiocontrast –induced nephropathy.-(T)

54.Narcotine is a potent narcotic anti- tussive.—(F)

55.Narcotine possess no narcotic action.—(T)

56.Narcotic anti-tussives suppress cough by direct action on cough centre making less receptive to cough stimuli.—(T)

57.Nedocromail sodium is a mast cell stabilizer.—(T)

58.Only l –isomer of dextromethorphan is anti- tussive.-(T)

59.Oxygen gas is an anti expectorant.—(T)

60.Oxygen toxicity is difficult to recognise because the toxic signs are similar to those seen in hypoxia.-(T)

61.Oxygen gas increases the viscosity and reduce the amount of respiratory tract secretion by lowering the blood flow through the mucosa.—(T)

62.Orciprinaline is not metabolised by COMT ,hence got more duration of action than isoprenaline.-(T)

63.Potassium iodide should not be given to patients with acute inflammation of respiratory tract.-(T)

64.Potassium iodide should not be given in pregnant animals.-(T)

65.Potassium iodide is contraindicated in hyperthyroidism, milking animals, advanced pregnancy.—(T)

66.Potassium iodide increases the respiratory tract secretion by 150 %.—(T)

67.Potassium iodide is having mucolytic action.—(T)

68.Potassium iodide is excreted through bronchial mucosa and increases the secretion.—(T)

69.Potassium iodide causes irritation to the gastric mucosa that in turn increase bronchiole secretion through vagal reflex.—(T)

70.Prostaglandin E^1 and E^2 can dilate bronchi.—(T)

71.Quarterinary ammonium compound is not superior to atropine in bronchodilator action.—(F)

72.Salbutamol is preferred than clenbuterol as a bronchodilator in small animals.-(T)

73.Saline expectorants stimulate gastro pulmonary vagal reflex and activate submucosal tracheo bronchial glands. (T)

74.Sildenafil increase the cyclic GMP levels in vascular smooth muscle cells.—(T)

75.Sildenafil decrease pulmonary hypertension by inducing potent relaxation of arterial smooth muscle.—(T)

76.Sedative expectorants reduce the acute inflammation of the resp.tract.—(T)

77.Sedative expectorants have powerful anti-tussive action.—(F)

78.Sodium chromoglycate is a mast cell stabiliser and prevent degranulation.—(T)

79.Sodium chromoglycate is used to prevent broncho-constriction.—(T)

80.Synthetic quarterinary ammonium compounds like glycopyrrolate can be used as a bronchodilator .—(T)

81.Sympathomimetics can be used to control bronchial asthma.—(T)

82.Specific β stimulant isoprenaline dilate bronchi.—(T)

83.Specific β_2 stimulant Terburtalin can dilate bronchi.—(T)

84.The anti-tussive action of codeine can not be blocked with naloxon.—(F)

85.The most common use of chromolyn sodium in veterinary practice is as a prophylactic agent in horse against chronic obstructive pulmonary disease.-(T)

86.Terbutalin is the active ingredient of Bricanyl.—(T)

87.Vasicine is having bronchial antispasmodic action and suppress the vagal endings.—(T)

88.Vasoactive intestinal peptide is the neurotransmitter of purinergic nervous system to bronchial muscles in cats.-(T)

89.Zufurlikast is useful in the treatment of asthma , it antagonise cystinyl containing leukotriene receptors.-(T)

90.Zileuton irreversibly inhibits 5-lypoxygenase activity , it is useful in the treatment of asthma.-(T)

IV.Choose the correct answers

1.All the following drugs are bronchodilators except. a) cocaine b) atropine c) histamine d) ephedrine —(C)

2.All the following are membrane shrinking drugs except. a) phenylephrine b) xylometazoline c) theobromine d) oxymetazoline,--(C)

3.All the following are mucolytic in action except a) sodium acetyl cysteine b) doxapram c) pancreatic dornase d) trypsin.—(B)

4.Antitussives are used in: a) productive cough b) dry cough c) both type of cough d) None of the above.—(B)

5.An agent that most likely to increase airway resistance in a Dog with pulmonary obstruction. a) albuterol b) isoproterenol c) propranolol d) phenoxybenzamine.-(C)

6.An anticholinergic drug that would cause bronchodilatation in Horse with heaves. a) Iprotropium b) clenbuterol c) triamcinolone d) atropine.-(A)

7.A drug with non selective bronchodilator action is a) terbulalin b) clenbuterol c) albuterol d) epinephrine .-(D)

8.An expectorant , when nebulized and inhaled breaks disulfide bonds with in tracheal mucosa a) guaifenesin b) N-acetyl cysteine c) potassium iodide d) saline.-(B)

9.A drug used as a nasal decongestant is a) isprotopium b) terbutaline c) albuterol d) phenylephrine.-(D)

10.A direct respiratory stimulant is a) Epinephrine b) ketamine c) ephedrine d) Doxapram.-(D)

11.Afferent sensors of cough reflex are depressed by a) ammo.carb b) pot. Iodide c) Benzonatate d) none of the above.-(C)

12.Antagonist which will stimulate respiration in barbiturate suppression a) nalorphine b) naloxon c) bemegride d) none of the above.-(C)

13.As a saline expectorant one of the following drug is most active a) ammonium carbonate b) ammonium chloride c) potassium iodide d) glycyrrhiza.-(C)

14.Bronchodilator which is considered the safest for use in an animal with cardiac disease. a) Isopreterinol b) terbutaline c) ephedrine d) epinephrine.-(B)

15.Bronchitis can be caused by the following. a) chemical irritants b) allergy c) bacteria d) virus e) worms f) all the above.—(F)

16.Bronchial relaxation can be attained by a) suppression of central reflex mechanism b) suppression of irritation in nostril c) paralysis of vagal terminals d) all the above.-(D)

17.Bromhexine a) hydrolyse the acid mucopolysaccharides that significantly contribute to mucus viscosity, b) will increase the concentration of certain antibiotic in the alveoli by altering the permeability of the alveolar capillary membrane while treatment.c) It is a mucolytic agent d) all are true.—(D)

18.Bromhexine is an anti-tussive agent derived from plants a) it causes bronchial irritation b) it improve lysosomal function c) it suppress cough centre d) none of the above.-(B)

19.Diphenhydramine is having a) antihistaminic action b) sedative action c) anti-tussive action d) all the above.-(D)

20.Dilation of bronchi can be brought about by suppression of the following a) centre of reflex mechanism b) irritation of nostril c) vagal terminals d) all the above.-(D)

21.Expectorants are used in: a)) productive cough b) dry cough c) both type of cough d) None of the above.—(A)

22.Following drugs can act as stimulant expectorant a) Ol. Receni b) Ol. Arachis c) Ol. Menthae d) none of the above.(C)

23.Following medicines are examples for stimulant expectorant. a) creosote b) guaiacol c) guaifenesin d) all the above.—(D)

24.Following agents can be used as demulcent expectorants: a) Syrup, b) honey c) sugar d) all the above.—(D)

25.For the control of infection and inflammation of the resp.tract the following drug is used.a) Antibacterials like Amoxicillin b) Glucocorticoids like Prednisolon c) Leukotriene receptor antagonist like Zufirlukast d) all the above. –(D)

26.Following agents can be used as saline expectorants: a) Potassium iodide, b) ammonium chloride c) ammonium carbonate, d) magnesium sulphate,e) all the above except d—(E)

27.Following local irritants stimulates respiration a) ammonia gas b) carbon dioxide c) nikethamide d) nitrogen –(A)

28.Following drugs stabilizes the mast cell membrane and reduce the allergic response a) sodium chromoglycate b) glucocorticoids c) naphazoline d) none of the above.-(A)

29.Following drugs are mucolytics a) sodium acetyl cysteine b) camphor c) thymol d) all the above.-(A)

30.Glyceryl guaiacolate is more effective in a) acute cough b) chronic cough c) broncho constriction d) none of the above.-(B)

31.In acute respiratory infection it is not advisable to give a) potassium iodide b) glycyrrhiza c) ammonium carbonate d) all the above.-(A)

32.Ipecacu is more active as an expectorant in a) Rats b) Cats c) Dogs D) Cattle.-(A)

33.Methyl xanthenes bring about bronchodilation by a) competitive inhibition of phosphodiesterase b) increase the concentration of cyclic AMP c) block the formation of 5 AMP d) all the above.-(D)

34.One of the following is not a saline expectorant: a) Potassium iodide, b) ammonium chloride c) ammonium carbonate, d) magnesium sulphate.—(D)

35.One of the following is not a stimulant expectorant.a) Ol.Eucalyptus b) Ol.turpentine c) Menthol d) Potassium iodide.—(D)

36.One of the following gas is an effective expectorant a) carbondioxide b) oxygen c) nitrogen d) hydrogen .-(A)

37.One of the following drug suppress the afferent sensors of cough reflex and pulmonary stretch receptors. a) potassium iodide b) benzonatate c) guaiacol d) Tr. benzoin.-(B)

38.One of the following is a narcotic anti tussive. a) codeine b)dextromethorphan c)diphenhydramine d) pheneramine maleate.—(A)

39.One of the following is a non narcotic anti tussive a) codeine sulphate b) pot, iodide c) dextromethorphan d) all the above.-(C)

40.One of the following is a membrane shrinking drug. a) atropine b) adrenaline c) Oxymetazoline d) none of the above –(C)

41.Opium alkaloids have the following action. a) narcotic b) addictive c) anti-tussive d) all the above.-(D)

42.One of the following gas is an expectorant a) oxygen b) carbon dioxide c) nitrogen d) none of the above -(B)

43.Sodium chromoglycate is used as an anti allergic agent a) it stabilizes the mast cells b) prevent de granulation c) prevent release of SRSA d) all the above –(D)

44.The most potent anti-tussive among the following is a) morphine b) codeine glycyrrhiza d) *adhatoda vasica*.—(A)

45.The following agents are demulcent expectorant .a) syrup b) honey c)sugar d) all the above.—(D)

46.The aim of the treatment of cough at the initial stage a) increase the mucosal secretion b) protect the mucosa c) reduce cough d) eliminate the primary cause e) all the above.—(E)

47.Trimeprazine tartrate is an antihistaminic a) it has anti allergic action b) it can be recommended in kennel cough c) have tranquilizing action d) all the above.-(D)

48.The following specific B2 stimulants can bring about bronchial relaxation a) salbutamol b) terbutalin c) clenbuterol d) all the above.-(D)

49.Phenylephrine is used in respiratory affections a) causes shrinkage of swollen mucosa b) has expectorant action c) antibacterial action d) none of the above.-(A)

50.Potassium iodide act as an expectorant by a) direct stimulation of respiratory glands b) reflex action originating from gastric irritation c) both the above.-(C)

51.Relaxation of bronchi can be brought about by a) nitrites like amyl nitrite b) xanthenes like amynophylline c) antihistaminics like pheneramine d) prostaglandins.e) all the above.—(E)

52.Respiratory suppression due to barbiturate can be reversed with the following a) nalorphine b) bemegride c) naloxon d) none of the above.-(B)

53.Sodium acetyl cysteine relieve cough by a) interaction of SH group with disulphide bond of mucoprotein b) irritate the mucous membrane c) increase the secretion of mucosa d) none of the above.-(A)

54.Vasicine from *Adhatoda vasica* is good in cough a) it suppress the vagal endings b) good in chronic bronchitis c) good in bronchial asthma d) all the above.-(D)

55.Wood tar derivatives are included under .....expectorant. a) stimulant b) anodyne c) saline d) none of the above.-(A)

56.Tocolytic action is seen with a) B1 agonist b) B2 agonist c) Alpha 1 agonist d) Alpha 2 agonist.-(B)

V.Match each one in A to all the matching ones in B and C

A	B	C
1.Productive cough	Codeine-8	Diphenhydramine-9
2.Demulcent expectorant	Dopram-12	*Adhatoda vasica*—15
3.Saline expectorant	Liquid volatile oil—6	Respiratory stimulant--12
4.Stimulant expectorant	Benzonatate—7	Syrup—2, 7
5.Menthol	Bronchodilator—10, 13	Mucomyst--14
6.Ol.Eucalyptus	Ammo.chloride—1, 3	Opium—8
7. Local anti-tussive	Vasicine--15	Stimulant expectorant—6
8. Narcotic anti-tussive	Solid volatile oil—5	Bronchodilator—10, 13
9. Non narcotic anti-tussive	Sodium acetyl cysteine-14	Nasal decongestant
10.Ephedrine	Guaiacol-4	Depress stretch receptors—7
11. Oxymetazoline	Benadryl-9	Coal tar derivative-4

12. Doxapram	Nasovion-11	Tachyphylaxis—10
13. Salbutamol	potassium iodide—3	Ammonium carbonate—1,3
14. Mucolytics	Zeet-9	Sodium iodide- 1, 3
15. Bromhexine	Honey-2, 7	Pheneramine maleate-9

A	B
1. N-acetyl cysteine	Anti-tussive-(7)
2. Chlorpheneramine	Mast cell stabilizer-(6)
3. Phenylephrine	Mucolytic-(1)
4. Ephedrine	Leukotriene receptor antagonist-(5)
5. Zafirlukast	phosphodiesterase inhibitor-(8)
6. Cromoglycate	Decongestant-(3)
7. Dextromethorphan	H1 blocker-(2)
8. Sildenafil	bronchodilator-(4)

VI. Define/explain in 1—2 sentence:

1.Expectorants. –are drugs which will stimulate the fluidity and volume of respiratory tract secretion-thereby reduce pain-tends to reduce the incidence of cough.

2.Mucolytics:- are agents which render the bronchial secretion more fluidy by the lysis of mucous and become easier to expel by cough.

3.Nauseant expectorant: Some emetics at sub- emetic dose produce nausea which will increase the resp.tract secretion. Emetine is the alkaloid responsible for this. Ipecacu, squill, balsam of tolu, coccillana.-Ipecacu contain emetine

4.Sedative expectorants--stimulate secretion of mucous membrane which will reduce acute inflammation and cough (reflexly) cough become less frequent, more productive and effective.

5.Stimulant expectorant.—used to stimulate or promote the repair of chronic inflammatory process and stimulate the respiratory tract secretion.

6.Anti tussives --are agents which will suppress the cough by action on the cough centre directly/reflexily .eg. codeine, dextromethorphan

VII.Answer the following:

1) . Classify antitussives with examples:

I.Centrally acting anti-tussives a) Opioid / narcotic anti-tussive eg.Codeine, hydrocodone . b) Non opioid / non narcotic anti-tussive eg. Dextromethorphan , noscapine . II.Peripherally acting: a)

Demulcents eg. Honey, syrup. b) Mucosal anaesthetic eg. Benzonatate. c) Bronchodilator eg. Ephedrine, theophylline d) Expectorants eg. Bromhexine, water aerosole e) Miscellaneous eg. dropropizine, levodropropizine.

2) .Classify drugs used in allergic asthma and inflammatory disorders.

I. Anti-inflammatory drugs: a) corticosteroids- dexamethasone, beclomethasone. b) Non steroidal anti-inflammatory drugs-flunixin, ketoprofen. II. Bronchodilators: Adrenergic agonist-ephedrine, terbutaline. b)Muscarinic receptor antagonists-Atropine, glycopyrronium. c)Methyl xanthenes-theophylline, aminophylline. III. Mast cell stabilizers-cromoglycate, nedocromil. IV. Antihistamines-mepyramine, chlorpheneramine. V. Miscellaneous drugs: a) 5HT antagonist- cyproheptadine, ketotifen. b)Decongestant-ephedrine, phenylephrine

3) . Classify expectorants:

I.Secretory expectorants/stimulant expectorants: a)Reflex expectorant-Ipecacuanha, balsam of tolu. b) direct acting expectorant-Guaiacol, guaiphenesin. c) mixed acting expectorant- potassium iodide, ammonium carbonate. II.Mucolytic expectorants-bromhexine, acetylcysteine. III.Diluent expectorants-water aerosol, glycerine. IV.Miscellaneous-carbondioxide, syrups.

4.) Classify with examples the drugs used in allergic disorders . I. Anti inflammatory drugs: a) steroidal-corticisteroids b) Non steroidal-flunixin, ketoprofen. II. Bronchodilator: a)Adrenergic agonist-isoprenaline b) muscarinic receptor antagonist-Atropine c) Methyl xanthenes-theophylline d) Leukotriene antagonist-montelukast. III. Mast cell stabilisers-sodium cromoglicate. IV. Antihistamines-Chlorpheneramine. V. Miscellaneous- a) Serotonin antagonist-cyproheptadine b) decongestants – pseudoephedrine.

5) Why acetyl cysteine can not be administered as aerosol using equipment having rubber components ?.—It react with rubber and release Hydrogen sulphide ,a toxic gas.

6) What is the mechanism of action of balsam of tolu as expectorant. It acts via gastro-pulmonary reflex and also by direct stimulant action on trachea-bronchial glands and increase the secretions.

7) How salbutamol will act as a broncho dilator? Salbutamol interact with B2 receptor – conformational changes in receptor- result in activation of adenyl cyclise on the inner cell membrane-which convert ATP to c AMP –cAMP serve as a second messenger for activation of specific kinase - activate certain enzymes that cause relaxation of airway smooth muscles.

8) How methyl xanthenes will act as a bronchodilator? Methyl xanthenes inhibits phosphodiesterase enzyme which degrade c AMP and c GMP level result in activation of protein kinase A.-inhibits synthesis of leukotrienes , tumour necrotic factor-Alpha and histamine release. This reduce inflammation. Methyl xanthine also release catecholamines from adrenal medulla which further elevate the levels of cAMP in cells. It antagonise adenosine receptors stimulation of which cause contraction of bronchial muscles.

9) How Montelukast act as a bronchodilator? Montelukast act as a Leukotriene receptor C4, D4 and E4 antagonist thereby prevent broncho constriction.

10) What is the mechanism by which anti-tussives interfere with cough ? –Anti-tussives interfere with cough reflex either at the level of the sensory endings of the pharynx, larynx or upper respiratory tract or suppress the cough centre of CNS directly.

11) Why potassium iodide is preferred in the later stages of bronchitis ? iodides are too irritant to use in acute inflammatory condition of respiratory tract.

12) What is the use of exogenous surfactant in neonates? Exogenous surfactant like Beractant and calfactant are administered in to respiratory tract of prematurely born animals to compensate the decreased surfactant production.

13) What are the aim of the treatment at recovery stage of cough?-- The aim of the treatment at recovery stage is to increase the fluidity of mucous--- stimulate the activity of Celia to expel debris.

14) What are the different group of drugs used in respiratory affections?—Expectorants, anti-tussives, bronchodilators, membrane shrinking drugs, respiratory stimulants, respiratory suppressants, respiratory antiseptics, chemotherapeutic agents, mucolytics.,

15) What are the methods by which bronchial relaxation can be achieved? Supress the centers of reflex mechanism by narcotics, suppress the irritation in nostrils by spraying with local anaesthetics like cocaine, suppress the vagal terminals by parasympatholytics like atropine, stimulate the sympathetic nerve ending by Ephedrine, Direct relaxation of bronchial muscles can be achieved by nitrates, xanthenes, antihistaminics and prostaglandins.

16) What is the mechanism of action of methyl xanthenes as bronchodilators: It act as a competitive inhibitor of cyclic nucleotide phosphodiesterase -an enzyme that catalyse the inactivation of cyclic 3' 5' AMP by converting to 5' AMP resulting in an increase level of cAMP.

17) How carbondioxide act as a respiratory stimulant?-It stimulate respiration because of its physiological reflex stimulation of respiratory centre .

18) What is the mechanism of action of sodium chromoglycate as an antihistaminics: It stabilize the mast cell membrane and prevent degranulation and release of histamine and SRS-A

VIII Give your answer and explanation, why not others explain.

1.Which drug is efficacious for bronchodilation in an asthmatic cat ? a) Terbutaline b) Fluticasone c) Propranolol d)Epinephrine e) Theophylline.

The answer is A. Terbutaline is a rapid acting B2 –selective adrenergic agonist that produces bronchodilation with few side effects. Additionally it is available as injectable, oral and aerosol preparation. Fluticasone is a glucocorticoid , which may be beneficial , but it is too slow in onset to be used in emergency situation. Propranolol is a β –adrenergic blocker and cause broncho constriction. Epinephrine would rapidly cause broncho dilation but has significant side effects because of its mixed A and B effects, that is tachycardia or bradycardia, hypertension, and cardiac arrhythmias. Epinephrine is used for life-thretening anaphylactic reactions to evoke bronchodilation and vasoconstriction to raise blood pressure. However, when treating an asthmatic cat the side effects of epinephrine are too profound and risky. Theophylline is a methyl xanthine bronchodilator , but it is slower in onset and less profound in its dilating effect making terbutaline a better choice.

2.Which one of the following is a phosphodiesterase type V inhibitor used in dogs to decrease the pulmonary artery pressure? a) Nedocromal sodium b) Pirbuterol c) Metaproterenol d) Sildenafil e) N-acetylcystein.

The answer is D. Sildenafil is an inhibitor of phosphodiesterase type V, which inhibits the degradation of cyclic GMP. Cyclic GMP is a potent vascular smooth muscle relaxant that lowers the pulmonary blood pressure. Pirbuterol and metaproterenol are selective β2 – adrenergic agonist used for bronchodilation. Nedocromil sodium is a mast cell stabilizer to prevent the release of inflammatory mediators, including histamine. N-acetylcysteine is a mucolytic agent, which when nebulised and inhaled breaks the disulfide bonds of mucus, making it less viscous.

3.Which of the following drug is an anticholinergic agent produce bronchodilation , when administered as an inhaler in horse with chronic obstructive pulmonary disease ? a) Clenbuterol b) Ipratropium c) Glycopyrolate d) Triamcinolone d) Atropine.

The answer is B. Ipratropium is an anticholinergic agent, when inhaled, would induce bronchodilation in a horse with chronic obstructive pulmonary disease. Clenbuterol is a rapid acting selective β2 –adrenergic agonist that will cause broncho dilation in the horse but by a different mechanism. Glycopyrrolate and atropine are anticholinergic agent like ipratropium , but these drugs are not available as an aerosol in a multidose inhaler. Triamcinolone is available as an aerosole but is a glucocorticoid not an anticholinergic agent.

4.Which one of the following adrenergic drug is a non selective bronchodilator compared to the others which are B2 selective agonist? a) Isoetharine b) Terbutaline c) Clenbuterol d) Albuterol e) Epinephrine?

The answer is E. Epinephrine is a nonselective adrenergic agonist, which activates both α and β –receptors. All the others are selective β2 – adrenergic agonists.

5. Which one of the following describes the mechanism of action of theophylline? a) It stimulates the M3 receptor to induce vasodilation. b) It blocks the release of interleukin-1B and tumor necrotic factor. c)It blocks the degradation of cyclic AMP in the smooth muscle cells. d) It increase the sensitivity of the peripheral chemoreceptors.

The answer is C. Theophylline blocks the degradation of cyclic AMP in the smooth muscle, which leads to bronchodilation. Theophylline may block adenosine receptors to increase cyclic AMP as well. β2 –Adrenergic agonist such as clenbuterol block the release of interleukin-1β and tumor necrosis factor as well as dilating bronchi. Cholinergic agonist stimulate the M3 receptors on the endothelium to increase the nitric oxide synthesis. Nitric oxide penetrates into vascular smooth muscle cells to stimulate guanylyl cyclase to produce cyclic GMP, thereby resulting in vasodilation. Doxapram increases the sensitivity of the peripheral chemoreceptors and increases ventilation of the lungs by increasing the tidal volume and rate of breathing.

6. Which one of the following drug would be useful in visually evaluating the laryngeal motion of the deeply sedated dogs? a) Doxapram b) Theophylline c) Sildenafil d)Zafirlukast.

The answer is A. Doxapram increases ventilator effort even when the animal is deeply sedated. When the dog breathes with a large tidal volume , the normal larynx abducts on inspiration to a greater extent while the paralyzed larynx does not move or may even abduct during inspiration. Theophylline is a bronchodilator that can be injected IV, but does not affect laryngeal motion. Sildenafil is a phosphodiesterase inhibitor used to dilate the pulmonary arterioles and reduces hypertension. Zafirlukast is a leukotriene receptor antagonist used to reduce inflammation in the lung.

7.Which expectorant as inhalation , breaks the disulfide bonds with in the tracheal mucus molecules?
a) Guaifenesin b)N-acetyl cysteine c) Potassium iodide d)Saline e)Terbutaline

The answer is B. N-acetylcysteine , when inhaled , breaks the disulfide bond within the tracheal mucous molecules. Guaifenesin ia an oral expectorant presumably induce a vagal reflex by contact with the gastric mucosa . Potassium iodide is an oral expectorant that stimulates the respiratory tract glands by reflex to evoke a watery secretion. Saline can be nebulized and inhaled to break up mucus by adding more water. Terbutaline can be aerosolized and inhaled . It act as a bronchodilator that may allow better removal of mucus by coughing, but it does not affect the chemical nature of the mucus.

8 Which one of the following drugs will reduce nasal congession and oedema in horse that is recovering from anaesthesia? a) Ipratropium b) Terbutaline c)Albuterol d)Phenylephrine e)Fluticasone.

The answer is D. Phenylephrine is an α –adrenergic agonist, causing vasoconstriction in the mucosa of the nose to induce decongestion. Terbutaline and albuterol are selective β2 –agonists that would not affect the vasculature of the nasal cavity. Ipratropium is an anticholinergic agent and fluticasone is a glucocorticoid. These drugs will not cause acute vasoconstriction in the nasal cavity , but are used to induce bronchodilation. The onset of glucocorticoid- induced bronchodilation is slow, probably would take a few days to see the effect.

9.Which one of the following opioids has a strong anti-tussive effect but is only mild analgesia?
a)Fentanyl b)Morphine c)Codeine d) Hydromorphone e) Oxymorphone?

The answer is C. Codeine is a potent anti-tussive drug and not an analgesic. Morphine fentanyl , hydromorphone , and oxymorphone are strong analgesics, which stimulate the μ opioid receptor.

10.Which one of the following would be the most beneficial in reducing the work of breathing in a preterm foal that was born without endogenous surfactant being produced and exhibiting respiratory stress? a) Doxapram injection IV b) Saline nebulisation c) Terbutaline aerosol d) Theophylline orally e) Beractant injected in to trachea ?

The answer is E . Beractant , a bovine lung extract is used as an exogenous surfactant. It is injected directly in to the trachea and distributed to the bronchi and bronchioles by gravity and positive pressure ventilation. Nebulized saline is not a substitute for surfactant. Bronchodilation from terbutaline or theophylline may be slightly beneficial but not a substitute. Doxapram will increase ventilator activity , but without surfactant the lung will not want to stay inflated.

IX. Write short notes on:

1.Bronchodilators:A) Anticholinergics like Atropine, Glycopyrrolate, Ipratropium aerosol. B)Adrenergic nonselective agonists like Epinephrine, Ephedrine, Isoproterenol. C) Beta 2 selective agonist like Terbutalin, Albuterol, Isoetharine, Clenbuterol. D) Methyl xanthenes like theophylline. (explain each)

2.Methyl xanthenes as broncho dilator: inhibits phosphodiesterase which induce bronchodilation by blocking the degradation of cyclic AMP in smooth muscle cells and inhibit light chain myosin kinase . Increase cAMP in mast cells inhibit the release of histamine and other autacoids. Increase cAMP in chromaffin cells of adrenal medulla promote release of catecholamines which dilate bronchi . The other benefits of methyl xanthenes are increased mucociliary clearance, reduce pulmonary artery

pressures and stabilization of mast cells. Adenosine receptors antagonistic action also stimulate cAMP level

3.Decongestants: decongestants cause shrinkage of swollen mucosa by their vasoconstrictive property –given as nasal spray –most of them poses α receptor activity causing constriction of smaller arteriols-suppress the exudation and mucosal oedema.

4.Respiratory stimulants: Respiratory stimulants are classified in to a) analeptics like pentylene tetrazole, doxapram b) local irritants like ammonium carbonate c) Specific antagonists are used when respiration is suppressed due to specific agent Eg. morphine X nalorphine, Barbiturate X Bemegride. d)Physiological stimulants like oxygen and carbondioxide during anaesthetic resp.depression-(Explain)

5. Complications of cough? Chronic cough may result in restlessness, hernia, breaking of stitches in surgical cases, exhaustion, undesirable effect on circulation, elevate intrathoracic pressure, reduce flow of blood to heart, reduce cardiac output , sometime loss of consciousness, intrapulmonary rapture of tissues leads to emphysema.

6.Saline expectorants: Saline expectorants increase the fluidity and volume of respiratory tract secretion thereby relive pain and reduce the incidence of cough-reduce acute inflammation –when cough occur it become more productive and effective and less frequent. Eg.Ammonium chloride, Ammonium carbonate, Potassium iodide-Reflex expectoration-action arise from stomach. Excess ammonium chloride results in lung oedema.

7.Demulcent expectorants: They sooth and protect the mucous membrane of pharynx so that afferent impulse to cough centre is reduced. Eg. Honey, syrup, sugar, losengens will have soothing effect in pharynx for 1—2 hrs- must be given repeatedly- glycyrrhiza is another compound.

8.Stimulant expectorant.—used to stimulate or promote the repair of chronic inflammatory process and stimulate the respiratory tract secretion. Aromatic compounds eliminated inpart by resp.tract mucosa- creosote, guaiacol, guaifenesin. Administered as inhalation-reduce the thickness of mucosa in chronic bronchitis.

9.Role of leukotrienes in the mechanism of cough: leukotrienes are potent broncho constrictors and trigger inflammatory response such as oedema formation. Drugs that antagonise leukotrienes receptors are zafirlukast, Zileuton, montelukast. Their effect in controlling the cough is not fully proved.

10.Nauseant expectorant; A number of substances mainly of plant origin which produce emesis at higher doses are occasionally used at lower dose to induce vomition by stimulation of the vagus to produce reflex secretion of trachea bronchial glands. At sub- emetic dose produce nausea which will increase the respiratory tract secretion. Ipecacu obtained from the root and rhizome *of Cephalis ipecacuanha* ,the active principle is emetine. squill, balsam of tolu,coccillana. Acalypha, -Ipecacu contain emetine.

11. Anti-tussives: Are drugs which will suppress cough by action on the cough centre directly /reflexily. Drugs include two class locally active and centrally active.I. Locally active anti-tussives: a)Demulcents like honey, syrup ,glycerine, liquorice-coat over the irritated/ inflamed mucosa and depress generation of afferent impulse to cough centre. b) Benzonatate- local numning effect on the mucous membrane- prevent generation of cough reflex. II. Centrally active anti-tussives: a) Non

narcotic/ non opioid anti-tussives- Dextromethorphan,noscapine, pholcodine, levopropoxyphen- supress cough centre directly and reduce cough with out any narcotic action . b) Opioid/ narcotic anti-tussives- reduce the sensitivity of the cough centre to afferent stimuli and reduce cough - produce narcotic action also along with cough suppression eg.codeine, hydrocodone, butorphanol.

ESSAYS:

1.Classify drugs acting on respiratory system with examples, Explain Expectorants .

2.What are anti-tussive drugs useful in small animals? Explain.

3.Explain the anti inflammatories and bronchodilators used in respiratory tract affections in small animals.

4.Classify cough suppressants with examples, explain anti-tussives.

5.Explain expectorants and anti-tussives in detail.