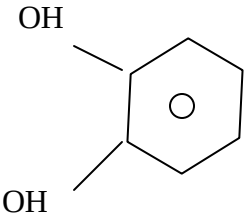
**Question paper -5**
**ANS Questions**

**I.Name the following**

1.The organic acid from which Acetyl choline is synthesized. -(Acetic acid)
2.The most important parasympathetic nerve in the body.-(Vagus)
3.The $10^{th}$ cranial nerve.- (Vagus)
4.The parasympathetic nerve which supply to all thoracic and abdominal viscera- (Vagus)
5.The autonomic division of nerve supply to the sweat glands in cattle.-( Sympathetic)
6.The mediator of sweat glands in cattle. -(Acetyl choline)
7.Two cholinesterase other than acetylcholinesterase. -( Butyryl choline , Propionyl choline)
8.Two synthetic reversible cholinesterase inhibitor. -( Neostigmine, Carbamates)
9.Two non depolarising muscle relaxants.- ( Tubocurarine, Gallamine)
10.Two centrally acting muscle relaxants.-( Mephenesin, Methocarbamol)
11.Two drugs which will interact with neuromuscular blocking agents and relaxes the muscles. -( Ether, Streptomycin, Magnesium, Kanamycin, Neomycin)
12.Two depolarizing muscle relaxants.- ( Decamethonium , Suxamethonium, Scoline, Brevadil)
13.Two Catecholamines. -(Adrenaline, Nor adrenaline , Dopamine.)
14.Two mixed acting sympathomimetics.- ( Ephedrine, Mephenteramine)
15.The major class of adrenergic receptors. -(Alpha and Beta.)
16.Two selective $\alpha_2$ adrenergic receptor antagonist .- ( Yohimbine, Atipamezole)
17.Three natural catecholamines. -( Epinephrine, Nor epinephrine, Dopamine)
18.Three non selective Apha adrenergic receptor antagonist.-( Phenoxy benzamine, Tolazoline, Ergotamine)
19.Two repartitioning agent in animals.- (Rectopamine , Zilpaterol)
20.Two selective $\alpha$ adrenergic receptor antagonist.-( Prazosin, Indoramin, Ketanserin)
21.The most potent $\alpha_2$ agonist available for use in veterinary medicine.- ( Meditomidine)
22.The enzyme which synthesize Acetyl choline.- ( Choline acetylase)
23.The enzyme which hydrolyze Acetyle choline. -( Acetylcholine esterase).
24.The precursor of nor epinephrine.- ( Dopamine)
25.The scientific name of Henbane.-( *Hyoscyamus niger*)
26.The active ingredient of pralidoxime.-( 2 PAM)
27.The other nameof Ergotism related to a Saint - ( St. Antony's fire)
28.The toxic principle in Mushroom.-(Muscarine)
29.The pre-junctional adrenergic receptor.- ( Alpha 2)
30.The parasympathetic receptors present in chromaphin cells .-(Nicotinic)
31.Three noncatecholamines.- ( Ephedrine, Amphetamine, Salbutamol, Phenylephrine,Tyramine)
32.Three plants which are having cholinergic blocking principles.- ( *Atropa belladonna*, *Datura stramonium*, *Hyoscyamus niger*)
33.Toxin responsible for the mushroom poisoning.-(Muscarine)
34.Two anti-nematodal drugs with nicotinic action.- (Levamisole, Pyrantal.)
35.Two basic types of cholinergic receptors.- ( Nicotinic and Muscarinic)
36.Two putative neurohumoral transmitters.- ( Histamine, 5HT, Purine and related compounds to ATP)

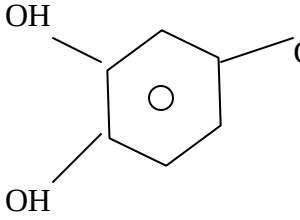
37.Two Ergotoxin group of alkaloids.-( Ergocrystine, Ergocryptine)
38.Two intracellular second messenger.- ( cAMP, cGMP)
39.Two natural alpha blockers.- ( Ergot , Yohimbine)
40.Two non catecholamine adrenergic drug.-( Ephedrine, Amphetamine, Salbutamol, Tyramine,Phenylephrine)
41.Two neurotransmitters with orthodihydrobenzene nucleus.-( Dopamine, Epinephrine, Nor epinephrine)
42.Two **β** 1 blocker.- ( Atenolol, Sotalol, Practolol, Metalol)
43.Two MAO inhibitor.- (Pargylin, Amphetamine)
44.Two drugs which blocks both **β** 1 and **β** 2.- ( Propranolol, Diacetolol, Levobanolol)
45.Two nondepolarising muscle relaxant.- ( Tubocurarine, Gallamine, Pancuronium)
46.Two cholinergic stimulant alkaloids.- ( Pilocarpine, Muscarine, Arecoline)
47.Two quarternary ammonium compound .-( Hexamethonium, Penta methonium)
48.Two reversible cholinesterase inhibitor.- ( Physostigmine, Neostigmine, Carbamates)
49.Two parasympathomimetics used to control blood sucking parasites.- ( Ronnel, Coral, Taban, Sarin)
50. Two cholinesterase reactivators .-( 2 Pyridine Aldoxime Methyl iodide , Mono Iso Nitroso Acetate , Di Acetyl Monoxime)
51.Two nerve gases.- (HETP, TEPP, OMPA, DFA)
52.The active ingredient of ISUPREL . - (Isoproterenol)
53.The active ingredient of Carbachol.- ( Carbamyl choline)
54.The active ingredient of Dexedrine . -( Dexamphetamine).
55.The other name for *Atropa belladonna*. -( Deadly night shade)
56.The releasing material at the end of preganglionic sympathetic nerves .- ( Acetyl choline)
57.The receptors for Acetyl choline.- ( Muscarinic and Nicotinic)
58.The vitamin used in the synthesis of neuromuscular transmitter of skeletal muscle.- (Choline)
59.The vitamin necessary for the synthesis of parasympathetic mediator.- ( Choline)
60.The most potent alpha receptor stimulant.-( Epinephrine)

61.




- ( Catechol )

62.




CH2--CH2-- NH2.

- ( Dopamine )

63.One selective pseudo-cholinesterase inhibitor--- Hexafluorinium.
64.One $GABA_A$ receptor agonist—(Mucimol.)
65.Two $GABA_A$ receptor antagonist—(Bicucullin, Picrotoxin.)
66.One $GABA_B$ receptor agonist—(Baclofen)
67.One $GABA_B$ receptor antagonist—( Phaclofen)

**II.State True or False**

1.Autonomic nervous system is absolutely essential for the action of Heart.- (F)
2.Action of d –tubocurarine can be antagonized by anti cholinesterase like neostigmine or edrophonium.-(T)
3.Acetyl choline is synthesized from choline and Acetyl Co-enzyme A.-(T)
4.Adrenaline is the most potent alpha receptor stimulant. -(T)
5.Adrenaline will act on sphinctur muscles of Eye. -(F)
6.Acetyl choline causes mydriasis.- (F)
7.Acetyl choline is seen only at the post ganglionic parasympathetic nerve endings.-(F)
8.Activated charcoal can be used as an oral antidote for Atropine.- (T)
9.Alpha receptors are excitatory in intestine.- (F)
10.Along with Magnesium less quantity of Brevadil should be used.- (T)
11.Along with Aminoglycoside antibiotics less quantity of Neuro muscular blocking agent has to be used. -(T)
12.Alpha methyl Dopa is not destroyed by MAO.-(T)
13.At the end of pre-ganglionic fibers Acetyl choline is released.-(T)
14.Autonomic nervous system is absolutely essential for the action of various organs-( F)
15.Atropine is contra indicated in glaucoma. -(T)
16.Atropine protect the effectar cells from the shower of Acetyl choline.- (T)
17.Atropine is more active when vagal tone is low.- (F)
18.Atropine blocks the sensory buds topically.-(T)
19.Atropine blocks the sensory buds of the skin.- (T)
20.Atipamezole is an Alpha 2 agonist.- (T)
21.Atipamezole can be used to reverse the effect of medetomidine, Amitraz and Xylazine.-(T)
22.A reduced quantity of neuromuscular blocking agent has to be prescribed while on Magnesium therapy.-(T)
23. 4- Amino pyridine can antagonize the action of Tubocurarine.- (T)
24.Baclofen is a GABA derivative that acts as agonist on pre-synaptic $GABA_B$ Receptors.-(T)
25.Baclofen suppress poly synaptic and monosynaptic pathway to relax muscles.- (T)
26.By stimulation of Beta receptors on adipose tissue adrenaline decreases the concentration of free fatty acids in blood.- (F)
27.Dinoflagellate toxin, Snakevenom toxin and tick paralysis toxin acts similar to Botulinum toxin on neuro muscular junction.-(T)
28.Guanidine reverses the neuro muscular block caused by Botulinum toxin.-(T)
29.Canal of Schleman is blocked by Atropine.- (T)
30.Catecholamine have primarily direct action.-(T)
31.Catecholamine with OH group only on $3^{rd}$ position is indirectly acting compound-(F)
32.Catecholamine with OH group only on $4^{th}$ position is directly acting compound- (F)

33.Dantrolene produce muscle relaxation by interfering with calcium release from sarcoplasmic reticulum.-(T)
34.Dantrolene produce muscle relaxation by depression of polysynaptic path way in internuncial spinal neuron.- (F)
35.Denervation does not reduce the effect of indirectly acting sympathomimetics.- (F)
36.De polarising muscle relaxants will attach to $M_M$. receptors and depolarize the post junctional membrane.-(T)
37.Dogs are highly susceptible to Tubocurarine, a neuro muscular blocking agent.-(F)
38.Dopamine deficiency can be treated with L–Dopa.-(T)
39. *d*-isomer of curare is less active than *l* –isomer.- (F)
40.Histamine release is one of the important side effect of Tubocurarine.-(T)
41. *l*- isomer of tubocurarine is more active than d isomer.- (F)
42.Epinephrine is the most potent Beta receptor stimulant.-(F)
43.Ergot contain only three alkaloids.- (F)
44.Ergot is an alkaloid obtained from a fungus. -(F)
45.Ergot is obtained from rye plant.- (F)
46.Ergometrine mainly acts on Uterus.- (T)
47.Ergotoxin will comes under ergocristin group of alkaloids.-(F)
48.Generally Alpha receptors are excitatory in nature .-(T)
49.Gallamine is a synthetic short acting neuro muscular blocking agent.- (F)
50.Glycopyrrolate, a synthetic quarterinary ammonium compound is used as pre anesthetic agent.-(T)
51.Hyoscine is a CNS suppressant at therapeutic dose-(T)
52.High dose of Nicotine initially stimulate parasympathetic and sympathetic ganglia and then paralyse the neuro muscular junction.-(T)
53. *l*- isomer of noradrenaline is more powerful. -(T)
54.Isoproterenol is a synthetic catecholamine.-(T)
55.In most tissues $\alpha$ receptors are excitatory and $\beta$ receptors are inhibitory in nature.-(T)
56.In Intestine $\alpha$ receptors are inhibitory and relaxation occurs.-(T)
57.In Heart muscle $\beta$ receptors are excitatory in nature.-(T)
58.In synechia Physostigmine must be used alternatively with Atropine. -(T)
59.Levo isomer of norepinephrine is more powerful .-(T)
60.L –Dopa can easily cross Blood Brain Barrier unlike Epinephrine. -(T)
61.$M_1$ receptors mediate gastric secretion and relaxation of lower oesophageal Sphincter.- (T)
62.$M_2$ receptors predominate in myocardium and some smooth muscles.-(T)
63.$M_3$ receptors are located in smooth muscles and secretary glands.- (T)
64.$M_4$ receptors are not found in CNS.-(F)
65.Methocarbamol is a centrally acting muscle relaxant acts by preventing the release of Acetyl choline at neuro muscular junction.-( F)
66.Methocarbamol preferentially block convulsion due to electric shock and strychnine.-(T)
67.Mephenesin is a neuromuscular blocker with very long duration of action.-(F)
68.Mephenesin carbamate is having less duration of muscle relaxant action than Mephenesin.-(F)

69.Magnesium interfere with release of Acetyl choline from the nerve terminals.- (T)
70.Magnesium compete with Calcium for the transport mechanism for mobilization into nerve terminals.-(T)
71.Most of the non catecholamine have direct and indirect action.-(T)
72.Muscarinic receptor subtypes of CNS is mainly $M_1$ and $M_2$.- (T)
73.Muscarinic receptor subtypes of Autonomic ganglia is mainly $M_1$.-(T)
74.Muscarinic receptor subtypes of end organ is mainly $M_2$.-(T)
75.Neostigmine can counteract the effect of Suxamethonium.- (F)
76.Nor epinephrine is the most potent alpha receptor stimulant.- (F)
77.Nicotinic receptors are present in chromaphin cells.- ( T)
78.Nicotine can be absorbed even through the intact skin. -(T)
79.Nicotine first stimulate and then suppress both the sympathetic and parasympathetic autonomic ganglia. -(T)
80.Nicotine will stimulate both acceleratory and inhibitory mechanism of heart.-(T)
81.Heart rate is reduced by nicotine even though acceleratory and inhibitory mechanisms are stimulated.-(T)
82.Nicotinic receptor subtype $N_M$ are found in neuromuscular junction.- (T)
83.Nicotinic receptor subtype $N_N$ are found in the neurons of the CNS and autonomic ganglia.-(T)
84.Norepinephrine is equally potent as Epinephrine on Beta 1 receptors.- (T)
85.Norepinephrine is slightly less potent on Alpha receptors.- (T)
86.Nor epinephrine is the most potent Alpha receptor stimulant.- (F)
87.Orciprenaline is metabolized by COMT.- (F)
88.Octa methyl pyrophosphoramide is a nerve gas synthesized by Americans in the second world war.- (F)
89.Organo phosphates will inactivate only acetyl choline esterase in the body.-(F)
90.Organo phosphates will inactivate acetyl choline esterase as well as Pseudo cholinesterase in the body.-(T)
91.Para sympathetic ganglia is not far from the organ being innervated.- (T)
92.Phentolamine and Tolazoline blocks both $\alpha$ 1 and 2 receptors .-(T)
93.Physostigmine is a parasympathomimetic alkaloid .-(T)
94.Physostigmine can be used to overcome curariform drugs. -(T)
95.Post synaptic $\alpha_2$ receptors are seen in blood vessels, Thrombocytes and CNS.-(T)
96.Post junctional adrenergic receptor is $\alpha_2$. -(F)
97.Prazosine blocks only $\alpha_1$ receptor and not $\alpha_2$. -(T)
98.Presynaptic $\alpha_2$ receptor stimulation inhibits the further release of transmitters.- (T)
99.Presynaptic $\alpha_2$ receptors are found at adrenergic and cholinergic nerve terminals.- (T)
100.Prazosine is used in the treatment of congestive heart failure.-(T)
101.Propantheline is a synthetic quarterinary ammonium compound having antimuscarinic action.- (T)
102.Propantheline is used as antispasmodic and antisecretary agent in diarrhea and colitis .-(T)
103.Propantheline is an effective drug in urinary incontinence. -(T)
104.Pseudo ephedrine is having only less CNS effect. -(T)

105.Pseudo cholinesterase is seen in various body tissues.- (T)
106.Pseudo cholinesterase is mainly found in neuromuscular junction.-(F)
107.Sympathetic de-nervation can terminate the action of direct acting adrenergic Agent.- (F)
108.Sympathetic de-nervation can terminate the action of indirectly acting adrenergic Agent.- (T)
109.Release of adrenaline causes distant vision.- (T)
110.Rectopamine increase lypolysis.- (T)
111.Streptomycin and Brevidil have additive action on muscle relaxation.- (T)
112.Saliva is increased by pilocarpine and decreased by Arecoline.-(F)
113.Small doses of Nicotine stimulate parasympathetic ganglia. -(T)
114.Small doses of Nicotine stimulate both acceleratory and inhibitory mechanism of Heart.- (T)
115.Radial muscles of the eye carry $\alpha_1$ receptors and so mydriasis with adrenaline.- (T)
116.Sweat glands receive innervations only from parasympathetic system.- (F)
117.Suxamethonium is a Non depolarizing ultra-short acting muscle relaxant.-(F)
118.Since the therapeutic index of neuromuscular blocking agents are wide supervision by a qualified person is not necessary for administration.- (F)
119.Succinyl choline is a competitive inhibitor of Acetyl choline.- (F)
120.The neurons of the preganglionic fibers are located in paravertebral ganglia.-(F)
121.The neurons of the post gang ionic fibers are located in CNS.- (F)
122.The pre ganglionic fibers of sympathetic system is shorter than the post ganglionic fibers.-(T)
123.The proposed mechanism of action of Dantrolene is by depression of polysynaptic pathway in internuncial spinal neuron.- (T)
124.The mediator of sweat glands in Horse is adrenaline.-(T)
125.The centre of autonomic nervous system is pituitary.-(F)
126.To reverse the effect of xylazine in ruminants Tolazoline is effective.-(T)
127.Tolazoline is a competitive antagonist for $\alpha_1$ and $_2$ receptors.-(T)
128.Tyramine is an indirectly acting sympatho mimetic amine. -(T)
129.Terbutaline is an orally effective $\beta_2$ agonist.- (T)
130.Terbutaline is not advisable orally in horse since the absorption is very low. -(T)
131.6-Hydroxy dopamine produce anatomical peripheral sympathectomy.-(T)
132.Yohimbine promote the formation of c AMP by blocking the $\alpha_2$ receptors activation.-(T)
133.Pseudo ephedrine have no relation to Ephedrine and have more action on CNS.-(F)
134.Beta cells of pancreas posses $\alpha_1$ receptors.-(F)
135.Neostigmine is a parasympathomimetic alkaloid.-(F)
136.Glycopyrrolate is aquarterinary amines having more marked antisialagogue action than Atropine—(T)
137.Active release of Nor epinephrine from granules is mimicked by Guanithidine and blocked by Bretylium—(T)
138.Dopamine Beta hydroxylase is blocked by Disulfiram—(T)
139.MAO is inhibited by Pargylin and Tranylcypromide.—(T)
140.Tyramine induces Nor epinephrine release by displacing it from the cytoplasmic pool but not from the granules.---(T)

141.Benzodiazepins can raise the threshold for CNS toxicity of anaesthetics –(T)
142.Scopolamine is not superior to atropine as an antisilagogue—(F)
143.Even though Scopolamine is having superior antisilagogue action than atropine it is not recommended because of its more marked sedation—(T)
144.GABA $_A$ receptor causes an increase in chloride conductance—(T)
145.Benzodizepins act by enhancing pre and post synaptic inhibition through GABA.(T)
146.Picrotoxin antagonise Benzodiazepins in a non competitive manner.—(T)
147.Barbiturates prolong the GABA response rather than intensifying it as in the case of Benzodiazepins.—(T)
148.The so called "Sleeping sponge" was used to induce loss of consciousness in ancient age.—(T)
149.Dandrolene inhibit depolarisation triggered release of calcium ion from sarcoplasmic reticulm—(T)
150.Diamine butyric acid is a competitive inhibitor of neuronal uptake of GABA--(T)
151.Nipecotic acid is a competitive inhibitor of GABA—(T)
152.The so called " Sleeping sponge "was produced by soaking sponge in extract of opium, Hemlock, Hyoscyamus, Lettuce etc.—(T)
153.The major site of action of local anaesthetic is receptor operated ion channels.—(T)
154.The major site of action of local anaesthetic is not voltage depended ion channels.(T)
154.One of the metabolic product of Epinephrine and Norepinephrine is Vanilic mandelic acid.—(T)
155.Sympathetic nervous system also contain small amount of Acetyl choline along with Nor adrenaline.—(T)
156.Adrenaline relaxes non pregnant and pregnant uterus in rats.—(T)
157.Adrenaline constrict non pregnant and pregnant uterus in rabbits.—(T)
158.Adrenaline relaxes non pregnant uterus and constrict pregnant uterus in cats.—(T)
159.Adrenaline constrict pregnant uterus and relax non pregnant uterus in humans.—(T)
160.Adrenaline fecilitate gluconeogenesis.—(T)
161.Adrenaline causes phosphorylation of Troponin and combine with calcium in heart.—(T)
162.Pseudo ephedrine is having no action on bronchi.—(T)
163.Pseudo ephedrine is used mainly as a nasal decongestant .—(T)
164.Adrenal medulla of ferocious animal is having more nor- adrenaline than other animals.(T)
165.If autonomic fibers to an organ is disconnected the organ will slowly atrophy.---(F)
166.Noortropics will facilitate learning.—(T)
167.L DOPA and 5HT enters the brain easily.—(T)
168.Progabid is a GABA analog.—(T)
169.Tyrosine hydroxylase is not a rate limiting enzyme.—(F)

**III.Fill up the blanks with most appropriate words:**

1.Ordinarily action of sympathetic and para sympathetic system is antagonist except .....which is stimulated by both.-(salivary glands)
2.Out of Adrenaline and Nor adrenaline , .....is preferred in haemorrhagic shock because of its increased vascular resistance.-(nor adrenaline)
3.Pilocarpine is obtained from the plant.....--( *Pilocarpus jaborandi*)

4.Pre ganglionic fibers are longer in .....division of Autonomic nervous system.-( Parasympathetic)
5.Parathion is converted to a more toxic compound.....in the body.-(Paraoxon)
6.Pseudo ephedrine is having .....action on CNS than Ephedrine.- (less)
7.Pseudo ephedrine is available as .....-(Sudafed)
8.*Physostigma venenosum* is otherwise called as .....bean.-(Calabar/Ordeal)
9.Physostigmine can be used to treat ..... of rumen.-(atony)
10.Physostigmine is an alkaloid but Neostigmine is a .....drug.-(Synthetic)
11.Reserpine is obtained from .....plant.- ( *Rauwolfia serpentina*)
12.Rectopamine is recommended for ..... ( species of animals).-(Cattle and swine)
13.Small doses of Acetyl choline stimulate only .....receptors.- (Muscarinic)
14.Stimulation of .....system produce intense effect and .....system produce discrete effect. -(Sympathetic, Parasympathetic)
15.Substitution of CH3 group at Beta carbon of Ach. give.....-( Methacholine)
16.Substitution of CH3 group at Beta carbon of .....will give Bethanecol -(Carbamyl choline)
17.The active principle of extract of adrenal gland was isolated by .....-(J.J.Abel)
18.The mediator of sweat glands in Horse is .....-(Adrenaline/Nor adrenaline)
19.The oxidation rate of Adrenaline hydrochloride solution can be reduced by the addition of .....-(Sodium bi sulphite)
20.The efferent segment of the ANS is divided in to .....and.....-(Sympathetic and Parasympathetic or Thoraco lumbar and Cranio sacral).
21.The chemical mediator in the autonomic ganglia of sympathetic system is ..... -(Acetyl choline)
22.The cell bodies of pre-ganglionic neuron is located in the .....-(CNS).
23.The synapse of pre ganglionic axon with a post ganglionic neuronal body occurs .....-(outside CNS or Autonomic ganglia).
24.The centre of autonomic nervous system is in .....-( Hypothalamus).
25.Toxic dose of ergot causes .....of blood in capillaries leads to ..... .of extremities-.(stasis, gangrene)
26.The active principle of *Atropa belladonna* is .....& .....-(Atropine & Hyoscyamine)
27.The active principle Epinephrine was isolated in 1899 by .....-( J.J.Abel)
28.The active ingredient of Dristan is .....-( Phenylephrine)
29.The L.D.50 of Botulinum toxin is .....micro gram /Kg.. -( 0.01)
30. The recent application of Lobeline is as a .....-(Smoking deterrent)
31.The Nicotinic receptors are ligand gated cation channels, while the muscarinics receptors are .....coupled receptors. -( G- protein)
32.The action of parasympathetic and sympathetic is excitatory on .....glands-( Salivary).
33.The common name of *Areca catechu* is .....-( Betel nut)
34.The cholinergic receptors are divided in to .....& .....-( Muscarinic and Nicotinic)
35.The organs in pelvic region like bladder, colon, sex organs are supplied by parasympathetic innervations from .....portion of spinal cord.-( Sacral)
36.The oxidation product of physostigmine is.....-( Eseroline)

37.The two classes of neuromuscular blocking agents are.....& .....-( depolarising and non depolarizing)
38.The cell body of the pre-ganglionic neuron is located in .....-( CNS)
39.The scientific name of deadly night shade is .....-( *Atropa belladonna*)
40.The ganglionic synapse of Sympathetic nerve system is located .....from the organ of supply -(far)
41.The precursor of Dopa is .....-(Tyrosine)
42.The ratio between .....and.....ganglionic fibers are more than one in .....system.-( Pre, Post, sympathetic)
43.The releasing material at the post ganglionic parasympathetic nerve is .....-(Ach)
44.The salt of Physostigmine is available as .....-( Physo. Salicylate/ sulphate)
45.The uterine relaxation by adrenaline is due to stimulation of .....receptors.-( $\beta_2$)
46.The name Atropine is derived from the name of one of the three Greek Goddesses.....-( Atropos)
47.Tubocurarine was used by Tribals as .....in hunting animals.-(arrow tip poison)
48.To measure the .....level in the circulation of organo Phosphorus poisoned animals Delta pH test is adopted. -( Cholinesterase)
49.To test the function of pituitary adrenal axis .....test is performed.-(Thorn test)
50.Under normal condition most of the organs are under the control of.....division of autonomic nervous system. -(Parasympathetic).
51.Under normal condition blood vessels are under .....control.-(Sympathetic)
52.When crude ergot powder/ liquid is used as a uterine .....we must ensure that .....is dilated.- (stimulant, cervix)
53.When ambient temperature is low Xylazine causes .....-( Hypothermia)
54.When ambient temperature is high Xylazine causes .....-( Hyperthermia)
55.When epinephrine hydrochloride is exposed to light, it attain a red color because of the presence of.....-( Adrenochrome)
56.When Ergot is administered for stimulation of uterus we must make sure that the .....is opened.- (Cervix)
57.Urinary bladder carry .....receptors and so relax with adrenaline.-( $\beta$)
58.Urinary bladder sphincter have ..... receptors and so contract with adrenaline-($\alpha$ )
59.Xylazine is an $\alpha_2$ adrenoceptor agonist that is structurally related to .....-(Clonidine)
60.Yohimbine is a blocker of ..... adrenergic receptor .- ( $\alpha_2$ )
61.Zilpaterol is recommended for.....cattle -(beef )
62. .....is a hydantoin derivative acts directly on contractile mechanism of voluntary muscle and causes relaxation.- (Dantrolene)
63. .....produce anatomical peripheral sympathectomy-destroy adrenergic nerve. -(6-hydroxy dopamine)
64. 40 % nicotine sulphate is otherwise known as .....-(Black leaf 40)
65. .....is a central muscle relaxant related to Mephenesin.-(Methocarbamol)
66.....will act as a false neurotransmitter-($\alpha$ methyl nor adrenaline)
67.. .....triggers the release of neurotransmitter from the nerve terminals.-(Calcium).

68... .....posses $\beta_2$ adrenergic receptors.-( Bronchi, Skeletal.muscles, Uterus,

Vascular smooth muscles).

69.. .....blocks the re uptake of Nor epinephrine in to the vesicles.- ( Reserpine).

70.. ....., ..... and.....blocks the reuptake of Nor epinephrine in to presynaptic terminals.-( Cocaine, Imipramine and Amitryptyline).

71. .....and .....blocks the release of Nor epinephrine from nerve terminals.-( Bretylium and Guanithidine)

72. .....blocks the metabolism of Nor epinephrine by COMT -( Pyrogallol).

73.. .....blocks the metabolism of Nor epinephrine by MAO- ( Pargyline).

74.. . .....and .....are nociceptive neurotransmitters in the dorsal horn neurons of spinal cord.-( Substance-P and CGRP (Calcitonin Gene –Related peptide)

75.....is used in USA as "Black leaf 40"-.(Nicotine sulphate 40%)

76.....is a centrally acting muscle relaxant.-( Mephenesin, Methocarbamol, Carisoprodol)

77.....and.....are ergotamine group of alkaloids.-( Ergotamine, Ergosine)

78.....will reverse the N.M.blocking action of Botulinum toxin.-(Guanidine)

79.....is a beta 2 blocker.- ( Butoxamine)

80.....will prevent the synthesis of Acetyl choline.-( Botulinum toxin, Snake venom, Tick toxin)

81.....are plants containing atropine.- ( *Atropa belladonna, Datura stramonium*)

82.....and.....are examples for food containing Tyramine.- ( Cheese and Wine )

83..... is a natural local anesthetic which blocks the neuronal amine uptake.-(Cocaine)

84.....produce anatomical peripheral sympathectomy.- ( 6-hydroxy dopamine)

85.....is a COMT inhibitor.-( Pyrogallol)

86.....blocks tyrosine hydroxylase . -( Alpha methyl para tyrosine)

87.....receptors of parasympathetic system can not be blocked with atropine.- ( Nicotinic)

88.....(Dilution) solution of Carbachol is used in large animals and .....solution in small animals.-( 1/1000, 1/10000)

89.....receptors of parasympathetic system is seen in smooth muscles.- ( Muscarinic)

90.....is an inhibitor of MAO. -( Pargyline)

91.....inhibits the synthesis of Acetyl choline.-( Hemicholinium chloride)

92.....is otherwise called as arrow tip poison. -( Tubocurarine )

93.Destruction of Nor epinephrine by COMT is blocked by…….(pyrogallol)

94.Granular reuptake of Nor epinephrine is blocked by .....(Reserpine)

95.GABA $_B$ receptor causes an increase in .....conductance--.-(Potassium)

96.Mucimol from Amanita mushroom is a structural analog of ……..…(GABA)

**IV.Choose the correct answers**

1. Following organs receive only parasympathetic division of nervous system.
a)Ciliary muscles b) Gastric glands c) Pancreatic glands d) All the above-- (d)

2. Following order of ranking is correct about the potency of action on $\beta$ receptors
a)Isoprenalin ,Adrenaline, Nor adrenaline b) Nor adrenaline ,Isoprenalin, Adrenaline c ) Adrenaline, Isoprenalin, Nor adrenaline--- ( a)

3.Following are choline neurotransmitters in the CNS. a) Acetyl choline b)Butyl choline c) Propionyl choline d) None of the above--- ( a,b,c)

4.Following drugs are depolarizing muscle relaxant . a) Tubocurarine b) Gallamine c) Pancuronium d) Suxamethonium ---.( a, b,c/ All are correct except d)

5.. High dose of the following drugs activates Alpha 1 receptors a) Xylazine b) Detomidine c) Romifidine d) All the above.--- (d)

6. Most of the organs have both sympathetic and para sympathetic supply except a) Adrenal medulla b) Pilomotor muscles c) Sweat glands d) all the above.-- (d)

7.Neuro muscular blocking agents are classified in to --a) Centrally acting b) Peripherally acting c) Depolarising d) Non depolarizing --( c ,d )

8.. $N_N$ nicotinic receptors are present on the following areas a) Adrenal medulla b) Spinal cord c) Certain areas of brain d )All the above --( d)

9. Pseudo cholinesterases are found in various body tissues likea) Liver b) Pancreas c) Blood d) All the above.-- ( d)

10.Skeletal muscle relaxation can be brought about by.a) Anesthetics like Ether b ) Anti convulsants like Benzodiazepins c)Centrally acting muscle relaxant like Mephenesin d)Peripherally acting Muscle relaxants like Tubocurarine.--( a,b,c,d)

11.. Sweating in horses and sheeps -- a) Not affected by atropine b) Increase c) Decrease d) Vary with condition.---( a)

12. Following drugs are synthetic para sympatholytic agents eg.-- a) Homatropine b) Methyl atropine c) Methantheline d) Dicyclomine e) all the above --- (e)

13.The cell body of the pre-ganglionic neuron is located --a) In the CNS b) Outside CNS c) Near the organ d) In the organ--- (a)

14. .The most potent Alpha receptor stimulant -- a) Adrenaline b)Nor adrenaline c) Iso proterinol d) None of the above---.( a)

15.Which one of the following is having no ortho dihydroxy benzene nucleus.-- a) Epinephrine b) Dopamine c) Amphetamine d) None of the above. ---(c)

16.Which one of the following is a non catecholamine-- .a) Epinephrine b) Dopamine c) Amphetamine d) None of the above. ---(c)

17. When action potential reached at the axon terminals --a) Calcium will get in b) Sodium will get in c) Neurotransmitters will be released d) Potassium will get in--( a,b,c)

18.Neuronal reuptake of Nor epinephrine is blocked by the following drugs- a) Cocaine b) Ouabaine c) Chlorpromazine d) Imipramine e) All the above—( c)

19.One of the following is the most potent Beta blocker- a) Propranolol b) Timolol c) Alprinolol d) Nadolol—( b)

20.In messners plexes the ratio of pre and post ganglionic fibers of para sympathetic system is – a) 1: 1, b) 1: 100, c) 1: 1000, d) Non of the above.—( c)

21.What happens to the Nor epinephrine after release in to the synaptic cleft. a) Excess NE is taken back in to axon by active transport b) Excess NE is diffused to terminals c) Enzymatic inactivation by COMT d) All the above.—(d)

22.Islets of pancreas carry Muscarinic receptors type- a) $M_5$, b )$M_4$, c) $M_3$, d) $M_2$.—($M_4$)

**IVa .Choose the correct answer and give your explanation**.

1.Alpha 1 receptors are associated with which one of the following effect.?
a)Cardio acceleration b) Vasodilation c) Pupillary dilation d)Broncho dilation e) Pupillary constriction.--(answer is c)
Alpha 1 receptors stimulation in the iris causes contraction causing mydriasis. Increasd heart rate is associated with Beta 1 stimulation, Vaso dilation and broncho dilation is associated with Beta 2 stimulation, Miosis is associated with stimulation of muscarinic receptors.

2.Which of the following adrenergic agonist at clinical dose produces dilation of vessels in muscles, constriction of cutaneous vessels, and positive inotropic and chronotropic effects on the heart? a) Phenyl propanolamine b) Isoproterinol c) Isoxsuprine d) Epinephrine e) Dobutamine.-- (Answer is d)
Activation of B1, B2 and for $\alpha_1$ receptors produce the following effects. The only one drug having all these action at clinical dose is Epinephrine. Phenyl propanolamine predominantly activate for $\alpha_1$ receptors . Isopreterinol activate Beta 1 and 2 but not Alpha.Isoxsuprine is a selective Beta 2 agonist. Dobutamine is a selective Beta 1 agonist.

3. Which of the following drug produces papillary dilation(mydriasis) without causing cycloplegia? a) Sco[polamine b)Pilocarpine c) Isoproterenol d) Tropicamide d) Phenylephrine.--( Answer is e)
Phenylephrine ,an Alpha 1 agonist constrict the radial muscles of the iris to induce mydriasis. Scopolamine and tropicamide are muscarinic antagonist that produce mydriasis and cycloplegia. Pilocarpine is a muscarinic agonist that produce miosis when placed in the eye.Activation of Beta receptors by Isoproterinol does not change pupil size.

4. Which of the following bronchodilators is considered the safest for use in animal with cardiac disease? a) Iso proterinol b) Terbutaline c) Ephedrine d) Epinephrine.---(Answer is b).

Only Beta 2 stimulation is needed which is seen with Terbutalin. Epinephrine and Isoproterinol is having both B1 and B2 action which affect heart also. Ephedrine causes the release of adrenaline and nor adrenaline from the nerve terminals causing all the actions of $\alpha$ and $\beta$ stimulation which also affect the heart. Terbutalin at higher dose may stimulate Heart caution must be observed.

5.Nicotinic receptor sites are found in all the following locations, except-
a) parasympathetic ganglia b)sympathetic ganglia c) skeletal muscles d) bronchial smooth muscles.--- (Answer is d)
Bronchial smooth muscles contain only muscarinic receptors ,not nicotinic receptors. Both parasympathetic and sympathetic ganglia contain Nn –nicotinic cholinergic receptors, and the skeletal muscle neuro muscular junction contain only Nm-nicotinic cholinergic receptors.

6. Which of the following drugs would be most likely to increase myometrial contractility?
a) Atropine b) Phenoxybenzamine c) Rectopamine d) Xylazine-- (Answer is d)
Myometrial contraction is increased by activation of $\alpha 1$ , $\alpha$ 2 and M3 receptors and is decreased by activation of $\beta 2$ receptors. Xylazine is an $\alpha$ 2 agonist it can facilitate parturition and cause abortion. Atropine is a muscarinics receptor antagonist, Ractopamine is a $\beta$ 2agonist. Phenoxy benzamine is an alpha blocker. Later drugs evoke uterine relaxation.

7. Which of the following is the sign of Bethanechol stimulation of muscarinics receptors?
a) Skeletal muscle twitchingb) Urination c) Constipation d) Dry mucous membranes--- (Answer is b)
Stimulation of M3 muscarinic receptors causes urination by contraction of bladder. Bethanecol does not stimulate nicotinic receptors and has no action on skeletal muscle twitching, constipation, and dry mucous membranes which are due to antagonism of M3 receptors

8.Which of the following muscarinics receptor subtype mediate the Bethanechol induced decrease in heart rate and contractility? A) M1 b) M2 c) M3 d) M4 e) M5--
(Answer is b)
M2 receptors mediate the decrease in all aspects of cardiac activities and is due to inhibition of NE release from the sympathetic nerve endings of the heart. M2 receptors of these endings and are inhibitory receptors.activation of these inhibits the NA release.

9.Which of the following adrenergic receptor sub type mediates the phenylpropanolamine induced contraction of the trigone and sphincter muscle of the urinary bladder? This effect is used to treat urinary incontinence. a) $\alpha$ 1 , b) $\alpha$ 2, c) $\beta$ 1,
d) $\beta$ 2, e) $\beta$ 3.--- (Answer is A).
The A1 receptors are found in sphincter muscles (except iris sphincter) Activation of A1 evokes contraction of trigone and sphincter muscle of the urinary bladder and thus A1 agonist can be used to control urinary incontinence.

10. Metoprolol is used in cats with hyperthyroidism showing cardiac arrhythmia. The use of metoprolol in this cat will most likely to cause a) hypersalivation b) mydriasis c) bronchoconstriction d) hyperglycemia e) decrease rennin secretion.--- (Answer is e)

B1 receptors mediate rennin secretion, blockade of these will decrease secretion. Hypersalivation ,bronchoconstriction, hyper glycemia can not be induced by B1 blockage.

11. In patients with liver or renal disease which of the following neuromuscular blockers would be the choice for these patients? a) Atracurium b) Pancuronium c) Succinylcholine d) Tubocurarine e) Vecuronium ----(Answer is a)
Atracurium is spontaneously degraded in the plasma by a process called Hoffman elimination and ester hydrolysis. This does not require the help of kidney and liver. Other N.M.blockers require the participation of liver and kidney to eliminate the drug
12. Which of the N.M.blockers will cause transient and painful muscle contraction and an increase in bronchial and salivary secretion? a) a) Atracurium b) Pancuronium c) Succinylcholine d) Tubocurarine e) Vecuronium.--- (Answer-c)
Succinyl choline is depolarizing N.M.blocker which causes initial contraction before relaxation which can be painful. It stimulate muscarinics receptors to increase bronchial and salivary secretion.
13. Which of the following is not a pharmacological effect of Yohimbine? A) CNS excitation b) Hyperglycemia c) Hypertension d) increase G.I. motility e) Tachycardia -- ( Answer- b)
Yohimbine is an A 2 antagonistand the effects are oposit to that of A2 agonist. A2 agonist induce CNs depression, hypotension, hyperglycemia, decrease G.I motility and bradycardia. Yohimbine does not cause hyperglycemia.
14. Which receptor subtype mediates DA induced vasodilatation in renal , mesenteric and coronary arteries? a) D1 b) D2 c) D3 d) D4 e) D5---(Answer is a)
Dopamine activate D1 receptors in renal mesenteric and coronary arteries to induce vasodilatation. D1 receptors are coupled to Gs just like $\beta$ receptors.

**V.Match the following**

| **A** | **B** |
|---|---|
| 1.Alpha methyl p- tyrosine | Constriction of pupil -( 10) |
| 2. Pargylin | Prevent neuronal amine uptake in to granules -( 3) |
| 3. Reserpine | Prevent neuronal reuptake -(4) |
| 4.Cocaine | Block conversion of Tyrosine to Dopa- ( 1) |
| 5. Pyrogallol | Block conversion of Dopa to Dopamine- ( 6) |
| 6.Alpha Methyl Dopa | MAO inhibitor -( 2) |
| 7.Thorn test | COMT inhibitor -(5) |
| 8. Bronchi | $\beta_1$ Receptors -(9) |
| 9. Heart | $\beta_2$ receptor - (8) |
| 10. Para sympathetic stimulation | Function of pituitary adrenal axis. -(7) |

| A | B |
|---|---|
| 1. M2 receptors | in heart reduce excitability -(4) |
| 2 .M3 receptors | smooth muscles sphincter , secretary glands - (8) |

| | | |
|---|---|---|
| 3. M5 rece[ptors | | in mid brain dopaminergic neuron- ( 1 ) |
| 4. B3 | " | found in adipose tissue -(7) |
| 5. D1 | " | in renal mesentery and coronary circulation -(6) |
| 6. D3 | " | nucleus accumbens at base of striatum- (2) |
| 7. D4 | " | Heart and CNS -(3) |
| 8. D5 | " | Lymphocytes - (5 ) |

**VI. Answer the following**

1. Classify synthetic alpha blockers with examples:-
a) Haloalkylamines- eg.phenoxy benzamine b) Imidazoline eg.Phentolamine c) Dibenzazepines-eg. Azapetin d) Benzodioxan eg. Piperoxan.

2.. Classify Beta Adrenergic blockers with examples:-
a)Drugs which blocks $ß_1$ and $ß_2$ eg. Propranolol, Levobanolol. b) Drugs which blocks $ß_1$ and less action on $ß_2$ eg. Sotalol, Atenolol c) Drugs which blocks $ß_2$ eg. Dufoxan

3.What are parasympatho lytics?-
Drugs which will prevent Acetyl choline from producing its effect in structures innervated by post ganglionic parasympathetic nerves, also inhibits acetyl choline on smooth muscle cells that respond to acetyl choline but have no parasympathetic supply.

4.Classify parasympatholytics: -
a)Those opposes the Acetyl choline at post gang ionic parasympathetic nerve endings ( Cholinergic blocking) eg. Atropine.
b) Those prevent the release of Acetyl choline at ganglia (Ganglion blocking) c) Those replace the Acetyl choline from receptor site.( Neuro muscular blockers) d)Those prevent the action of Acetyl choline by blocking the release . eg.Botulinum toxin.

5. Action of Atropine on cardio vascular system:-
It blocks the Vagus- tachycardia when vagal tone is high- blocks reflex vagal stimulation arise from cyclopropane anesthesia-large doses suppress myocardial and cutaneous blood vessels (dilate). Heart rate first shows a temporary decrease followed by marked acceleration (Vagal block).

6.. What are the methods by which we can bring about muscle relaxation:-
a) Anesthetics like Diethyl ether, Methoxy flurane, Halothane etc.
b) Anti convulsants like barbiturates,Diazepam.
c) Centrally acting muscle relaxants like Mephenesin.
d) Peripherally acting muscle relaxants –Neuro muscular blocking agents.

7.Mechanism of action of Non depolarising muscle relaxants:
They compete with Acetyl choline for attachment to the receptors-have no agonistic properties-stimulate the threshold of end plate .Small amount of Acetyl choline released is antagonised and so paralysis happens. The order of paralysis –eyes, face,neck,limbs,abdomen and intercostals muscles- recovery is in the reverse order.

8.Whar are Non depolarizing muscle relaxants?
They are agents which willcompete with acetyl choline at the motor end plate –prevent depolarization of end plate and muscle stimulation. Hence there will be relaxation of muscles Eg. Tubocurarine(Curare), Gallamine, Pancuronium.

9.What are depolarizing muscle relaxants:
This group of muscle relaxants mentain the neuro musculsr junction in a depolarized state-manifested by fibrillary twitching of group of skeletal muscle fibers. After this the motor end plate become paralysed and muscle relax. Eg. Suxamethonium, Scoline, Brevidil.

10.Classify the following drugs as $\alpha$ stimulant, $\alpha$ blocker, $\beta_1$ stimulant, $\beta_2$ stimulant, $\beta_1$ blocker, and $\beta_2$ blocker( Phenylephrine, Phentolamine, Ergot, Yohimbine, Isoproterenol, Debutamine, Propranolol, Practolol , Salbutamol, Procaterol .Butoxamine, Terbutalin )
In belladonna poisoning Physostigmine is preferred than Neostigmine. Why? Since Physostigmine can penetrate the blood brain barrier but not the Neostigmin

1.Phenylephrine--- $\alpha$ stimulant
2.Phentolamine---- $\alpha$ blocker
3. Ergot---------- $\alpha$ blocker
4. Yohimbine –-----$\alpha$ blocker
5. Isoproterenol -- $\beta$ stimulant
6. Debutamine --- $\beta_1$ stimulant
7. Propranolol---- $\beta_1$ and two blocker
8. Practolol------- $\beta_1$ blocker
9. Salbutamol---- $\beta_2$ stimulant
10. Procaterol--- -$\beta_2$ stimulant
11.Butoxamine—$\beta_2$ blocker
12. Terbutalin--- $\beta_2$ stimulant

11.Write the dose of the following.
Adrenaline in cardiac arrest....--( ½ to 1ml- 1/10000 sol - intracardially)
Atropine in Dogs. .....--(0.045 mg/kg)
Arecoline as rumen stimulant in cattle -- (0.8 mg, s/c)
Ext. ergotum for cattle----(5 -- 10 ml.)
Carbachol for cattle------(4mg/455 kg)
Protopam.....----(30--40 mg/kg)
Mephenesin for Cat. ....---.(22mg/kg)
Brevidil for Horse--------( 0.1 -- 0.18 mg/kg)
Flaxedil for Dogs.....---.(1.1 ---2.2 mg/kg)
Ergometrine for Cattle....--( 10—20 mg)
Adrenaline in Cattle----(5—10 ml , 1/1000 sol)
Neostigmine in curare poisoning...--(0.022mg/kg)
Isuprel in cardiac arrest.....--( 20—40 Micro gram)

12.Write the active ingredients of the following.

| | |
|---|---|
| Syncurine....-(Decamethonium) | Robaxin....-(Methocarbamol) |
| Soma.....-(Carisoprodol) | Protopam..-(2-PAM) |
| Brevidil.....-(succinyl choline) | Gynergen -( Ergotamine tartrate) |
| Flaxedil.....-(Gallamine trithiodide) | Inderal.....-( Propranolol) |
| Tubarine.....-(Tubocurarine) | Eraldin.....-(Practalol) |
| Carbachol....-(Carbamyl choline) | Ismelin.....-(Guanethidine) |
| Duvoid.....-(Bethanechol) | Aldomet....-(Alpha methyl dopa) |
| Mecholyl.....-(Methacholine) | Darenthin....-( Bretylium) |
| Isuprel.....-(Isoprenaline) | Dopar .....-( L.Dopa) |
| Asthalin.....-.(Salbutamol) | Dristan.....-( Phenylephrine) |
| Medihaler....-Isoproterinol, Phenylephrine | Eraldin.....-( Practolol) |

13.What are the important difference between adrenaline and ephedrine?--

| **Adrenaline** | **Ephedrine** |
|---|---|
| 1.Animal origin | Plant origin |
| 2.Not active orally | Active orally |
| 3.Less stable | More stable |
| 4.No CNS stimulation | CNS stimulation |
| 5.Blocked by Ergot | Not blocked by Ergot |
| 6.No Tachyphylaxis | Tachyphylaxis |

14.State the route of administration of Adrenaline in

1. Epistaxis.....-(Local application in the nostril)
2. Cardiac arrest.....-( Intra cardially)
3. Asthma..... - (Intra nasally as inhalation)

15.Rabbits can tolerate large dose of atropine .Why?

Rabbits liver contain an enzyme atropinase (Atropine esterase) to metabolize atropine-.Hence it can handle larger dose.

16.Atropine is preferred over *l* Hyoscyamine Why?

Even though *l*-hyoscyamine is more active a mixture of these two is preferred because that is more stable

.

17.Ergot alkaloids are not used as $\alpha$ blockers Why?

Even though ergot alkaloids have alpha blocking action it is not used for that purpose because at that particular dose it become toxic to other organs.

18.Even though ergotamine is an $\alpha$ blocker it is used in migraine?

Because of its powerful direct vasoconstrictor action, it can counteract $\alpha$ blocking on blood vessels on head.

19.Sodium sulphite is added to epinephrine solution . Why?

To prevent oxidation and decomposition.

20.Will you prefer depolarizing or non depolarizing muscle relaxants . Why?
Prefer non depolarizing muscle relaxants. Because action of non depolarizing muscle relaxants can be controlled with Neostigmine . Against depolarizing muscle relaxants there is nosuch antidote.

21.Action of Tubocurarine can be blocked with Neostigmine How? Before giving Neostigmine Atropine must be given. Why?
Tubocurarine is a competitive blocker and compete with Acetyl choline at neuro muscular junction. Neostigmine is an indirectly acting choline mimetic ,blocks the cholinesterase reversibly hence level of Ach is increased at neuro muscular junction to counteract tobocurarine. Atropine is giving before giving Neostigmine to block the muscarinics stimulation which is unwanted here.

22.When adrenaline is administered there will be temporary apnea .Why?
When adrenaline is administered the respiration is increased. Stimulation of baroceptors also occurres simultaneously . Stimulation of baroceptors cause a momentary inhibition of respiratory centre seen as apnea.

23.What is the basic principle in 'Thorn test'.
This test is used to verify the function of pituitary adrenal axis by counting the Eosinophils in peripheral blood before and after injecting Epinephrine. Epinephrine stimulate Hypothalamus which in turn causes the release of ACTH which produce Leucopenia mainly due to reduction of Lymphocyte and Eosinophils. This is the principle of the test.

24.How Carbachol cause sweating in horse?
The mediator of sweat glands in horse is adrenaline. When Carbachol is administered it stimulate the adrenal medulla causing the release of adrenaline which causes sweating. Chromaphin cells in medulla will act as post gang ionic fibers.

25.What is post synaptic modulation?
Modulator act on post synaptic structure which alter their excitability or spontaneous firing pattern eg. A neuro peptide-Y release as a co- transmitter with nor-adrenaline enhances vasoconstrictor action of nor adrenaline.

.26.Magnesium ions interfere with release of Acetyl choline from terminals How?-
Magnesium ions compete for transport mechanism responsible for mobilization of Calcium in to nerves. Which interfere with the release of Acetyl choline

**VII.Write short notes on**

1.Pilocarpine:
Alkaloid from *Pilocarpus jaborandi* and *P. microphyllus*-Pilocarpine nitrate is used-direct parasympatho mimetic-stimulates organs innervated by post ganglionic cholinergic fiber-very powerful in inducing exocrine secretions like saliva & sweat-Atropine blocks the action. Used in Glaucoma and Synechia.

2.Effect of adrenaline on circulation.:
selective vasoconstriction of arterioles of skin , mucous membrane and viscera-shunt more blood in to essential organs like lungs, heart, vasodilatation of skeletal muscles,- heart rate and force increase- B.P.increase after a peak rise a moment slow due to reflex Vagal action( via baroceptors of carotid and aortic body, Atropine blocks this)- B.P. again rise and then slow down below normal ( because the threshold of ß receptors is very low but at the initial phase stimulation of α receptors overcome the effect of ß)

3.Putative neuro humoral transmitters:
Histamine, 5 HT, Dopamine, Purine and related compounds to ATP. Explain each. Adrenergic receptors: Alpha –Vaso constrictor –skin-viscera, mydriasis, increase the blood glucose. Beta 1 –stimulate rate and force of heart beat. Beta2 vasodilatation, bronchi relax, uterus relax.

4.Non catecholamine adrenergic drugs:
Amphetamine, Ephedrine, Salbutamol, Phenylephrine. Explain each

5. Pregnancy reversal of adrenaline:
The opposite effect of adrenaline on pregnant and non pregnant uterus is called as Pregnancy reversal. Non pregnant uterus relax and pregnant uterus contract- vary with species. In human non pregnant uterus constrict and pregnant uterus relax.

6.Action of Nicotine on autonomic ganglia:
Small doses of Nicotine blocks only parasympathetic ganglia-slighly higher ( 0.05mg/kg) suppressed the heart rate and stimulate the intestinal motility- double the dose (0.1mg/kg) initial stimulation of para sympathetic ganglia followed immediately by increase in B.P. because of stimulation of sympathetic ganglia and adrenal medulla- 1-5 mg/kg blocks the autonomic ganglia –more than 10 mg/kg first stimulate and then paralyse the neuromuscular junction.

7.Propranolol:
Propranolol is a $ß_1$ & $ß_2$ blocker, Little effect on Heart of resting individuals. Stimulated heart is suppressed, force reduced, suppress arrhythmia during anesthesia- competitive antagonism with adrenaline. Broncho constriction , used in ventricular tachycardia, atrial fibrillation and atrial flutter. Contra indicated in Angina and hypertension.

8.Reserpine:
An alkaloid present in *Rauwolfia serpentina*. It reduce tissue storage of catecholamines & 5HT by reducing its uptakes in to granules-impaire the Mg ++ ATPase which is necessary for the transportation to granules-orally active-onset is long 1-2 days. Can be used in hypertension

9.Mushroom poisoning:
It is the toxicity produced due to the consumption of certain species of Mushroom-commonly seen in human beings- Toxin is muscarine- parasympatho mimetic- stimulate the parasympathetic system. There are two type of poisoning. One type of poisoning

symptoms will starts in few min or few hrs. characterized by stimulation of parasympathetic system. It can be blocked by Atropine. More dose may cause convulsion then give sedatives. Second type of poisoning is caused by another type of mushroom-symptoms after several hours/days-mainly G.I.symptoms, shock prostration and death. If initial symptoms are passed , followed by acute hepatitis-renal damage –and death. Atropine is not useful.

10.Action of Ogano phosphorus compounds on parasympathetic system.

O.P compounds ( eg. Parathion, Malathion)inactivate cholinesterase and pseudo cholinesterase irreversibly result in over activity of parasympathetic system. Toxicity causes salivation, sweating, vomition, diarrhea, dyspnoea, miosis, reduce B. P. S.K.muscle fibrillation, twitching, clonic convulsion-later paralysis-death. Treat with Atropine and Oxime compounds.

11.Atropine sulphate:

An alkaloid present in *Atropa belladonna*- white crystalline powder- Rabbits liver contain atropine esterase hence can handle large dose of atropine without toxic effect unlike other species. Protect the effector cells from Acetyl choline- blocks Muscarinics receptors- very high dose blocks Nicotinic also. Competitively antagonize Acetyl choline- more action on heart and salivary glands- repeated dose may cause tolerance.

12.Toxicity of atropine :

Mad as a wet hen- mania, excitement, hallucination
Red as a beat- beetroot face,cutaneous vaso dilatation.
Dry as a bone- all secretions reduce, increase body temperature(not in dogs)
Blind as a bat – photophobia, mydriasis.
Treatment of over dose:If orally taken- Activated charcoal can be given to adsorb it.
Cholinergic drugs like Pilocarpine , Methacholine, Physostignmine.
Artificial respiration.

13.What are neuromodulator?

Substances regulating the activity of autonomic nervous system – affects the synthesis, storage, release, and action of neurotransmitters-act pre and post junctional-modulation involves slower process than neurotransmitter-operate through intra cellular messenger rather than directly on ligand gated channels. It originate from cellular and non synaptic sites yet influence the excitability of nerve cells. Substances such as Carbon dioxide and Ammonia arising from active neuroglia act as potential modulators through synaptic action.

14. Homotropic and Heterotropic neuromodulation?

When neurotransmitter regulates its own synthesis and release usually by interacting its pre-synaptic receptors it is called homotropic modulation Eg. NA on $\alpha_2$ receptor when a different neurotransmitter from adjacent nerve fiber or a neuro-modulator produced locally in tissue affect the synthesis and release of neurotransmitter from pre-junctional nerve this is called heterotropic .

..

15. "Dales reversal effect"

In Ergotamised animals when adrenaline is administered there will be a fall in BP instead of a rise ,this is called 'Dales reversal effect' In normal animals when adrenaline is injected it acts on $\alpha$ and $\beta$ receptors and there will be a rise in B.P. as an overall effect on these receptors. In ergotamised animals ergot will block the $\alpha$ receptors so only $\beta$ receptors will be stimulated by adrenalineand there will be a fall in B.P.

17.Differentiate Catecholamine and Non-catecholamines--

**Catecholamines**.

Two hydroxyl groups on position 3 and 4 on benzene
Mainly direct action
High affinity for alpha or beta receptors
Usually short half life
Metabolised mainly by COMT and MAO
Not effective orally
Can not crosses BBB
Mainly excreted as metabolites
Denervation –no loss of activity.

**Non catecholamines.**

Lack one or both hydroxyl group
Mainly indirect and mixed action
Moderate to poor affinity
Moderate to longer half life.
Resistant to COMT and poor substrate for MAO
Orally active
Easily traverse BBB
Substantial portion of drug is excreted unchanged in urine.
Denervation causes loss of activity.

18.Classify muscle relaxants.

Classified mainly in to two, peripherally and centrally acting.

I. Peripherally acting.
  1) Neuromuscular blocking drugs.
    a).Non depolarizing /Competitive N.M.Blocking
      i. Long acting-d-tubocurarine, Pancuronium.
      ii. Intermediary acting-Vecuronium, Atracuronium
      iii.Short acting-Mivacurium
    b)Depolarising /Non competitive N.M.blocking –Suxamethonium, decamethonium.
  2 )Directly acting drug- Dantrolene

II. Centrally acting.
  a) Carbamate derivatives-Methocarbamol
  b) Glyceryl ether-Guaiphenesin, Mephenesin
  c) Benzodiazepins-Diazepam, Chlordiazepoxide
  d) Gamma amino butyric acid derivatives-Baclofen

19.Uses of Para sympatho mimetics.

Horses-Colic caused by intestinal atony and tympani
Cattle-Ruminal atony, as a neuromuscular purgative
Elephant-In constipation
Cats –Urinary bladder atony
Parturition in multiparous animals, as insecticides, in Glaucoma, in myasthenia gravis, in urine retention.

Neuromediators: Substances that participate in the elicitation of post synaptic responce, fall under the c AMP, c GMP as second messenger at specific sites of synaptic transmission. Activation of cyclic nucleotide dependent protein phosphorylation reaction can alter properties of membrane proteins that are known to be substrates in this reaction.

**Explain in detail.(essays)**

1. Explain the actions of acetyl choline on different systems of body.
2. Explain the actions of adrenaline on different systems in the body.
3. Explain neuro muscular blocking agents as muscle relaxants.
4. Explain the steps in the synthesis of catecholamines from phenylalanine, with the help of structural formula.