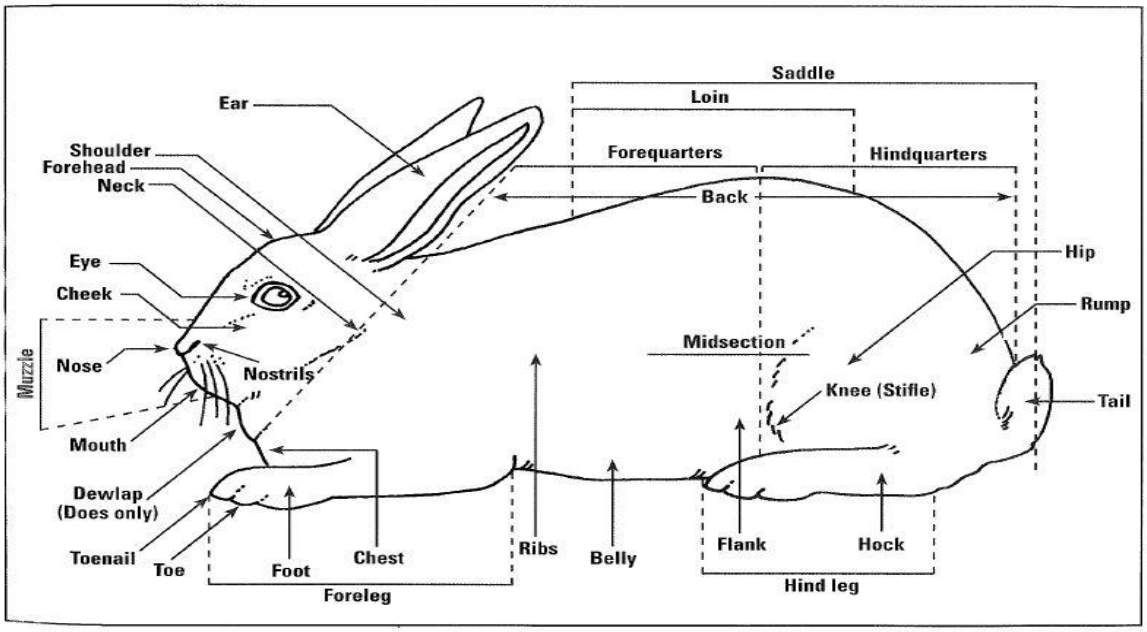
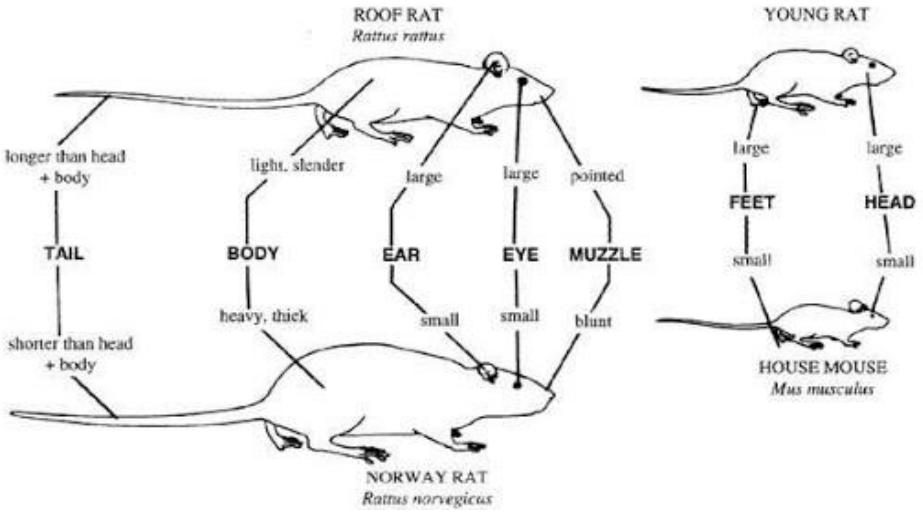
EXERCISE No. 1

Object: Body parts of lab animals



Body parts of Rabbit



Body Parts of Rat

EXERCISE NO: 2

Object: Breeds of Rabbit and other Lab Animals

There are about 35 breeds with 70 strains. The breeds of rabbit can be classified as :

1. Fancy breeds
2. Fur breeds
3. Meat breeds

Fancy Breeds	**Fur Breeds**	**Meat Breeds**
Angora (a) German (0.7-1 kg) (b)British (400-600g) (c) Russian (300-400g) (d) crossbred (5-600g)	Argenti	New Zealand White
Dutch	Baberum	Soviet Chinchilla
English	Blue Emperial	Grey giant and
Harlequin	Chifex	White giant
Lop	Chinchilla	
Netherland dwarf	Nubian	
Polish	Siberian	
Silver	New Zealand red	
Tam	Hawam	

EXERCISE NO. 3

Object – Biological data and different reproductive traits of laboratory and fur animals.

Trits	Rat	Mlce	Rabbit	Guinea pig	Dog	Cat
Zoological Name	Rattus novergicuss	Mus musculus	Orctolagus cunicules	Cavia porcellus	Canis familiaris	Felis domisticus
Chromosomes no	42	40	44	64	78	38
Birth Weight (gms)	4.5-6	1	30-100	75-100	60-500	110
Litter Size	5-16	5-12	7-10	4-5	5-12	3-4
Adult Male B.wt (gms)	300-800	30-40	2.5-3kg	900-1500	1-90kg	3.5-4.5kg
Adult Female B.wt. (gms)	250-400	30-40	2-3kg	700-1300	1-90kg	3.5-4.5kg
Maturity age (days)	70-84	36-48	180-210	72-90	180-365	180
Mating age (days)	80-100	48-60	180-210	72-120	1-1.5 years	270
Gestation period (days)	21	21	29-32	68-72	60-65	63
Male: Female Ratio	1:3	1:8	1;10	1:12	1:12	1:5
Estrus Cycle (Days)	4-6	4-5	Induced	13-20	After 6 months	15-28
Estrus Period (hrs)	12	12	----	1-6	6-13 days	3-6 days
Weaning age	21	21-28	28-36	14-21	36-48	-------

(days)						
Weaning Weight (gms)	25-55	8-12	100-150	160-230	------	700-800
Mammary gland (pair)	6	3-5	4	2-3	3-5	2-3
Body Temperature	37.5^0C	36.5^0C	38.5-39.5^0C	38-40^0C	100-104^0F	
Pulse/minute	120	120	130	120	75-100	
Respiration rate	110	110	30-60	42-104	15-40	

EXERCISE NO. 4

Object: Identification of lab animals

Identification in laboratory animal depends upon the type of animal and the purpose for which they are identified. There is no definite method, which can be used for identification of lab animals. Mostly the identification methods are of temporary in nature, except in rabbit. The common methods used for identification are

1. Tagging
2. Coloring agent
3. Branding
4. Tattooing

Rabbits are identified by tagging for this two types of tags are applied, one on the legs, second on the ears. On the legs tags are mainly applied on the hind leg just above the hock joint at the age of 8-9 weeks.

Rabbits are also identified by some colouring agent, most common colouring agents which are used for lab animals are

(i)	Gention violet	-	Violet colour
(ii)	Picric acid & alcohol	-	Yellow colour
(iii)	Trypan blue	-	Blue colour
(iv)	Methyl violet	-	Violet colour
(v)	Carbol fuchsin	-	Red colour

These colouring dyes are also used for rat, mice & guinea pig. When these coloured dyes are used for identification, then marking should be renew after 5-6 weeks because at this time colouring dye may disappear. The coloured lab animals can be identified by shaving the hairs of the body from the particular place and under such condition shaving should be repeated after 2-3 weeks because hair may get recover. The animal can also identify by some body patch of different colours.

The freeze branding may also be used some times.

Tattooing is used in guinea pigs. But the drawback of tattooing is that the colour of skin may change because of severe haemorrhage.

Observation: - Draw the diagram of different instruments used in identification of laboratory animals.

EXERCISE NO. 5

Object: - Handling of Lab animals

The handling of animals is required for examination, giving medicine shifting from the place to another, therefore it is essential that laboratory animals should be handle comfortably and without panic to the animals. There are different ways of handling for different species which are as follows.

Rabbits : Rabbit has tendency to attacking with front legs, Hence handler should be careful, There are 3 ways of handling of rabbit depending upon their body size and age of the animals.

Smaller size: They are handled, by grasping lion region with the help of thumb, index finger and middle finger. Rabbits are never handled with ears alone, because it will be painful.

Middle size: They are lifted by grasping the fold of skin over neck region along with both ears and for support other hand is placed below pelvic region.

Large size: Lifting is similar to that of the middle size, the only difference is that one which is place on the neck region is passed along the body to support the body and other hand is placed below the pelvic region.

Rats: The rats are lifted and handled by placing the palm over the body of the rat and grasp firmly around the neck forming a circle with the help of thumb and index finger. One of the front leg should be included in the circle and other front leg should be placed in between fore and middle finger, the other hand is placed below the pelvic region for support. The furious rat is firstly handle with the help of tail then rotate it repeatedly, after rotating few rounds place the rat on rough surface, this will prevent the movement of rat and rotation or rat will make little unconscious.

Mice : They are also handled by grasping the tail in similar fashion as that of rat. The newly born mice can be handled with the help of loose fold of the skin over neck region for releasing rate and mice first the front leg should touch the ground then they should be released. They should not be dropped from above the ground, otherwise it may cause injury.

Guinea pig : This species is very much docile but they can bite easily, while handling the guinea pigs there should be least disturbance because guinea pigs are most sensitive to the noise and disturbance. Handling is same as that of rate and mice.

Observation :- Draw the diagram of different methods of handling of laboratory animals.

EXERCISE NO. 6

Object: Housing system and space requirements for laboratory animals

Objectives:

1. To protect laboratory animals from extreme environmental condition.
2. To protect animals from predators and theft.
3. To save labour and time.

Experimental house should be properly maintained. To construct experimental house, selection of site construction material, type of infrastructures required should be kept in mind.

(i) Location

1. Experimental house should be at elevated area.
2. It should be away from the city and industrial area.
3. There should not be excessive noise and pollution.
4. Protected/Separated from industrial smoke and other pollution.
5. Experimental house should be near to main road.
6. Proper ventilation air and light should be available.

(ii) Construction materials

(1) Wall: It must be smooth and clean and made up of cement (Brick plastered with cement). Alternatively we can think of wood also. Which do not have any crevices.

(2) Roof: II should be made up of RCC/concrete.

(3) Floor: It must be non slippery made up of concrete or slabs.

(iii) Rooms required

1. No, of rooms depends upon number of species maintained, strength and duration.

2. The size of each animal room can be constructed for the number of experimental animals to be housed and space requirement for animal of each species.

4. The number and size of supporting rooms other than animal's room are governed by the unit to be operate as per requirement.

The following separate room should be included in order to facilitate normal care of animal.

(a) One or two rooms for each species.

(b) Isolation room

(c) Quarantine room

(d) Storage for bedding material and miscellaneous

(e) Office

(f) Cage washing room

(g) Toilet

(h) Feed store room

(iv) General construction guidelines

(1) Corridor should be at least 7 ft. wide to permit ease movement of equipment, supplies and persons.

(2) The door should open into room rather than in the corridor or door should be of sufficient size to permit passage of equipment such as cage-racks. Normally door which are 48" wide and 84" height are metal or metal covered doors which are preferably provided to prevent entrance of insects and vermin (Rodents).

(3) Door should be equipped with self closing devices.

(4) Exterior windows are not needed if adequate light and ventilation are provided.

(v) Environmental control

Adequate environmental control is essential to provide proper health and comfort of the animal.

1. **Temperature:** For most species temperature of 70-74°F is suitable and most of them should be housed satisfactorily at a temperature between 66-80°F. The fluctuation of temperature inside the house should not be more than 2 to 4°F irrespective of season.
2. **Air:** Exchange is necessary to provide fresh air. Exchange of air is required to remove moisture, odour, CO_2 and other contaminants. The recommended air exchange for all species is 10-15 complete changes/hour.
3. **Humidity:** Relative humidity for most species should be in the range of 40-60% preferably 45-55%.

Caging of laboratory animal

1. Cages should provide for easy observation of animal.
2. Designed which help to minimize air borne diseases is desirable. For this reason cages should have solid sides.
3. Feed and water devices may be attached to the cage or cage door or wall or they may part of cage construction.
4. The material used for prepation of cages should be easily available non corrosive, cheap and easily cleaned.

<u>Type of cages</u>

1. Shoe box/Solid floor cage

These have solid floor and closed from all four sides. The tops are made up of wire or perforated metal and usually constructed in a way to allow feed and water provided without lids being removed.

2. Wire cage/Grid floor cage

Cages which have wire or grid floor are designed to permit all excreta and waste feed to pass through into a collection unit below. These cages provide better sanitation and removal of excreta without moving animal. They also aid in the prevention of caprophagy.

Most animal cages aremaintained as batteries (cages kept one above the another) i.e. a large number of similar/identical cages on a stand. This is desirable for economical use of apace and for easy maintenance,

Mice:

* Cages size: 25cm L X 15cm W X 22,5cm H (10x6x6 inches)
* Capacity: 4 adult mice or 10-12 weaners.

Rat:

* Cage size: 40-45 cm L X 25-30 cm W X37.5 cm H, (16x10x15 inches)
* Capacity: 2 females + 1 male. Separate cage for pregnant female,

Guinea Pigs:

* Cage size : 3x1.5x1.5 feet with screen bottom and tray underneath the case. Capacity: 6-8 guinea pigs.

Rabbit:

* Cage size: 61 cm I. x 48 cm W x 46cm H.
* Single adult rabbit.
* Nursing does required double size.

Average floor space required for laboratory animals

*	Mice	-	39-99 sq. cm
*	Rat	-	100-200 sq. cm
*	G. pig	-	270-650 sq. cm

* Rabbit - 1.5-2 sq. feet

Formula for calculating floor space

$A = N (0.7w + 6\sqrt{w})\ cm^2$

$A = N (0.3w + 5\sqrt{w})\ inch^2$

Where A = space

W = weight of the animal

N = No. of animals

EXERCISE No. 7

Object: Feeding of Rabbits

Rabbits are herbivores, simple stomach and require regular supply of fresh feed. They can be raised, reared on roughage, concentrate, and peleted feed. Digestion is similar to Monogastric animal but they have habit of caprophagy.

Concentrates: Cereal grains and their by product, various cakes, mineral and

Vitamins are consumed by the rabbit.

Roughages: Roughages utilized by rabbits are Barseem, Lucerne, maize, Jowar are offered in hay racks. Various root crops, turnip, sweat potato; radish, tree leaves and leaves of cauliflower are also consumed by the rabbit.

Pellet feed: Size of pellet should be 10-12 mm in length and 3-4 mm in diameter. The advantages of these feeds are.

1. It reduces the spoilage of feed.
2. It is easily to handle and store.
3. They have proper ingredient to meet out the requirements.

Feeding habit of rabbits

- Rabbit require about 8-9% DM and this dry matter should be given through 60% of the roughage and 40% of concentrate.
- Rabbit should be given fresh and regular feed. Change in diet should be gradual, otherwise animal will suffer from indigestion or will be off fed.

- Rabbit diet should have 20% crude fiber which keep the digestive system proper, If the diet is deficient in Methonin, an essential amino acid may form hair ball in their stomach.

Observation: - Write the CP and ME/TDN value of different feeds ingredient used in feeding of laboratory animals.

Ingredients	C.P.	ME/TDN

- Rabbit needs various vitamins like B-complex, vit-C which are soluble in water and fat soluble like- A, D, E & K.
- Requirement of vit C & B complex can be meet out by caprophagy & A,D,E & K can be meet out through feeding of leguminous roughages or hay.
- Rabbit should be provide mineral mixture in their diet to avoid various deficiencies diseases related to minerals.
- There should be regular and clean supply of water.
- Requirement of water depends on the status of animal and type of feed offered.
- Average requirement of water is 500 ml to 2 tit/day.
- Rabbit consumed feed by nibbling.

Nutrient Requirement of different category of animals

S. No	Nutrients	Grower	Adult	Pregnant	Lactating
1	CP%	16	14	16	18
2	TDN	60	55	60	70
3	Crude fibre %	14	16	14	12
4	Fat %	2.5	2	2.5	2.5
5	DE K cal/kg	2400	2200	2400	2500
6	Lysine %	0.7	0.5	0.8	0.8
7	Methionin %	0.6	0.8	0.6	0.6
8	Calcium	0.6	0-4	0.8	1.1
9	Phosphorus	0.4	0.3	0.5	0.8

Common composition of concentrate mix

	Ingredients	Part
1- Pregnant & lactating	Maize	15
	Oat/Barley	15
	Soybean/Gram	10
	Wheat bran	3.5
	Mineral mix	1
	GNC	15
	Leguminous hay	40

2- Adult Animal	Maize	20
	Oat/Barley	20
	Gram/Soyabean	10
	GNC	5
	Min. mix.	0.5
	Leguminous hay	45

Caprophagy :- Caprophagy starts at the age of 3-4 weeks when rabbit starts consuming solid food along with dam's milk.

There are two type of feces in rabbit.

1- Soft feces.

2- Hard feces.

Hard feces is excreted during day time, while soft feces is excreted during night hrs or early in the morning. These feces are rich in protein and vitamin mainly B. Complex group and undigested food particles.

When rabbit ingest these feces it provide nutrients and also helps in proper digestion of undigested food, which are not digested when they are in colon.

Observation :- Write the feeding schedule and feed ingredient used in feeding of laboratory animals in your college.

Composition of feces

S. No	Ingredient	Soft	Hard
1	DM	55.3	82.5
2	Fat	1.3	1.4
3	CP	39.7	20.3
4	Cf	26.4	47.4
5	NfE	24.9	24.7
6	Ash	7.7	6.2

EXERICISE NO. 8

Object: Feeding and watering utensil used in lab animals

1. Feeding equipments: There are 3 types of feeding equipments, which are used in lab animals.

(i) Open utensils

(ii) Hoppers

(iv) Hay rack

(i) **Open utensils:** These are made up of iron, tin or galvanized or earthen pot. To prevent tilting or turning of bowl, these bowls can be fixed with the help of clamp, in the cages. These are easy to fill but the main drawback with this type of utensil is more spoilage of feed either by screeching by lab animal or some times lab animal urinate and defecate in this bowl.

(ii) **Hopper :** Made up of tin or galvanised sheet, they are attached with cage in such a way that the feed can be filled from outside without opening the cage.

(iii) **Hay rack :** They are mainly used for rabbit and they are also attached out side of the cage so that the rabbit can consume fresh quality of hay all the time.

2. Drinkers/Waterier: There are three types of watering utensils commonly used for laboratory animals .

(a) Open bowl

(b) inverted water bottles

(c) Automatic watering system.

(a) Open bowl: It is similar to that of feeders.

(b) Inverted water bottles: These are used mainly for smaller unit of mouse or rat, in this inverted bottle of plastic or glass, is fixed in cage in inverted position with the help of clamp. Mouth of bottle is fitted with narrow curved tube and is suspended in the cage. This tube may curved or bend because of narrow diameter of tube, the water will not pass or flow from this tube until there is suction by the animals.

Advantage: More hygienic than open bowl.

Disadvantage: It is laborious for refilling as compare to open bowl.

(C) Automatic watering system:

This system is used for larger unit of lab animals. In this system the nipples are attached with main pipe line, which is fixed in cages at convenient height, so that the lab animal can suck or drink the water themselves.

Advantage :-

- This will save the labour for filling of water.

- No contamination of water.

Disadvantage:

- Water consumption of individual animal can not be controlled.

- There will be no proper care or contact of stuff with the animal which is important to monitor the health status of animal.

- If there is leakage in nipple thin this may lead to dampness in the cage.

EXERCISE No. 9

Object: Breeding method used in lab animals.

There are two Breeding methods which can be used in laboratory animals.

1. **Permanent Method:** In this the male & female are allow to live together and the female litter down in the presence of male and other members of group.

2. **Temporary Method:** In this the male and female live together till the parturition but the females are separated from the group before the parturition. Permanent method are again classified into 2 types.

   (i) Monogamy : One male and one female are housed together.

   (ii) Polygamy: One mate or more male is housed together with several females.

   Temporary method are again divided in two groups.

   (i) Harem method: Male and female are run together but separate prior to parturition.

   (ii) Hand mating method: Male and female are left together for sufficient time till parturition is taken place.

Different method used in different laboratory animals are given below

Mouse : Only permanent i.e. monogamy and polygamy is used.

Rat : Monogamy and Harem system.

Guinea Pigs : Polygamy and Harem system.

Rabbit : Only hand mating.

Cat : Harem and hand mating.

Dog : Hand mating.

EXERCISE No. 10

Object: Pregnancy diagnosis in laboratory animal.

The pregnancy diagnosis in laboratory animals is not easy job it required skill and experience. The best method is through abdominal palpation. The shape and size of embryos in different animals are given under.

Rabbit: Pregnancy diagnosis can be done by palpation after 2 weeks of mating. For palpation place one hand below the abdomen in front of hind limb and palpate the embryos gently. On palpation, they will resemble like marble shape object of 2 cm in diameter. At the time of palpation, the female should be in relax position otherwise it will be difficult to differentiate between embryos and internal organ. Avg. gestation period is 29 - 32 days.

Mouse: On 10th day of mating the embryo will resemble like string tied with knots. On 14th day this knot become bigger in size and resemble like pea seed . Between 15 to 16 days there is enlargement of the abdomen because during this stage there is maximum development of foetus. On 19th day the movement of foetus can be observed from outside. Avg. gestation period 19 -21 days.

Rat: On 15th day foetus resemble like pearl like string. Body weight of rat starts increasing after 17th day of pregnancy. Avg. gestation period 21 days.

Guinea Pig: By palpation embryos can be identify after 3 week of mating and the foetus resembles like pebbles. At the end of pregnancy, there is increase in 100% body weight of female. Avg. gestation period 68 -72 days.

Dog: After 21-28 days of pregnancy, on palpation the foetus will resemble a small swelling of 2 cm diameter. Between 30-45 days, the pregnancy diagnosis by palpation is difficult because there is increase in amniotic fluid in comparison to size of foetus. After 45 days the pregnancy can again be diagnosed by palpation. Avg. gestation period 60 - 65 days.

EXERCISE NO: 11

EXERCISE NO: 12

IMPORTANT RECOGNIZED BREEDS OF DOGS, CATS AND PET BIRDS

1. Affenpinscher	Endowed with seriousness, intensity and humor and appearing like a cartoon it is nicknamed the 'monkey dog'. It was once an efficient rabbit tracker. The not responding well to obedience training it is a good companion animal. The body weight is about 3kg and height 25-30cm.	
	Sophistication, beauty, grace, elegance and dignified appearance are the hallmark of the very fashionable dog in the western world. In native Afghanistan, it is still used for guarding sheep and goat flocks and to hunt the lurking wolves. The thick long coat protects the animal from extreme cold. The show dog mu st be groomed well every day. In view of the in nate independent predisposition, it requires to undergo a carefully planned training schedule. The Afghan weighs around 25 kg, and is 65-75 cm tall.	
2. Australian Cattle Dog	This was originally bred from the bloodlines of the Bob tail, Blue-Merle Collie and Dingo for cattle ranching by the pioneer. The emphasis was on sturdiness and ability to ward off predators. The body weight is 16-20kg and height 45-50cm.	
3. Australian Kelpie	Australia's most popular working dog Kelpie is a robust, tireless, and lively dog, bred specifically for livestock herding and not suited to urban homes. The body weight is 16-20kg and height 45-50cm.	

4. Australian Terrier	This breed was evolved by crossing different English Terriers for curbing the rodent menace in the farms, but is now adapted for use as a companion dog. The average weight is only 5 kg and height 25 cm.	
5. Basenji Hound	Originating in France, this heavy, long low set dog has pendulous ears like the bloodhound. Originally a hunter it now serves as a companion and very friendly to the children. The coat is tri-coloured or lemon and white. They weigh 20-25 kg and are about 37 cm in height.	
6. Beagle	Originating in England, the Beagle is a scent-tracker hound, presently it is a very affectionate popular companion dog. It weighs 8-14 kg and is about 33-40 cm tall.	
7. Bearded Collie	This high spirited but friendly livestock farm dog needs constant personal attention. It is not suited persons who cannot spare time and energy. The surface coat with long hair requires regular grooming. The body weight is 20-25 kg and height, 50-55 cm.	
8. Bernese Mountain Dog	Originating from Berne Switzerland, it is large working dog trained for herding livestock and pull carts. Though bred for increased size with inborn guarding ability, it is very affectionate. The body weight is 40-44 kg and height 60-70 cm.	

9. Blood Hound	An ancient scent-hunting tracker with an exceptionally loud voice, bred in Belgium for use in hunting game and to trace out criminals and lost children. Though not easy to train, it is affectionate. The body weight is 36-50kg and height 60-70 cm.	
10. Border Collie	This is the most popular working sheep dog in the United Kingdom and Ireland. It does not adapt well in the urban homes because of the strong predatory instinct, constant stimulation to work is needed. It weighs 14-22 kg and is 46-54 cm tall.	
11. Border Terrier	This is a typical Terrier dog, leggy enough for contact with the riders on horseback and small enough to hunt down the fox in hillside caves. The thick and durable surface coat is designed by nature to protect from the cold climate. Full of stamina and vigour it is friendly and ideal family dog. It weighs 5-7 kg and is 25- 28 cm tall.	
12. Boston Terrier	This is an agile, good looking, well-mannered ideal companion dog It was evolved by crossing several other renowned breeds. The body weight ranges widely from 4.5-11 kg and height from 38-48 cm. The large head size may require caesarian delivery, occasionally. The well-planned genetic manipulation was largely successful.	

14. Boxer	German origin, one of the most popular breeds, Boxer maintains the puppy like amiable behavioural profile throughout life along with fast reaction time. It is very friendly with the children. However, the muscular build and awesome appearance are the hallmark of an excellent guard dog. It has bears a dark mask in the muzzle area and is traditionally docked. It weighs 25-32 kg and is 53-63 cm tall.	
15. Bulldog	The Bulldog was evolved in the United Kingdom for bull-fighting. However, following the legal bane, it was genetically modified by Bill George. Now it is used purely for the show-ring and is a good companion. The phenotypic traits also changed during this transformation along with health issues like respiratory disorders. The body weight is 23-25 kg and height 31-36 cm.	
16. Bull Mastiff	With inheritance from English Mastiff (60%) and Bull Dog (40%) bloodlines it combines a handsome powerful appearance with speed, strength and endurance. But its stubborn nature and resistance to obedience training have greatly restricted its popular acceptance. The body weight is 40-60 kg and height 64-69 cm.	

17. Bull Terrier	The bull dog's strength, combined with the tenacity the Terrier created Bull Terrier - the ultimate fighting dog. It is a good companion animal, but the chance bite wound is to be nasty. Genetic disorders like chronic cutaneous inflammation are also frequently encountered. The coat color is white, fawn, red, tri-coloured, or black. The body weight is 24-28 kg and height 53-5 cm.	
18. Bulli	A native Indian breed, Bulli is also sometimes referred to as Indian Mastiff because of the overall similar appearance. The traits are not defined in-depth.	
19. Chow Chow	In the past, throughout Mongolia and Manchuria in Central Asia, the meat of Chow Chow was considered a delicacy, and its skin an ideal fur for clothing. The overstuffed teddy bear like appearance and black tongue are the hallmark of this breed. The thick coat appearing as cream, white, fawn, red, blue or black needs constant grooming. The body weight is 22-32 kg and height 46-56 cm.	
20. Cocker Spaniel	Originally used as a retriever of small game like wild birds from the dense undergrowth, it is now mainly a companion dog. The ears are strikingly pendulous. It weighs 13-15 kg and 38-41 cm in height.	

21. Collie	The elegant looks made Collie very popular among the English gentry in the Victorian era. Originally a herding dog, it is now raised mainly for the show-ring, excellent companion easy to train, safe with the children. It is also a reliable watch dog. The coat needs to be groomed daily. The body weight is 18-30 kg and height 51-61 cm.	
22. Dachshund	German origin, the Dachshund is distinguished for its low set long body conformation. It was originally used for hunting small game. The show-standard dog the working dog has deep chest and short legs. Three distinct varieties, namely smooth haired, long haired and wire haired are recognized. Coat colour is black/ tan, red, brown and chocolate.	
23. Dalmatian	Though Dalmatia on the Adriatic coast in Europe is stated to be the home, there is evidence that it had actually originated in India and taken to Greece by ancient traders on board the sailing ships. It was primarily used as a pack hunter, retriever and show dog in circus. It was also used to guide horse-drawn carriages in the populated areas in Europe and the USA before the advent of motor cars. Now it serves as a dependable companion dog. Striking black spots in the white coat are a characteristic feature of this breed. The body weight is 23-25 kg and height 50-61 cm.	
24 Dobermann Pinscher	It was developed by a German tax collector Louis Dobermann through cross breeding of several bloodlines including Pinscher, Grey Hound and Terrier. This is very popular all over the world as an obedient, alert, intelligent companion/ service dog. The coat may be black and tan or brown. It weighs 30-40 kg and	

	stands 65-69 cm tall.	
24. English Setter	This graceful, elegant, quiet and easy to train breed is a very good companion to the children. It needs regular exercise. The coat is black/ white, lemon white, Pink/ whiteor tri-coloured. The body weight is 25-30 kg and height 61-69 cm.	
25. Fox Terrier	Once a classic working dog, this smooth coated breed now largely serves as a good companion dog. Sometimes it tends to be strong-willed and even obstinate. Very active and agile, it enjoys exercising outdoors. The body coat may be white/black, white/tan or black/tan. It weighs 7-8 kg and is about 39 cm tall.	
26. German Shepherd	The name is derived from its native place Alsace in Germany. Well-bred German Shepherd is an excellent, calm, dependable, responsive, obedient companion dog. Primarily raised as sheep dog, it came to be used all over the world for security, guarding, and companionship, epitomizing loyalty and faithfulness to its master. The body weight is 30kg and height about 65 cm.	

27. Golden Retriever	In United Kingdom, this breed was developed by carefully planned inter-crossing of the Flat Coated Retriever, Irish Setter and select varieties of Spaniel. It is very attractive, obedient and intelligent dog, very popular in the show-ring. All shades of gold and cream are accepted, but not red.	
28. Himalayan Sheepdog	This ancient breed had spread out from northern India across Central Asia into Europe. It is a muscular, robust and efficient guard dog. Still in use as herder, it is also a companion dog. The surface coat exhibits varying colour patterns. It weight 23-41 kg and is 51-60 cm in height.	
29. Indian Spitz	Closely resembling the more popular Pomeranian, the identity of Spitz may be easily mistaken. This breed is elegant in the show ring when well-trained. Often white in colour, it may also appear as brown and black.	
30. Miniature Pinscher	It is a good companion dog resembling a tiny Doberman. It is extra-ordinarily brave and may challenge a dog 10 times its own size. Contemporary slim appearance is the result of careful selective breeding. The body coat is red, chocolate, blue tan/ black, weight 4-5 kg and height 25-30 cm.	

31.New Foundland	Originally used as helper dogs by the marine fishermen, trained teams of this breed assist the border security personnel in France in sea rescue and other emergency services. Advantage is taken from the loyal friends inborn instinct of rescuing people from water, a shining example of benevolent human-animal inter-relation. Nature has bestowed webbed toes to assist them in swimming. The large body coat is brown or black in colour, weight 50-68 kg, and height 66-71 cm.	
31. Pekingese	Its origin is traced to the Chinese royal courts, designer-bred for bowed legs, double coat to conceal them and a ruff of fur around the neck to give an aura of dignity! It is a pleasing companion. The body weight is 3-6 kg, height 15- 23 cm.	
32. Pointer	The Pointer was especially bred to stand and point at the hare on the run to the accompanying pack of dogs, enabling them to chase and seize the prey in the wild undergrowth. It is very friendly and a good tempered companion dog. The body coat is lemon/ white, orange/white, or black/white, weight 20-30 kg and height, 61-69 cm.	

33. Pomeranian	Queen Victoria's patronage and reduced size through selective breeding made the Pomeranian very popular among celebrities and the common people. Barking non-stop, It is an excellent watch dog and a good companion in the households. Regular grooming is needed. The coat displays a variety of colours. The body weight is 2-3 kg and height 22-28 cm.	
34. Poodle	Poodle was the most preferred fashionable dog 50 years ago. The Toy and Miniature varieties Medium 15-19 kg and 34-38 cm; Miniature, 12-14 kg, 28-38 cm; Toy 6.5-7.5 kg, 25-28 cm.	
37. Pug	Once the faithful companion of the Buddhist monks in Asia, it was taken to Holland for the comfort of European aristocrats. Though tough and independent they adapt well to become affectionate family friends. Miniaturized from Mastiff, this breed is characterized by muscular compact body, flat surface and un blinking stare. Some individuals may suffer from respiratory problems and skin disorders. The body coat is silver, apricot/fawn, or black in colour, weight 6-8 kg, height 25-28 cm. were more popular, compared to the Standard/ Medium. The coat is trimmed only for show purposes; lion cut being the most popular. Regular grooming is essential.	

38. Rottweiller	A descendent of the ancient European boar hunters with a powerful impressive body, it takes its name from the village of Rottweil in Germany. It is now an excellent family companion and guard dog. The temperamental issues have been successfully resolved through meticulously designed breeding. It is now given a wide variety of assignments including policing. It weighs 41-50 kg and is 58-69 cm in height.	
39. Samoyed	In the Arcitic region, this breed was originally used for guarding Reindeer herds from the predators like polar beer. It is a friendly pet dog, well adapted to cold climatic conditions. However, it needs regular grooming to keep its luxurious coat in good shape. It weighs 23-30 kg and is 46-56 cm in height.	
40. Schnauzer	Originally a livestock tending breed, this is now primarily used as a companion dog. It is also assigned policing work in Germany, learning obedience easily. The coarse surface coat is trimmed regularly to permit the chin hair to impart a distinctive appearance. The colour profile is pepper/ salt or full black. The body weight is 14-15 kg and height 45-50 cm.	
41. Saint Bernard	This muscular giant breed was patronized by the inmates of an ancient Christian Monastery in Switzerland for hauling ability in snow-bound Alpine trails. It needs plenty of space and food. The body weight is 50-90 kg and height 60-70 cm.	

RECOGNIZED BREEDS OF CAT

1. Abyssinian	This is an affectionate inquisitive cat, very much attached to the adopting human family. Interestingly, they insist on being included in all the house-hold activities as a matter of right.	
2. Australian Mist	They are extremely affectionate and people oriented, always preferring to keep on getting involved in all family activities. Their balanced temperament makes them excellent pets even for the young children.	
3. Bengal Cat	These lively cats like to play, run around and leap sometimes prone to be mischievous. They are great climbers and jumpers, demanding much attention. They always keep the family entertained with their antics.	
4. Birman Cat	They are affectionate, intelligent and playful pets. Males especially often tend to be very talkative. They are otherwise very ploacid and loyal to their owners.	
5. Bombat Cat	They are highly extrovert, friendly and playful. Easily leash trained, they like to retrieve objects. Agile and athletic, their antics are enjoyable of friendly disposition, they get on very well with the children as well as family dogs	

6. British Shorthair Cat	They are placid, non-demanding, tolerant, docile and obedient. They are quiet and can be left alone without fretting. Homely by disposition, they love children and get along well with dogs.	
7. Burmese Cat	It is of very friendly, inquisitive and outgoing loving nature. It is alert, inquisitive, gregarious and upfront. Simply, it cannot be ignored. They behave more like dogs than cats.	
8. Burmilla Cat	It is outgoing, friendly and amiable cat. They have great with the children. Combined with low maintenance cost and wonderful temperament, they are an ideal family cat.	
9. Chinchila cat	They are very placid, quiet, affectionate and happy simply to lie around the home at will. Being decorative, they enjoy being noticed. They become very attached to the owners.	
10. Egyptian Mau	They like to hang around the owner's family; some cling to one particular individual, while others will take on the entire household. This bond lasts lifelong and the feline member would like to participate in all activities, whether wanted or otherwise.	

11. Himalayan Cat	Combining the striking appearance with a wonderful outgoing amiable personality, Himalayan cats are extremely affectionate, playful and intimate with the family.	
12. Persian cat	They are usually calm and quiet, gentle, undemanding and affectionate. They are very placid and unlikely to scratch anyone because of their serene nature they are in harmony with other pets. They are also very friendly with the children. They love to receive attention, stroked and patted.	

COMMON PET BIRDS

1. African Grey Parrot	This is really the gem in the world of parrots, but can be a bit nervous, awkward and eccentric. Their intelligence level is virtually as/ with a child of 5 or 6 years age. By the same token, they are susceptible to a variety of behavioural problems. This is not adept in memorizing tutored stuff, but can frame sentences, and semm to understand these.	
2. Macaw and Cockatoo	These are very smart birds. The intelligence level is variable. Macaws are very affectionate, but may be sometimes too demanding. Cockatoos are amazingly dexterous and curious, enjoying to dissemble things like their cage. These birds are very loud, demanding, social and gifted with a long life span of 50 to 70 years.	

3. Budgerigar (Budgy)	These common pet birds are in fact tiny parrots and are just as clever, great talkers and very inquisitive. They love music and are very likely to express their rejoicing, breaking out in dance.	
4. Lovebirds	These smaller parrots also excel in talking and display great problem solving capability. They love figuring things out. As the name suggests these little creatures do no relish left alone. They need constant companionship.	
5. Canaries	Each variety of these pet birds displays its own set of talents and behavioural profiles. Male canaries are highly acclaimed for their pleasing song. Females for their cuteness and fun-filled chirping. They are all hilarious creatures, very adorable.	

EXERCISE NO: 13

HANDLING AND RESTRAINT OF DOGS CATS AND PET

Communication

Any dog or cat exhibiting a potentially aggressive behavior should display a prominent caution sign posted to alert others including the staff/ helpers at the Clinic who may be required to handle the same animal. Specific recommendations should be posted with the sign and also in the medical records.

Restraint or control of the animal

The working principle is that one must avoid too much restraint to avoid unnecessary stress and agitate the animal. It should be borne in mind that every animal and every situation is different. So you must ensure effective control using as little restraint as necessary. A few useful tips:

1. Before attempting to restrain take a moment to permit the animal to become comfortable with you.
2. Crouch down to be on a level with the animal, but never sit down on the ground to ensure freedom to move away if so needed.
3. Avoid direct eye contact but at the same time maintain safe visual contact with the animal.
4. Always talk in a soothing tone, avoiding high pitched or excited talking.
5. Try patting your leg gently on the floor, motioning the animal towards you.

Types of Animal Restraints

1. **Verbal restraint**: Common words of command used in kennels or homes, such as COME, STAY, SIT, DOWN, NO may be useful to induce a dog to cooperate during handling. Soft soothing tones will calm down a frightened animal. Scrupulously avoid yelling or screaming which can cause the animal to become more fearful or aggressive.

2. **Physical restraint**: **Tools and Appliances**

Proper restraint of the pet animal is essential for the physical examination, administration of anesthesia or treatment in the clinic. Knowledge of the appliances is therefore necessary.

Leash: This is the most common tool used in handling animals in the clinic, placed around the animal's neck. Never try to drag the animal with the leash to avoid strangulation. If the leashed animal starts to struggle, pull away or jerk, pause and let the dog calm down and try again after reassuring. In case the animal refuses to cooperate, arrange to carry, applying muzzle if deemed necessary. While handling cats, a slip leash should be used as a back-up if the animal gets frightened and resists restraint. Improvised figure-eight harness with the looser loop applied properly around the chest behind the front legs, and the other loop around the neck will be very secure and effective.

Every animal being handled in the clinic must wear a slip-lead, as a thumb rule**.** This includes dogs, puppies, cats and even sedated animals. A frightened animal always attempts to get loose and run away. Animals presented in the clinic on leash/ collars should be transferred to slip-leads as stop gap arrangement.

Hand: Hands can be used as very effective versatile tool to gently stroke a dog patient or to firmly a grasp a struggling cat while adjusting the quantum of pressure required. However, hands and fingers are also most vulnerable to injury. So one has to be very cautious while handling patients with hands.

Towel: A clean towel or small blanket is very useful tool for restraining cats and small dogs with reduction in the animal's arousal upon covering the head and body, besides protecting the handler from injuries from the sharp claws.

Control pole: This device is employed judiciously for the safe handling of only extremely aggressive dogs while taking care to avert serious injury to the animal. This should always be done under the supervision of an experienced clinician who will also evaluate the chemical restraint option, as a viable alternative.

Net: The net is the primary tool for restraining highly irritable cat or wildlife for safe handling and transport. Effective use is possible only after training and practice under proper supervision.

Muzzle: A nylon or plastic muzzle is used for handling a freaky or potentially aggressive dog. It is important to use a proven product and apply the same securely to prevent the chances of accidental bite. Further, proper handling is even of the muzzle animal is highly recommended for added safety. Specially designed muzzle for cat extends up to cover the eyes to minimize the visual contact stimulation, and has proved highly effective.

Sedation protocol: Occasionally, for highly aggressive or stressed animal undergoing emergency surgical treatment, prompt sedation and/or general anesthesia may become unavoidable under advisory of the attending clinician.

Routine handling and care of dog

Grooming: This is certainly the most important part of the dog's fitness maintenance protocol. It is the common practice of the owners to opt professional grooming. However, it is a good idea to handle the systematized routine bathing and grooming duties at home during a suitable time slot, preferably during the quiet morning hours in a well-drained secure bathing-grooming area.

Step 1. Assemble the necessary grooming equipments and supplies in a dry spot. These include the grooming brush and comb, nail clippers, Neem seed oil, body surface powder and ear cleaner. Also add pet shampoo and bath towels for uninterrupted bathing-cum-grooming sessions, well tuned to the animal's attention span.

Step 2. Secure the dog properly for the grooming sessions with a grooming lead (in lplace of the neck collar) in a suitable tub. Small dogs can be bathed in the sink or in rubber bins. It will be better to place a rubber mat below the animal's feet. Keep a muzzle handy for use if needed.

Step 3. Hold the dog securely and examine the ears for any signs of inflammation like redness or irritation. Clean the dog's ears very carefully trickling a few drops of Neem seed oil or other suitable ear cleaning solution into the ear canal, while gently massaging

the base of the ear. Any debris or discharge may be removed with some sterile cotton balls, soaked in clean water.

Step 4. Trim the toenails with a pair of high quality dog nail clippers and some antiseptic powder. Gently take each paw one by one and push on the nail pad to extend the nail. Gently snip off a small portion of the nail tip at a 45^0 angle, taking care to avoid bleeding especially with dark nails. Stop any accidental capillary bleeding by pressing with thrombophob swabs. Dewclaws on the side of the feet, if present, should also be trimmed.

Step 5. Brush the surface coat regularly to remove any debris and mats of shed hair and improve the cutaneous blood circulation. Gently brush down to the skin while keeping an eye for any cuts, scrapes and ecto-parasites like ticks, mites and flea. If the dog exhibits an undercoat and top coat, brush both layers carefully. Any mats seen behind the dog's ears or on the legs should be removed with a slicker brush containing short, slanted metal bristles. No attempt should be made to drag the mat to remove it inflicts pain to the animal while most often the purpose is not served.

Step 6. Bathe the dog thoroughly by running warm water over top of the head, back and whole body. Apply shampoo to his back down to the tail, and also top of the head, gently massaging the entire body surface, barring the front portion of head. Then rinse the surface coat taking care to cover the eyes and nose while working on top of the head and the face, in succession. The rest of the body is rinsed from the top down.

Step 7. Dry the dog completely, patting the coat gently with bath towels to avoid tangling of hair. Use a hair dryer at low speed over short periods, sparing the face.

Fig. Different equipments and techniques used in restraining dogs and cats.

EXERCISE NO: 11

BREEDING MANAGEMENT OF FEMALE DOGS

1. Breeding

The estrous cycle in the female dog comprises four different phases, namely proestrus, estrus, diestrus and metestrus in sequence. Proestrus, the initial phase (lasting on an average 9 days) is associated with a blood tinged vaginal discharge of uterine origin and moderately enlarged turgid vulva with changes in the vaginal cytology smears, culminating by the appearance of cornified ('superficial' and 'anuclear') cells coinciding with the corresponding increase in the blood estrogen titre.

During estrus (Av. 9 days), the female becomes sexually receptive during the transition from the estrogenic to progestational phase enabling breeding. Ovulation is triggered by the surge in the release of leutinizing hormone, LH (2-3 mg/ml serum) from the pituitary gland in the brain leading to the release of initially immature (infertile), followed by mature (fertile) oocysts. This day is termed the 'day zero' by the dog breeders. The female is most fertile and can be bred with good conception rate from 2 to 7 days after the day zero. Primiparous female dogs must undergo detailed gyneocological examination prior to breeding to ascertain the general health condition and to rule out problems like vaginal stricture and malformed nipples before permitting mating with the stud dog. Screening test for *Brucella canis* is advised annually for the stud dog and before each breeding season for the female.

Following estrus and breeding the female enters diestrus becoming refractory to refractory to mating. The abrupt change in the vaginal smear cytology is marked by the reemergence of non-cornified parabasal epithelial cells. This phase lasts 2-3 months. Whelping occurs 56-58 days after the onset of diestrus, as determined by the vaginal smear cytology procedure 64-66 days post-LH surge. Occasional female dog that fails to conceive may exhibit the phenomenon of pseudo-pregnancy.

Following diestrus female dog enters anestrus, characterized by the total absence of any reproductive activity. During anestrus, the uterine mucosa undergoes repair and recovery. The inter-estrus period encompasses on an average 7 months (range 4 ½ -10 months). The vaginal discharge is scanty, and the vulva retracts to the original size with

the abatement of edema. Vaginal cytology reveals small parabasal cells, occasional white blood cells and small number of mixed bacteria representing the normal flora.

Table: Recommended feeding schedule for pregnant female dogs

Food ingredients (g/day)				
Body weight (kg)	**Cereals**	**Meat**	**Milk**	**Greens/Fruits**
5.0	100	50	100	100
7.5	150	50	100	100
10.0	200	100	100	150
12.5	250	100	100	150
15.0	250	100	100	200
20.0	350	100	100	200
25.0	450	150	-	200
30.0	550	150	-	200
40.0	600	150	-	250
50.0	700	200	-	250
60.0 or more	800	200	-	250

Note: 1. Vitamin-mineral supplementation will be highly beneficial.
2. Suitable salt combination may be given to control pregnancy nausea, if needed.

EXERCISE NO: 13

PREPARING DOGS FOR THE SHOW EVENTS

It is universally accepted that the intrinsic value of the individual dog in the purity of breed, optimized health status, clean coat and high level of intelligence and excellent behavioral profile conforming to the recognized pure breed. In-depth knowledge is essential to prepare the dog for the show.

Registration of the dog

The dog must be registered with the Kennel Club of India (KCI) as per their detailed rules, norms and procedures for any KCI approved dog show.

Preparation of dog for show

The dog must be neat, clean and trim. It should be in good general body condition and state of health. The body weight must be consistent with the scales laid down for the particular breed, gender and age group. The body coat needs special attention. For breeds possessing hard coat, the last bath should be given two or three days preceding the show. A light apparel may be provided to prevent the surface coat from getting dirty. In the other breeds, a bath may be given in the evening before the show. During trimming only the operator's finger and thumb should be used, pulling the hair in the direction of the layout of the coat, making conscious efforts to pluck evenly to avoid ungainly bald patches. This technique ensures removal of only dead hair, and greatly enhances the smart appearance. The fingers may be rubbed with household talcum powder. The dog should not be trimmed too closely. The primary objective of trimming and grooming is to accentuate the desirable features of the dog's body configuration and bring to lime light the surface outlines.

Veterinary examination at the site

Clinical examination of the dog is conducted by qualified and experienced veterinarians to rule out any infectious disease or infestation of ectoparasite. Dogs with skin ailments like dermatitis, ectoparasite like ticks, fever, GIT involvement, etc. are refused entry. The participants should be encouraged to reach the venue early to

prevent overcrowding, and give a bath with antiseptic soap on returning home after the show.

Preparing the dog for presentation in the ring

The dog should be taught regularly to walk in a wide circle and stand in a vantage position to draw the on-lookers attention. A lead of nearly 90 cm should be used and held loose enough to maintain adequate control of the animal. The best time for training sessions is just before the principal meal. The trainer may offer tidbits like dog biscuits to reward his ward for good behavior. The dog should never be handled by strangers to avoid nervousness. Help form only persons known to the pet must be taken for assistance in handling.

The exhibitor must act tactfully and concentrate his/her attention only on the judge and the pet dog. While the judge is examining, and during the parade the dog must be kept absolutely under command and control ‘on toes’, but thereafter the exhibitor should permit the dog to be at ease.

EXERCISE NO: 15

CARE AND MANAGEMENT OF DOGS

Puppy needs special nutrition with the right amounts of quality proteins, fats, minerals and vitamins and plenty of clean fresh water. Start grooming the body coat at an early age and care of the teeth by starting brushing is also strongly recommended: periodontal disease is the number one health problem. Regular exercise forms an integral part of the normal daily routine. Total veterinary health check-up at regular 2-week intervals is a must. Regular healthcare at home by close monitoring of the body weight, coat and skin, eyes and ears, gums is a must. Training for proper response to command and control will make the puppy a well-behaved member of the family.

Table: Feeding schedule of puppy at different stages of growth till adulthood.

Type of breed (Body size)	0-3 months	3-6 months	6-9 months	9 months
Small	100-150 ml milk/ 200 g semi-solid food, cereals, minced meat	150-200 ml milk/ 150 g minced meat + rice/ vegetables + rice mixed	250 ml milk/ 200g minced meat + rice, or vegetables+ eggs	250 ml milk/ 300g minced meat + rice/ vegetables+ rice mixed
Medium	250 ml milk/ 250 g semi-solid food (cereals, corn, bread-cums, dog biscuits, minced meat. Egg	300 ml milk/ 300 g minced meat+ rice + cereal mixture dog biscuits, bread cums	350 ml milk/ 500g meat+ rice mixure	400 ml milk/ 500-700g meat, depending on the body weight
Large	5-6 feedings (3 milk, 300 ml + 3 semi-solid food meat + rice with egg, 300g	4 feedings (2 milk, 400 ml + 2 semi-solid food meat + rice with egg, 500g	3 feedings (2 milk, 500 ml + 1 semi-solid food meat + rice with vegetables/egg, 600-750g	2 feedings (1 milk, 500 ml + 1 semi-solid food meat + rice with vegetables/egg, 650g

EXERCISE NO: 16

Feeding of Dog

The diet should be well-balanced to furnish the essential nutrition to support the metabolic demand. High energy, high protein and mineral-rich diet is required for the pregnant female to support the growth and development of the growing multiple fetuses *in utero*, and also the ensuing lactation post-partum. Stud males should not be offered high energy diet to prevent obesity. Proper feed formulation is very essential. Though dogs belong to the order Carnivora, domesticated dogs are well-adopted to omnivorous feeding habits. In India, dogs are often reared on vegetarian foods with milk and milk products included in their daily diet. The animal origin feeds include (i) meat: cleaned and chopped or minced, meat meal, etc. (ii) milk and milk products like skimmed milk, dried milk powder (iii) boneless fish and fish meal (iv) chicken meat and offals like head, legs, gizzard, gut and eggs. The feeds of plant origin include (i) cereals like wheat (chapatti), barley, oats, corn, sorghum, rice and minor millets (ii) cereal byproducts like wheat germ meal, maize gluten, broken rice, wheat bran (iii) pulses and byproducts like grams, beans, soybean, kidney beans (v) fruits like apple pulp, banana, mango, peaches and vegetables like tomato, carrot, bean pods, spinach etc. Nutritionally important feed supplements and additives include common salt, mineral mixture and multi-vitamin mixtures, antioxidants and bacteriostats.

Certain precautions need to be followed scrupulously in the feeding of dogs. Meat, bones and chicken should never be offered without proper cooking. Raw egg contains the anti-vitamin enzyme, avidin. Always take care to feed at a particular spot in a clean utensil, using separate bowls for feeding and watering. A definite feeding schedule should be followed for breakfast, lunch and dinner. Meat from hormone-implanted and chemically caponized birds and fish with spikes, spoiled foods and damaged grains should be totally avoided. Clean wholesome drinking water should be provided ad lib and changed frequently, especially during the summer months.

EXERCISE NO: 17

Physiological parameter of dog and cat

Normal Range of Temperature, Pulse and Respiration of Pet Animals & Birds

S. No.	Animal	Temperature	Pulse	Respiration
1.	Dog	99-102.5^{0}F	60-140 bpm	10-35 bpm
2.	Cat	100.5-102.5^{0}F	140-220 bpm	20-30 bpm
3.	Birds	105-108^{0}F	245-615 bpm	30-60 bpm