Table 12. **Comparative Account of Urinogenital Systems of Vertebrate Types.**

Characters	FISH Dogfish *(Scoliodon)*	AMPHIBIA Frog *(Rana)*	REPTILIA Lizard *(Uromastix)*	AVES Pigeon *(Columba)*	MAMMALIA Rabbit *(Oryctolagus)*
	[I] URINARY AND EXCRETORY SYSTEM				
1. Excretory organs	Include a pair of *kidneys*, a pair of *urinary ducts*, and a *urinogenital sinus*. No bladder.	Include a pair of *kidneys*, a pair of *ureters* a *urinary bladder* and *cloaca*.	Include a pair of *kidneys*, paired *ureters*, a *urinary bladder* and *cloaca*. No bladder.	Include a pair of *kidneys*, a pair of *ureters* and *cloaca*.	Include a pair of *kidneys*, paired *ureters*, a *bladder* and *urethra*.
2. Kidneys	Adult kidneys greatly elongated antero - posteriorly, ribbon-like flat, and attached to dorsal abdominal wall. Each kidney has 2 distinct parts. Anterior narrow part is *non-excre Tory*, genital in male but non-genital in female. Posterior broader part is functional kidney and called *opistho-nephros*.	Adult kidneys are elongated, oval, flat and attached dorsally one on either side of vertebral column in posterior abdominal cavity. They are not differentiated into parts and are *mesonephric*.	Adult kidneys are small, irregular, attached dorsally and lie in pelvic region at the base of tail. Each kidney is *bilobed*. Anterior broad lobes remains free while posterior narrow lobes become united forming a V-shaped structure. Kidneys are *metanephric*.	Adult kidneys are small, flat, dorsally attached in pelvic region, embedded in hollows of pelvis. Each kidney is *trilobed*, made of anterior, middle and posterior lobes. Kidneys are *metanephric*.	Adult kidneys are small, beanshaped and attached much anteriorly and asymmetrically in anterior abdominal cavity. Kidneys are *metanephric* and not divided into lobes.

(Contd.)

Characters	Dogfish (*Scoliodon*)	Frog (*Rana*)	Lizard (*Uromastix*)	Pigeon (*Columba*)	Rabbit (*Oryctolagus*)
3. Histology of kidneys	Covered ventrally by *peritoneum*, not differentiated into *cortex* and *medulla* and made of a compact mass of coiled *uriniferous tubules*.	Same as in fishes	Same as in fishes and amphibians.	Kidney covered ventrally by *peritoneum*, differentiated into *cortex* and *medulla* and contains a very large number of *uriniferous tubules*.	Each kidney covered ventrally by *peritoneum*, differentiated into an outer *cortex* and inner *medulla*, and made of much convoluted *uriniferous tubules*.
4. Uriniferous tubules	Have a special urea absorbing segment. Loop of Henle absent.	Lack a urea-absorbing segment and loop of Henle.	Lack urea-absorbing segment and loop of Henle.	Lack urea absorbing segment, but water absorbing loop of Henle present.	Absorb urea through glomerular filteration and tubular reabosrption and also have water absorbing loop of Henle.
5. Peritoneal funnels	Nephrostomes present.	Nephrostomes present.	Nephrostomes absent.	Nephrostomes absent.	Nephrostomes absent.
6. Ureters	Kidney ducts or mesonephric ureters of both sides run over ventral surface of kidney and open into a urinogenital sinus, which leads into cloaca. Ureters open separately in male but by a common aperture on a urinary papilla in female.	Mesonephric ureters arise and run along outer side of kidneys and open behind by separate apertures directly into cloaca. A urinogenital sinus is absent.	Metanephric kidney ducts or ureters run ventrally over kidneys and open dorsally and separately into middle chamber of cloaca, called *urodaeum*. Urinogenital sinus absent.	As in reptiles, ureters are metanephric. They run ventrally over kidneys and open behind separately into urodaeum through its roof. Without pelvis.	Metanephric ducts (ureters) arise from inner middle concavity or hilus of kidney and open dorso-laterally into urinary bladder. Cloaca absent. Ureters begin from a wide funnel-like cavity in kidney, called *pelvis*.
7. Urinary bladder	Absent	A large thin-walled membranous elastic bilobed urinary bladder opens ventrally into cloaca by a sphinctered aperture.	Small, thin-walled, inelastic, undivided sac opening ventrally into coprodaeum of cloaca.	Absent	Large, median, pear-shaped, muscular sac. Its neck, called *urethra*, opens at the tip of penis in male and into vestibule of female which opens to outside through vulva.
8. Nature of excretion	Predominantly ammonotelic because excrete more ammonia than anything else.	*Ureotelic*, excreting predominantly urea along with water.	*Urecotelic*, excreting semisolid uric acid and urates which are not much soluble in water.	Like reptiles, birds are also *urecotelic* excreting mainly uric acid and urates in a semi-solid state.	*Urecotelic* since chief excretory product in urine is urea dissolved in water.

[II] MALE REPRODUCTIVE SYSTEM