

Model Answers
B.Sc (Third Semester) Examination, 2013
Forensic Science
Paper I
(Medical Jurisprudence)
AS 3008

1. Multiple choice questions:

I. After death the rapid change in cellular level of the body is called as

- A. Cessation B. Autopsy C. Pulpation D. Autolysis

Ans: D. Autolysis

II. Vitreous humor is particularly examined for checking

- A. Poisoning cases B. Metabolic C. Alcohol level D. Exhumed

Ans: C. Alcohol level

III. Stiffening of the body is also called as

- A. Decomposition B. Mummification C. Rigor mortis D. None of the above

Ans: C. Rigor mortis

IV. The change in tissue after post mortem examination is called as

- A. Discoloration B. Putrefication C. Hypostasis D. Dogmatization

Ans: B. Putrefication

V. The most widely used drug for early medical abortion

- A. Misoprostol B. Methotrexate C. Mifeprax D. Mifepristone

Ans: D. Mifepristone

VI. The intense colour of haemoglobin is not caused by iron but by

- A. Biliverdin B. Plasma C. Porphyrin D. Serum

Ans: C. Porphyrin

VII. Road traffic incidents are a leading cause of

- A. Sterile B. Strengthening C. Morbidity D. None of the above

Ans: C. Morbidity

VIII. Sharp injuries are those caused by any implement with

- A. Blunt edges B. Sharp edges C. Cutting edges D. Raw edges

Ans: B. Sharp edges

IX. Exhumation is mainly defined for the dead body

- A. Identification B. Foul play C. Mystery D. Discovery

Ans: A. Identification

X. Rate of cooling helps in determining

- A. Manner of death B. Time of death C. Place of death D. Cause of death

Ans: B. Time of death

2. Describe about Forensic medicine. Significance of viscera examinations in Forensics.

Ans:

Forensic medicine, forensic pathology, and legal medicine are terms used interchangeably throughout the world. Forensic medicine is now commonly used to describe all aspects of forensic work rather than just forensic pathology, which is the branch of medicine that investigates death. Clinical forensic medicine refers to that branch of medicine that involves an interaction among law, judiciary, and police officials, generally involving living persons. Clinical forensic medicine is a term that has become widely used only in the last two or so decades.

Typical Roles of a Forensic Physician (Dr.):

- ✚ Determination of fitness to be detained in custody
- ✚ Determination of fitness to be interviewed by the police or detaining body
- ✚ Documentation and interpretation of injuries
- ✚ Assessment of alcohol and drug intoxication and withdrawal
- ✚ Undertake intimate body searches for drugs

3. Describe the sign and mode of death.

Ans:

Death is the extinction or cessation of life, but since life is difficult to define there is a reciprocal problem in defining death. The precise definition of death will always be a subject of controversy because it has social and religious aspects and is not a solely scientific issue, within this process of dying here are points of no return, the identification of which is the medical diagnostic challenge.

- Respiratory system
- Circulatory system
- Central nervous system

Failure with or in any of the systems, may results in death.

Sign of Death:

The three principal post mortem changes which occur within the first day after death are:

Algor mortis: (Body cooling, the chill of death)

Livor mortis: (Discoloration of the skin)

Rigor mortis: (Tightening of the muscles, stiffening of death)

Algor mortis:

Algor mortis is a term utilized to describe post-mortem cooling of the body. In most cases soon after death occurs the body temperature begins to fall and will continue to do so until the internal temperature reaches the temperature of the environment. The rate of cooling of the surface of the body is more rapid than the cooling of the internal organs.

Livor mortis:

Lividity is a dark purple discoloration of the skin resulting from the gravitational pooling of blood in the veins and capillary beds of the dependent parts of the corpse. Lividity is able to develop post mortem under the influence of gravity because the blood remains liquid rather than coagulating through out the vascular system as a consequence of stasis.

Rigor mortis:

Rigor mortis is the generalized stiffening of the skeletal and smooth muscles of the body following death. Immediately after death the muscles of the body are flaccid (relaxed). This period exists for 3 to 6 hrs after death. The development of rigor mortis is due to a biochemical process, which involves the loss of adenosine triphosphate (ATP). This is followed by calcium ion diffusing into the muscle cells and binding with troponin, thus allowing cross bridging developing between myosin and actin.

Mode of Death:

- ✚ Cerebral anoxia is due to bilateral occlusion of the carotid arteries. It is the most common cause.
- ✚ Cerebral congestion is due to occlusion of the neck veins.
- ✚ Asphyxia is due to direct compression of the air passage or lifting of the larynx to be closed by the root of the tongue.
- ✚ Reflex vagal inhalation is due to stimulation of receptors situated in the carotid sinuses and the carotid body.

4. Illustrate ante mortem, post mortem wounds and their utility in Forensic cases.

Ans:

Ante-mortem Wounds:

Of the three traumatic time-frames (ante-, peri-, and post-mortem), the easiest of the traumas to detect are those that occur ante-mortem duration. The ante-mortem trauma generally derive, signs of healing. While healing begins almost immediately after the fracture, evidence of the

healing processes can develop as early as one week after the injury. Ante-mortem trauma refers to an alteration produced before an individual's death that displays evidence of osteogenic reaction. Features that may indicate ante-mortem trauma include:

- Evidence of healing or healed fractures
- Development of a pseudo arthrosis
- Trauma-induced degenerative joint disease
- Infectious response
- Dental fractures with worn edges
- Surgically implanted devices

Postmortem Wounds:

Post-mortem trauma is that which occurs after death and is important for determining what transpired to the remains from the time of death to the time of recovery and afterwards. The differentiation of post-mortem traumas are critical in the understanding of whether they were caused intentionally by an individual attempting to conceal his or her crime. Postmortem damage refers to taphonomic alteration or defects produced after an individual's death that are unassociated with the death event. Features that may indicate postmortem damage include:

- . Differentially stained or recently exposed surfaces
- A lack of healing
- . Characteristics of the break lacking evidence of a plastic component.
- . Pattern of damage

5. What are Gun shot injuries and significance in Forensics.

Ans:

An understanding of gunshot wounds requires some knowledge of the construction and mechanism of guns and the ammunition which they fire. Rifles and handguns, but not shotguns, have rifled barrels. The rifling consists of spiral grooves cut the length of the interior or bore of the barrel.

Rifled weapons: Handguns and rifles are the two most frequently encountered rifled weapons. Handguns, as the name implies, are designed to be fired from the hand and may be revolvers or auto-loading pistols, so called 'automatics'.

Wound ballistics: Ballistics is the science of the motion of projectiles and wound ballistics is the study of the projectile penetration of tissues. A moving projectile, or bullet, has kinetic energy proportional to its weight and its velocity squared ($KE \propto WV^2$).

Rifled gunshot wounds: A gunshot wound is a penetrating wound which leaves a skin defect where the projectile passes through the skin. As a general rule a gunshot exit wound is larger and more irregular than a gunshot entry wound due to the effect of bullet tumbling and bullet deformation.

Shotgun wounds: In shotgun injuries the pellets rarely exit and therefore the wounding effect is the full wounding potential. Within increasing range, fewer pellets strike the target due to pellet dispersion, and the velocity of the pellets falls off rapidly due to poor pellet aerodynamics.

Q 6. Define Exhumation. What are the precautions to be considered for autopsy on an exhumed body.

Ans:

Exhumation: Sometimes, it is necessary to exhume bodies from graves when there may be doubts regarding cause of death, some foul play like abortion, or disputed bodies. Even in cases of doubtful identification, malpractice or insurance claim, exhumation may be done.

Rules: The exhumation can be done only on the orders of the magistrate. Previously, coroners were also authorised by law to order exhumation, but since the abolition of the coroner system, an exhumation can be done only on the orders of the magistrate. It should always be done under natural sunlight and should not be conducted after sunset.

Precautions:

1. After receiving a written order from the magistrate, the doctor should proceed to the site immediately.
2. The body should be taken out and postmortem examination should begin there itself.
3. In cases of suspected poisoning, 500 gm of earth in actual contact with the body should be kept for chemical analysis as control sample.
4. Before beginning to dig the grave, it should be identified by the undertaker or by the police.
5. The post-mortem should be done away from the eyes of people by covering and cordoning the area.
6. The complete post-mortem examination should be done to ascertain identification, age, time since death and cause of death.

Q 7. What are the different types of medications used for abortion.

Ans:

A medical abortion is one that is brought about by taking medications that will end a pregnancy. The alternative is surgical abortion, which ends a pregnancy by emptying the uterus (or womb) with special instruments. Either of two medications, mifepristone or methotrexate, can be used for medical abortion. Each of these medications is taken together with another medication, misoprostol, to induce an abortion.

OR

Before any abortion can be done, a medical professional must confirm that a woman is indeed pregnant and determine how long she has been pregnant. The length of a pregnancy is usually measured by the number of days that have passed since the first day of the woman's last menstrual period (abbreviated as LMP). Medical abortions can be provided as early as a pregnancy can be confirmed.

Mifepristone: Mifepristone (the abortion pill or RU-486) is a medication that was developed and tested specifically as an abortion-inducing agent. Mifepristone is taken in the form of a pill. It works by blocking the hormone progesterone, which is necessary to sustain pregnancy. Without this hormone, the lining of the uterus breaks down, the cervix (opening of the uterus or womb) softens, and bleeding begins.

Methotrexate is usually given to a pregnant woman in the form of an injection, or shot, although it also can be taken orally. It stops the ongoing implantation process that occurs during the first several weeks after conception.

Misoprostol: Within a few days after taking either mifepristone or methotrexate, a second drug, misoprostol, is taken. Misoprostol tablets (which may be placed either into the vagina, between cheek and gum, or swallowed) cause the uterus to contract and empty. This ends the pregnancy.

Mifepristone and methotrexate work in different ways, and so they will have slightly different effects on a woman's body. A clinician can help a woman decide whether medically induced abortion is the right option for her, and which of the two drugs she should use.

Q 8. Illustrate about burnt, mutilated and decomposed bodies and their uses in Forensics.

Ans:

Examination of burnt bodies:

Examination of mutilated bodies:

The body may be found in a mutilated form not only as a result of a criminal act but also due to animal bites. Sometimes, it may happen that because of an accident or severe trauma or bomb blast, only parts of the body are found. After it is determined that fragments belong to a human body, following points should be carefully noted:

1. All the body parts should be arranged in anatomical order to find out if they belong to more than one person or not.
2. The nature and character of parts should be observed as to how they are separated. It should be appreciated whether parts are cut or lacerated, or gnawed by animals.
3. The sex of the individual can be found out by facial features, body parts, shape of pelvis, external genitalia, bones, soft tissues like uterus or prostate and mammary glands.
4. Time since death should be calculated from the decomposition stage of various body parts.

Examination of decomposed bodies:

Sufficient care should be taken while examining decomposed bodies, as features may be altered and there may be difficulty in appreciating injuries. Due to an advanced stage of decomposition, the ligature mark on the neck may not be appreciated well as the skin may be peeled off. The shape of the injuries may be altered by maggots present on the body. Sometimes, the body may be in such an advanced form of decomposition that the cause of death may not be found.