KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University Established Under Section 3 of UGC Act 1956)

Coimbatore – 641 021.

LECTURE PLAN
DEPARTMENT OF BIOTECHNOLOGY

STAFF NAME: Mr Nishu Sekar
SUBJECT NAME: BASICS OF FORENSIC SCIENCE
SUB.CODE: 16BTU501B
SEMESTER: V CLASS: III B.Sc (BT)

S.No	Lecture Duration Period	Topics to be Covered	Support Material/Page Nos
		UNIT-I	
1	1	Introduction and principles of forensic science	T1:15-16
2	1	Forensic sciences laboratory and its organization and services	W1: R1 28-3
3	1	Tools and techniques in forensic science	
4	1	Branches of forensic sciences	W1
5	1	Causes of crime, role of modus	W1
6	1	Operand in criminal investigation	W1
7	1	Classification of injuries and their medico-legal aspects	
8	1	Methods of assessing, various types of death	
9	1	Revision of Unit-I	
10	1	Class test Unit-I	
	Total No of Hours Planned For Unit 1=10		
		UNIT-II	
1	1	Classification of firearms and explosives	R1:73-81
2	1	Introduction of internal, external and terminal ballistics	T121-24

3	1	Chemical evidence for explosives	T121-24
4	1	General and individual characteristics of handwriting	R1:106-119
5	1	Examination and comparison of hand writings	W1
6	1	Analysis of ink various samples	R1:106-119
7	1	Case study about ballistics	R1:106-119
8	1	Case study about handwriting	R1120-123
9	1	Revision of Unit-II	W1
10	1	Class test Unit-II	W1
	Total No of Hours Planned For Unit II=10		
		UNIT-III	
1	1	Role of toxicologist	R1:93-95
2	1	Significance of toxicological findings	R195;T1:36-54
3	1	Fundamental principles of finger printing	T1: 536-542
4	1	Classification of finger prints	T1: 536-542
5	1	Case study on toxicology	
6	1	Case study on finger prints	
7	1	Case study on history of finger print	T1: 536-542
8	1	Revision of unit III	
9	1	Class test for unit III	
	Total No of Hours Planned For Unit III=09		
		UNIT-IV	
1	1	Principles of DNA fingerprinting	T1 167-176
2	1	Applications of DNA profiling in forensic medicine	R1:214-215
3	1	Investigation tools	T1:167-176
4	1	e-Discovery, Evidence preservation	T1:167-176
5	1	Search and seizure of computers	R1:212-214; W1

6	1	Case study on DNA fingerprinting	R1:212-214
7	1	Case study on forensic medicine	R1:212; W1
8	1	Revision of unit IV	
9	1	Class test for unit IV	
	Total No of Hours Planned For Unit IV=09		
		UNIT-V	
1	1	Introduction of cyber security	T1:317-318 W1
2	1	Recent techniques in cyber security	T1:318-319
3	1	Development of fingerprint as science for personal identification	T1:427-428
4	1	Case study of cyber security	T1:428-429
5	1	Case study of recent techniques in cyber security	T1:429-432
6	1	Case study of fingerprint as science for personal identification	T1:440-441
7	1	Revision of unit IV	T1:459,460
8	1	Class test for unit IV	T1:463-466,R2
9	1	Previous year ESE question paper revision	T1:490
	Total No of Hours Planned for unit V=09		
Total Planned Hours	**47**		

TEXT BOOK

1. Gardener, G.,2001, principles of genetics john wiley and sons Inc, New york
(Page Nos. : 24-54, 56-77, 80-92, 103-118, 204-215, 236-256, 427-443, 458-463, 490-495, 502-505)

REFERENCES

1. P.S.Verma and V.K aggarwal., 2000 Genetics, S.chand and company ltd New Delhi.
2. Monoroe w.stricberger, 1985, genetics 3rd edition, macmillan

SEMESTER V

16BTU501B **BASICS OF FORENSIC SCIENCE** **3H - 3C**

Total hours/week: L:3 T:0 P:0 **Marks: Internal: 40 External: 60 Total: 100**

Scope: This course gives the fundamentals ideas of forensic science.

Objective: The objective of the course is to introduce fundamental concepts in forensic science.

UNIT- I

Introduction and principles of forensic science, forensic science laboratory and its organization and service, tools and techniques in forensic science, branches of forensic science, causes of crime, role of modus operand in criminal investigation. Classification of injuries and their medico-legal aspects, method of assessing various types of deaths.

UNIT-II

Classification of fire arms and explosives, introduction to internal, external and terminal ballistics. Chemical evidence for explosives. General and individual characteristics of handwriting, examination and comparison of handwritings and analysis of ink various samples.

UNIT-III

Role of the toxicologist, significance of toxicological findings, Fundamental principles of fingerprinting, classification of fingerprints.

UNIT-IV

Principle of DNA fingerprinting, application of DNA profiling in forensic medicine, Investigation Tools, eDiscovery, Evidence Preservation, Search and Seizure of Computers,

UNIT-V

Introduction to Cyber security and recent techniques. development of finger print as science for personal identification,

References

1. Bernard J. Glick, Jack J. Pasternak , & Cheryl L. Patten. (2010). *Molecular Biotechnology-Principles and Applications of recombinant DNA* (4th ed.). Washington: ASM Press.
2. Nanda, B.B., & Tiwari, R.K. (2001). *Forensic Science in India: A Vision for the Twenty First Century*. New Delhi :Select Publishers.
3. Bhasin, M.K., & Nath S. (2002). *Role of Forensic Science in the New Millennium*. Delhi: University of Delhi.
4. James, S.H., & Nordby J.J. (2005). *Forensic Science: An Introduction to Scientific and Investigative Techniques* (2^{nd} ed.). CRC Press, Boca Raton.
5. Eckert, W.G., & Wright, R.K. (1997). *An Introduction to Forensic Sciences* (2nd ed.). CRC Press, Boca Raton (1997).

UNIT-I

SYLLABUS

Introduction and principles of forensic science, Forensic sciences laboratory and its organization and services, Tools and techniques in forensic science, Branches of forensic sciences, Causes of crime, role of modus, Operand in criminal investigation, Classification of injuries and their medico-legal aspects, Methods of assessing, various types of death

Unit – I

INTRODUCTION

Forensic science is the application of science to criminal and civil laws, mainly—on the criminal side—during criminal investigation, as governed by the legal standards of admissible evidence and criminal procedure.

Forensic scientists collect, preserve, and analyze scientific evidence during the course of an investigation. While some forensic scientists travel to the scene of the crime to collect the evidence themselves, others occupy a laboratory role, performing analysis on objects brought to them by other individuals.

In addition to their laboratory role, forensic scientists testify as expert witnesses in both criminal and civil cases and can work for either the prosecution or the defense. While any field could technically be *forensic*, certain sections have developed over time to encompass the majority of forensically related cases. Forensic science is the combination of two different Latin words: forensis and science. The former, forensic, relates to a discussion or examination performed in public. Because trials in the ancient world were typically held in public, it carries a strong judicial connotation. The second is science, which is derived from the Latin word for knowledge and is today closely tied to the scientific method, a systematic way of acquiring knowledge. Taken together, then, forensic science can be seen as the use of the scientific methods and processes in crime solving.

Etomology

The word *forensic* comes from the Latin term *forensis*, meaning "of or before the forum".The history of the term originates from Roman times, during which a criminal charge meant presenting the case before a group of public individuals in the forum. Both the person accused of the crime and the accuser would give speeches based on their sides of the story. The case would be decided in favor of the individual with the best argument and delivery. This origin is the source of the two modern usages of the word *forensic* – as a form of legal evidence and as

a category of public presentation. In modern use, the term *forensics* in the place of *forensic science* can be considered correct, as the term *forensic* is effectively a synonym for *legal* or *related to courts*. However, the term is now so closely associated with the scientific field that many dictionaries include the meaning that equates the word *forensics* with *forensic science*.

Principles of forensic science

Forensics is a universal science, traversing the entire spectrum of various diverse fields. As a profession, in the 21st century, it has taken root in today's society though with different levels of advancement, protocols and policies in different jurisdictions. May the listed principles serve as a curtain raiser or some sort of refresher for the new and the old guard in the forensics field.

- *Law of individuality*: Every object, artificial or otherwise is unique. Although from a distance, objects of the same morphology, class etc. may seem the same, the devil is always in the details. Fingerprints, nDNA may all be similar but they are distinctly unique.
- *The exchange principle*: Commonly known as Edmond Locard's maxim on interchange "that a person or persons at a scene where a crime has been committed will almost always leave or take something away"
- *Law of progressive change*: You've probably heard of the saying "Change is inevitable". Well this also applies to objects although it may take different objects different time spans. Samples will degrade with time (e.g. nDNA), bodies decompose, tire tracks & bite-marks fade and the list goes on and on…
- *Law of comparison*: Samples can only be compared to like samples; be it reference, questioned or control samples. A questioned hair can only be compared to another hair sample, same with tool marks, bite marks, DNA…
- *Law of analysis*: An analysis can be no better than the sample under analysis, its chain of custody, its handling and the person analyzing it.
- *Law of probability*: Forensics is all about percentage chance. All conclusions derived after an analysis are dependent on method used and their accompanying advantages & shortcomings which are all factored in the end result.
- *Law of circumstantial facts*: Man (Eye witnesses, victims) when giving evidence may not always be accurate. They may intentionally lie or many have shortcomings e.g. poor senses (sight, hearing…), exaggeration and assumptions. However, evidence which in

turn provides a factual account has a higher percentage chance of accuracy and therefore highly reliable.*True belief only becomes knowledge when backed by some kind of investigation and evidence (Karl Marx)*

Forensic science laboratories and its organization and service

This is a specific issue identified in ISO accreditation standards - potential conflicts of interest. The answer is that it is not the nature of the host agency, but the nature of the responsibility and accountability of the laboratory staff and management which counts. If it is an issue, it is not a very serious one in practice as hardly any forensic science laboratories have been set up specifically to deal with the matter of operational independence. An example is the Swedish National Laboratory of Forensic Science in Linkoping. It is housed in a University and its budget and operations are controlled by an independent board. Another example is the State Forensic Science Centre in Adelaide, Australia, which was established by legislation which required it to be free from control by police or other legal service agency. **The main problem with forensic science laboratories and location within a police agency is that of resources.**

Although some of the finest and best-resourced laboratories in the world are found within police agencies (the former Metropolitan Police Laboratory in London, UK; the FBI Laboratory in Washington DC; and the Forensic Science Center at Chicago, for example), there are very many examples where the police host has not been able to understand the level of resources needed to establish, maintain and develop a quality forensic science laboratory. In general, the commitment is seen by the level of reporting relationship enjoyed by the laboratory director. Agencies which take their laboratories seriously have the director reporting to someone very senior in the hierarchy.

Financial organization of forensic science laboratories One of the largest forensic science organizations in the world,

The Home Office Forensic Science Service (FSS) in England, is currently organized as a government agency. This brings with it certain financial freedoms and disciplines, as it requires the FSS to operate as a business and recover its costs through the sale of services to customers.

This mode of operation was established for some services in Australia and New Zealand several years before its adoption by the FSS. It is a strange amalgamation of what most would regard as a core public service (administration of justice) being delivered by a public entity operating to (some) private sector business standards, and has not been adopted in the US or other countries.

The rationale behind the Australian and New Zealand initiatives was that governments wished to identify the true costs of delivering public services. They thus required indirect costs such as

capital depreciation, accommodation rental, leave and other staff benefits, and insurances to be quantified and included in the cost of providing the service.

The next step was to make the customer agencies responsible for meeting the costs of the service. The rationale here was that they would purchase only what they needed and could afford. The final step was to define a series of policy-purchaser-provider relationships, in which the government set policy and funded purchasers who sought the best value from available providers.

In some cases, where providers were government agencies, they were required to provide a return on capital to the government equivalent to the shareholder's return on the investment of a similar private industry.

In theory, commercialization of services should also introduce competition. Competition in turn should mean that providers have to focus on providing only timely, necessary services which meet the standards of the customer. However, one of the customer's standards will be to get the best return for the limited budget available. The consequences of quality failure in forensic science are too dramatic for it to operate in a price-driven market. Also one of the expressed concerns about existing service structures is that forensic services provided from police agencies may suffer from unconscious bias due to their close affiliation with the prosecution. A commercial service with a strong customer service ethic will have the same problem. Finally, discontinuing laboratory investigations which are not cost effective raises concerns at the long-term loss of analytical and interpretative skills in areas such as hair examination, and therefore possibly significant evidence not being available.

Probably the two main difficulties with public sector commercial services are that those who are devoting resources to quality assurance and who are honest with their costing will suffer as they are undercut by providers – especially other public sector providers – who either bid at marginal rates which do not reflect the true operational costs, or cut corners in quality to lower costs. The second difficulty is that police investigators and the laboratory do not have the normal purchaser-provider relationship that applies to the purchase of goods or services. Agencies such as prosecutor, defense and judiciary all have a major stake in the services and can influence service delivery without having to carry any fiscal responsibility. As an example, one of the earliest commercial services was established and developed in South Australia in the period 1984-87, and still in operation there. In that time the single greatest influence on the service was the decision by the Chief Justice to impose a 6-week maximum time period from charge to first hearing at which time evidence had to be ready for scrutiny by the defense. The provider laboratory and purchaser police department were left to deal with the mandate from within existing resources.

Forensic Science Tools and Technology

Forensic Science is the key to solving crimes all over the world. Without it, we would be stuck in the days of Sherlock Holmes, relying on less reliable evidence to reach conclusions about life and death situations.

With advances in forensic technology, law enforcement has more tools and resources at its disposal, making it harder for criminals to get away with their actions. As a result, the demand for forensics technology has only increased over time.

Along with that, public interest in forensics has also increased, especially with the popularity of crime based television shows. Series and movies such as Hannibal, Making a Murderer, CSI, and the perennial favorite Law and Order, do a great deal to expand interest in forensics, but they don't always accurately represent the science.

Massively Parallel Sequencing (MPS)

This may be the "most advanced tool in the field of Forensic Biology," according to Sheree Hughes-Stamm, who will investigate this research at Sam Houston University. Basically, MPS gives more information about DNA evidence than ever before, which will be critical in helping to solve missing persons cases, or situations where there has been a large disaster with many deaths.

Hair Bacteria Assessment

It sounds yucky – and it might be, but forensic biologists are now using analysis of crime suspects' hair bacteria to match sexual criminal suspects to the victims of their crimes. Scientists realized that hair samples have microbe populations that are mixed when people engage in sexual behavior. This makes it easier to prove that an offender committed an act if there is a match in their microbe population to the victim.

Rapid DNA

This new forensic technology, developed by the Department of Homeland Security can use DNA to make family connections in times of crisis. The Department of Immigration Services also wants to use it to connect families that are coming into the country. And of course, forensic analysts can use this tech to help solve crimes. Unlike other breakthroughs, this technology is fairly easy to use, and requires little training.

Time-Tracing Fingerprint Technology

We have all seen the detective dust for prints to see if a suspect's fingerprints are present at the scene of a crime. Now, we can dig even deeper into this process with advanced fingerprint technology that reveals *when* a fingerprint was left behind. This can help eliminate innocent

suspects from suspicion, and identify prints that were left at the scene long before crimes were committed.

3-D Models to Help Examine Victims

Photographs from crimes scenes and the morgue can often be hard for jurors and others to examine or understand. With new 3-D photography technology that uses image layering, investigators can learn and share more about the evidence they find. Intricate details revealed on a corpse, like relevant internal damage that may show signs of old or repeated injuries, but that can't be seen with regular photography, will now be available.

Branches of Forensic science

1. Forensic Anthropology: It deals with the identification of human body remains on the basis of osteology, osteometry and superimposition techniques. It also involves blood grouping, red cell enzyme and serum protein typing from blood and other body fluids which is called specifically as Forensic Serology.

2. Forensic Biology: It deals with the identification of biological evidences whether plant or animal in origin, through mutual comparison and identification.

3. Ballistics: It deals with the study of projectiles, firearms, their ammunition for detecting range of fire, angle of fire and trajectory of projectiles etc. etc.

4. Explosives: It deals with the identification of explosives and their remanants from the site of explosion or confiscated suspected material. Nowadays, explosive detectors and sniffer dogs are pressed into service for locating the explosives. The Mine detectors metal detectors also detect the networking of explosives.

5. Physics: It identifies metal, precious metals from their physical properties and also examines building materials, toolmarks, glass and paints, etc. for quality in different crime cases and for identification of the source.

6. Chemistry: It deals with the identification of substances of all types by chemical tests for their constitution and chemical properties. Mutual chemical comparison of the substances permits opinions whether they are from the same source or otherwise.

7. Toxicology: It is the study of poisons under which forensic science indicates symptomatically as well as on the basis of chemical and instrumental analysis for the identification of poisons, narcotics, drugs and other psychotropic substances.

8. Documents: Authorship of manuscripts, typed materials, printed materials and signatures, etc. are examined and source/authorship is established by forensic documents examiners. They are

also engaged in so many other problems concerning white—collar crimes like fake currency notes, fake lottery tickets, credit cards, passports, forgery and frauds in the banks and other Govt. departments.

9. Lie Detector: Polygraph is an instrument with the help of which peaks/ graphs concerning blood pressure, palpitation rate, perspiration rate and skin twitching etc. are recorded and a person can be interrogated scientifically as to whether he is speaking the truth or telling a lie.

10. Photography: Macrophotography at the scene of crime, whether is still photography or video-photography is of utmost help in recording the evidence. Likewise, photomicrography and micro—photography in the laboratory permits recording of minute physical clues from the crime case exhibits.

11. Footprints and tyremarks: It was treated to be rudimentary science in 60's, has developed as a scientific study and is treated to be an authentic evidence for the identification of persons from their foot/footwear's and vehicles from their tyremarks.' It is a reliable corroborative evidence at present.

12. Odonotology: It is the study of the teeth, the alignment of teeth, their eruption, falling, malformations, wear and tear and other surgical artifacts used for the restoration of the teeth, which permit identification of a person. Moreover, teeth also permit estimation of age.

13. **Medical jurisprudence:** At the time of autopsy of a deadbody and medico— legal examinations of the persons the reports are prepared by the medical experts which are of utmost help in finding out the cause of death and also help in ascertaining the extent of injury to the person. It involves internal examination of organs, injuries and symptoms.

14. Instrumentation: It is emerging branch of forensic sciences under which duplicacy of different equipments which may be mechanical, electrical, electronic are examined and identified.

15. Engineering: Forensic engineering deals with the cases of development of cracks in buildings, dams and other structures before the specified time or before their fixed up age. They also deal with whether the material used has been as per specification or otherwise. The engineering defects are also studied in the process.

16. Geology: It deals with the analysis Of oars, gems, and other precious stones recovered from the earth crust. Geologists also identify such materials in co—relation to a particular sitè/ area. The precious fossil forms are also identified and co—related to the important sites.

17. Archaeology: The articles of antiquity recovered in excavation and precious idols when stolen have to be identified by Forensic Archaeologists with respect to their Originality and age by dating methods.

18. Computer: We are passing through the age of computers today We are using computer for data storage, data processing for speedy transmission of data. However, more networking of computer upto Police stations and Police post level is still needed. Computers can be used for portrait building of suspects and criminals on the basis of the descriptions given by the victims of crime. Computer graphics are of utmost help in this process. With all these important branches of forensic science in service today still it is hot mandatory for the police to keep forensic reports on the file which is a must if we really have to take help from science in the investigation of crime and for giving justice to a common man.

CAUSES OF CRIME

There are various causes of crime. Which are described officially are stated below –

1. Social Causes of Crime
2. Economic Causes
3. Mental abnormality causes of crime
4. Geographical Causes
5. Political Causes of Crime

Social Causes of Crime

There are various social causes of crime. These are such as –

- Broken Homes
- Child Abuse
- Spouse Abuse
- Fights and quarrels in Family
- Negligence of Parents
- Dowry Deaths
- Bigamy- Marrying another while the first wife or husband is alive.
- Female Feticide
- Inequality amongst Sons and Daughters
- Alcoholism
- Narcotic Drugs
- Defective Education
- Casteism

- White Collar Crimes
- Unemployment

Economic Causes of Crime –

- Poverty
- Over Population
- Unemployment
- White Collar Crimes
- Industrialization and Urbanization
- Prostitution
- Bad Government Policies
- Prisons

Mental Abnormality Cause of Crime –

- Abnormality
- Psychoses
- Mental Deficiency
- Antisocial People ,etc..

Political Causes of Crime –

- Corruption
- Corrupt Politicians
- Religions vs Politicians
- Inequality

Modus Operandi

Influences on Modus Operandi

A criminal's MO behavior is learned, and therefore dynamic and malleable. This is because MO behavior is affected by time, and can change as the criminal discovers that some of the things done during a crime are more effective than others. Criminals can subsequently recognize these effective actions, repeat them in future offenses, and become more skillful, refining their overall MO. However, behavior may also change due to a criminal's deteriorating mental state, due to the influence of controlled substances, and/or due to increased confidence that law enforcement will not successfully apprehend them. These things may cause a criminal's MO to become less skillful, less competent and more careless.

Common ways that criminals can learn how to commit crime more skillfully are by gaining more experience, building confidence through success and/ or having more contact with the

criminal justice system. Being arrested just once may teach an offender an invaluable lesson about how to avoid detection by law enforcement in the future. Further still, and with some great irony, a prison term in the United States is referred to by some, in both law enforcement and the criminal population, as 'going to college'. This is because younger and less experienced offenders have the opportunity in prison to network with older and more experienced offenders who have already accumulated a great deal of criminal knowledge. Subsequently, a prison term of only a few years has the potential to advance an offender's skill level far beyond their original MO. Once released, such offenders may take their 'education' and embark on criminal enterprises that before would have been beyond their ability.

Criminals can also seek out knowledge directly, just like anyone else, without having to spend time with other, more experienced, criminals. They can learn from the things that they see or read, which include items ranging from those in the media to educational and technical materials. For example, a rapist may commit five different attacks in a single region. The attacks may go unconnected until DNA results come back and demonstrate that the rapes were more than likely committed by the same offender. If the media publishes a headline that reads 'Serial rapist linked to five attacks by DNA!', the rapist may alter his MO behavior to prevent law enforcement from linking future cases. He may do so by making temporary changes, such as using a condom during any future rapes, or he may decide to make a more permanent change and undergo a vasectomy. Either way, the rapist may make a conscious attempt to prevent the transfer of a particular type of evidence, based on what he has learned from the media coverage of the case or other similar cases.

MEDICOLEGAL CLASSIFICATION OF WOUNDS: INDIAN PERSPECTIVE

Simple wounds

These wounds are those which commonly occur in day to day life and when caused by other, heal rapidly without incapacitating a person from his work for more than two weeks.

Dangerous Wounds

Wounds are larger in size and more severe than Simple wounds. Generally, they are often fatal wounds, and in all cases, there is apprehension of danger to life. This fact should be at once intimated to the local Magistrate through local police station and arrangements made for recording – Dying Declaration. Danger to life should be considered imminent in compound fracture of the skull, wounds involving a large artery, rupture of internal organs etc. Injuries

which prove fatal by causing inter current diseases or complication like Tetanus, Gas Gangrene etc. are not considered as immediately dangerous.

Grievous Hurt

It is a special type of dangerous wound. These are the injuries or bodily pain, which commonly cause the sufferer to have either permanent damage or loss of a part of the body or incapacitates him from doing his normal work (i.e., attending nature's call, etc.) for more than 20 days. It may be mentioned that all dangerous wounds may also be grievous in nature but all grievous hurts may not be dangerous wounds.

Conditions

1. Emasculation – Injuries to the testis, deprivation of masculinity of a person by castration or cutting off of the male organ (cutting off of Pudendum also comes under this heading). Injury to the spinal cord involving Lumbar segments which may result in impotency is also important.
2. Permanent privation of sight of one or both eyes.

3. Permanent privation of hearing of one or both ears.

4. Permanent privation of any member of joint.

5. Permanent impairment or destruction of the power of any joint or any member of joint.

6. Permanent disfigurement of the head or face.

7. Fracture of a bone or dislocation of tooth.

Whether Cutting off of a bone is a grievous hurt, with cut not extending up to the medullary canal and with cut not extending up to the medullary canal and separation of suture between the skull bones (dislocation between two cranial bones) is a grievous hurt or not is a critical legal question.
8. Any hurt, which endangers life or causes the sufferer to be during the space of 20 days in severe bodily pain that render him unable to follow his ordinary pursuits. (Ordinary pursuits, i.e., ordinary work to which he is accustomed during his day to day life).

Important Questions

2 Marks

1. Define forensic Science.
2. Write short note on principles of forensic Science.
3. Give outline on forensic Science organization here in India.
4. Write short note on tools and techniques in forensic Science.
5. What are the operands in criminal investigation?
6. What is the role of modus in forensic Science?
7. List of names of various branches of forensic Science here in India
8. List out the possible causes of crime carried here in India.

08 Marks

1. Define forensic Science in brief and also explain in details about its various organization followed here in India.
2. Explain briefly about the various branches of forensic Science followed here in Indian and also explain in brief about the function of each branch.
3. Explain in the detail regarding the possible causes of crime, role of modus and operand in criminal investigation.
4. Write all different manners of assessing various types of deaths.
5. Write in brief about the classification of injuries and their medico-legal aspects.
6. Write assay on the forensic Science laboratory and services here in India

UNIT-II

SYLLABUS

Classification of firearms and explosives, Introduction of internal, external and terminal ballistics, Chemical evidence for explosives, General and individual characteristics of handwriting, Examination and comparison of hand writings, Analysis of ink various samples,

Unit – II

CLASSIFICATION OF FIRE ALARMS

The Categories: Automatic versus Manual Fire Alarms

There are two distinct types of fire alarms you can have in your commercial space. The first is an automatic fire alarm. When these alarms detect heat or smoke, they send an audio-visual alert throughout the building to alert the occupants of danger. The next type of fire alarm is a manual alarm. These fire alarms have pull stations stationed around your building. When a fire is seen or smelled by one of your employees, they simply pull the leveler and alert the occupants. Manual alarms come in a variety of designs and colors.

Types of Commercial Fire Alarms

Just as there are different categories of fire alarms, there are also different types. Let's take a look at the types of fire alarms and the features they offer.

Conventional Fire Alarms

Conventional fire alarms include a number of different "zones" that are hardwired to your central control panel. These systems allow you to be able to put separate fire alarms in each section of your building and helps to monitor if an alarm is broken.

Addressable Fire Alarms

These fire alarms are also called "intelligent systems" as they monitor the fire alarms in your building. Addressable alarms allow you to choose between automatic and manual alarms. Each alarm installed in this system has its own address, which allows you to see which alarm is working and which are failing. Addressable fire alarms are more expensive because of the monitoring features.

Hybrid Fire Alarms

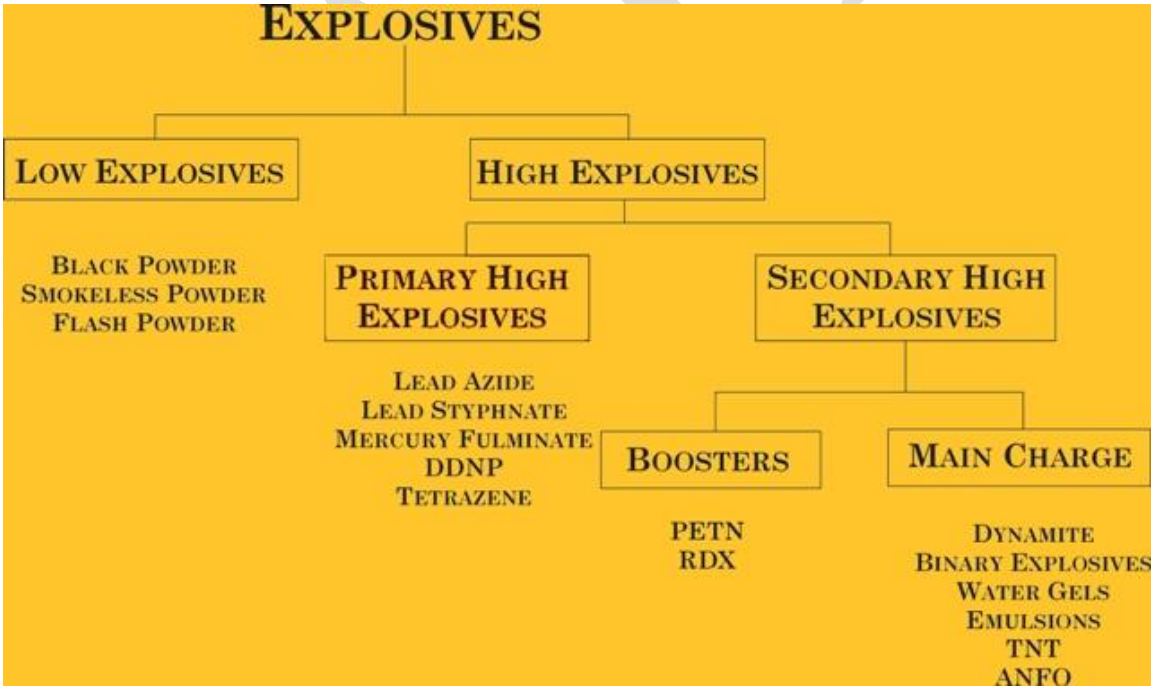
Hybrid alarms combine the hardwired zone features of conventional fire alarms with the addressable loops of the addressable fire alarms into a single panel. This combined technology fits some of the settings better than either the addressable or the conventional alarm.

When choosing a new commercial fire alarm, it is important to choose the alarm that is right for your space. For more information on installing a commercial fire alarm, call Fireline today!

Commercial Fire Alarms with Fireline

At Fireline, we offer an array of portable fire extinguishers, fire alarms, and sprinkler systems to keep commercial kitchens safe. **Fireline** offers the highest quality alarm systems to keep your business safe from fires and carbon monoxide poisoning. We also offer fire suppression systems as well to help keep commercial fires controlled should they break out. Our trained technicians will work with you to determine which air sampling smoke detection system is best for your business. We will also help install and maintain the system for your commercial building.

CLASSIFICATION OF EXPLOSIVES



1. Propellants or **low explosives** are combustible materials, containing within themselves all oxygen needful for their combustion, which burn but do not explode, and function by producing gas which produces an explosion. Under normal conditions, low explosives

undergo deflagration at rates that vary from a few centimeters per second to approximately 400 metres per second. It is possible for them to deflagrate very quickly, producing an effect similar to a detonation. This usually occurs when ignited in a confined space. Explosives of this class differ widely among themselves in the rate at which they deliver their energy. There are slow powders and fast powders for different uses. *Examples*: black powder, smokeless powder.

2. Primary explosives or **initiators** explode or detonate when they are heated or subjected to shock. They do not burn; sometimes they do not even contain the elements necessary for combustion. The materials themselves explode, and the explosion results whether they are confined or not. They differ considerably in their sensitivity to heat, in the amount of heat which they give off, and in their "brisance", that is, in the shock which they produce when they explode. Not all of them are brisant enough to initiate the explosion of a high explosive. *Examples*: mercury fulminate, lead azide, the lead salts of picric acid and trinitroresorcinol, m-nitrophenyldiazonium perchlorate, tetracene, nitrogen sulfide, copper acetylide, fulminating gold, nitrosoguanidine, mixtures of potassium chlorate with red phosphorus or with various other substances, the tartarates and oxalates of mercury and silver

3. High explosives detonate under the influence of the shock of the explosion of a suitable primary explosive. They do not function by burning; in fact, not all of them are combustible, but most of them can be ignited by a flame and in small amount generally burn tranquilly and can be extinguished easily. If heated to a high temperature by external heat or by their own combustion, they sometimes explode. They differ from primary explosives in not being exploded readily by heat or by shock, and generally in being more brisant and powerful. They exert a mechanical effect upon whatever is near them when they explode, whether they are confined or not. A high explosive compound detonates at rates ranging from 1,000 to 9,000 meters per second, and are, conventionally, subdivided into two explosives classes, differentiated by sensitivity:

- **Primary high explosives** are extremely sensitive to mechanical shock, friction, and heat, to which they will respond by burning rapidly or detonating.
- **Secondary high explosives**, also called **base explosives**, are relatively insensitive to shock, friction, and heat. They may burn when exposed to heat or flame in small, unconfined quantities, but detonation can occur. These are sometimes added in small amounts to blasting caps to boost their power.

Some definitions add a third category:

- **Tertiary high explosives** or blasting agents, are insensitive to shock, they cannot be reliably detonated with practical quantities of primary explosive, and, instead, require an intermediate explosive booster, of secondary explosive,

e.g. ammonium nitrate/fuel oil mixture (ANFO) and slurry (wet bag) explosives that are primarily used in large-scale mining and construction.

Examples: dynamite, trinitrotoluene, tetryl, picric acid, nitrocellulose, nitroglycerin, liquid oxygen mixed with wood pulp, fuming nitric acid mixed with nitrobenzene, compressed acetylene and cyanogen, ammonium nitrate and perchlorate, nitroguanidine.

INTRODUCTION TO INTERNAL, EXTERNAL AND TERMINAL BALLISTICS

Ballistics is the study of a projectile in motion. TC 3-22.9 defines it as "Ballistics is the science of the processes that occur from the time a firearm is fired to the time when the bullet impacts its target [and ceases movement]." Put simply, Ballistics is everything that happens the moment the firing pin comes in contact with the primer, to just before the projectile ceases movement in its target.

There are three major categories of ballistics: Internal, External, and Terminal. Internal ballistics are everything that happens to the projectile from the moment the trigger is squeezed to the moment before it exits the barrel. External ballistics is everything that happens to the projectile from the moment it exits the barrel to just before it impacts on its target (whatever it happens to be), and Terminal ballistics are what happens to the projectile from the moment it enters its target, to the moment before it comes to rest.

Knowledge of Ballistics is traditionally associated with Snipers and Squad Designated Marksmen, with the subject considered too advanced for the common Paratrooper to understand. However, it is just as important for Leaders and Paratroopers to understand the different categories of ballistics. It can help a Paratrooper to diagnose what malfunction is taking place with the weapon in the case of internal ballistics. It can help to ensure a probability of hit based off an adjusted point of aim off Center of Visible Mass, also known as a hold in the case of external ballistics. And it can help to ensure the highest probability of placement into an area that will incapacitate the enemy by switches and timers, in the case of terminal ballistics.

The category that has the greatest impact on whether the projectile will hit or miss the Paratrooper's intended target is External Ballistics. External Ballistics is comprised of Gravity, Drag, Wind, Altitude, Humidity, and Temperature. Some of these factors, such as gravity, are constants, and thus have a consistent effect on the projectile. Many of these factors are variable. Altitude, drag, humidity, temperature, and wind, all vary from shot to shot, so it is important that the Paratrooper understand what kind of an effect this has on their projectile so that they can account for it.

So to sum up, Ballistics is the study of projectiles in motion. There are three major categories of ballistics: Internal, External, and Terminal. It is important for Paratroopers and leaders to understand ballistics, so that they can compensate for the various effects they have on either the projectile or the weapon. And the Category that has the greatest effect on the projectile's intended path is External Ballistics

CHEMICAL EVIDENCE FOR EXPLOSIVES

A detailed investigation of a blast site will reveal crucial clues to lead the investigation. By thoroughly documenting the condition of the scene, including any structural damage and injuries or fatalities, investigators can slowly piece together what occurred.

Fragments of an exploded device will often be left intact, including switches, wiring, timers and circuit boards. If the timer was made from a unique type of watch, for instance, that information could help narrow the search for who created the device or where it may have come from.

After an explosion, residue from the explosive that was used will be left behind. To identify the type of explosive used, investigators may use an ion mobility spectrometer (IMS), a handheld chemical detection device, to identify residues that may be present around the blast site.

For large-scale incidents, the area of investigation may be expansive. The bombing of the Pan Am Flight 103 over Lockerbie, Scotland in 1988 created the largest crime scene in the world. It stretched for more than 1,200 square miles. By painstakingly piecing together the wreckage that was found in this area, investigators identified trace amounts of explosives that helped confirm the incident was indeed caused by a terrorist attack. Two hundred seventy people died that day—259 on the plane and 11 residents of Lockerbie.

In addition to collecting physical evidence, video footage may be available from security cameras or from witnesses' cell phones. Investigators will also interview witnesses and victims to gather crucial details.

How the Evidence Is Collected

If an undetonated device is located, it must first be rendered safe. A bomb should never be moved from where it was found because it could detonate. This should only be conducted by a qualified bomb technician. Safety is the primary consideration; damage to a structure can be repaired, but injury to a person could be life-altering or fatal.

To examine the type of explosive, bomb technicians use remote robotic equipment to take pictures of the device, or even to detonate the bomb. Robots are commonly fitted with a device

that can shoot a high velocity jet of water into the device, disrupting it. The bomb squad technician can then move in to confirm the area is safe and law enforcement can begin an investigation.

A bomb squad technician may also use a portable X-ray tool to examine a suspicious package to determine if it contains an explosive. X-rays are commonly used in airports to examine luggage to ensure baggage does not contain explosive devices.

Before being transported from the scene, all physical evidence is photographed, packaged, placed into containers, labeled and secured. Evidence could even be lodged in the bodies of victims or a suicide bomber. The body can be examined via X-ray images and the evidence retrieved if necessary.

If a community doesn't have its own specialized unit to handle explosives, it will have an agreement with a nearby bomb squad to handle these types of situations.

Who Conducts the Analysis

Several professionals may be involved in examining explosives evidence or a destructive device. A chemist who is specially trained examines items for explosive residues. This practitioner may work in concert with explosive device specialists who have knowledge of electrical components, expertise in device reconstruction and an understanding of post-blast damage.

In circumstances involving terrorist IEDs, the devices are analyzed by the FBI's Terrorist Explosive Device Analytical Center (**TEDAC**). TEDAC is located at the FBI Laboratory in Quantico, Virginia. IEDs collected from around the world are sent to TEDAC for forensic examination.

How and Where the Analysis is Performed

Once a device is rendered safe, it can be analyzed like any other piece of evidence to search for leads regarding who was responsible for creating and deploying the device. If large fragments of the device are retrieved, DNA or fingerprints may be present that analysts can attempt to match to a suspect. DNA profiles are compared to records in the FBI's national Combined DNA Index System database, "CODIS". **Learn more about DNA ▸**

Post-blast explosive residues can be analyzed using a variety of techniques such as infrared spectroscopy, gas chromatography/mass spectrometry, energy dispersive X-ray analysis, Raman spectroscopy and other techniques. **Learn more about drug chemistry ▸**

Explosive devices can be searched against several national databases that are maintained to identify trends in the manufacture of explosives, and track bomb and device designs employed by serial bombers and terrorist groups. These databases include the FBI's Terrorist Explosive Device Analytical Center, the ATF's Arson and Explosives National Repository and the National Fire Incident Reporting System.

GENERAL AND INDIVIDUAL CHARACTERISTICS OF HANDWRITING

As considered in the discussion of the learning process, individual characteristics, unlike class characteristics, are thought of as unique to a specific writer. This is not quite true; it requires a combination of individual characteristics and frequency of occurrence to make an individual's handwriting unique to him. Just as one number to a safe combination lock can be found in numerous other safes, a large enough series of numbers in a specific order will be unique to only one safe.

The following handwriting characteristics are some of those that tend to lend themselves to individualization and as such, are closely scrutinized by the examiner during a handwriting comparison.

Skill Level

Skill level can best be described as an appreciation of beauty as applied to handwriting. An individual with a **high skill level** produces writing that is fluid, rhythmic, perhaps artistically embellished and, in short, aesthetically pleasing to the eye. An individual with a **low skill level** produces a product that is hesitating, slowly executed, may contain grotesque, although repeated letter formations, and in general, is not very pleasing to the eye.

Skill level, by itself may be one of the more important characteristics of identification or non-identification. One of the basic concepts of handwriting identification is that a person with a low skill level cannot write above that level, while a person with a high skill level can write to a lower level, or generally produce writing of a lesser quality than what is his norm. This concept will, at times, allow for the disassociation (if not elimination) of a suspect from a questioned body of writing. If the questioned writing displays an extremely high skill level, the writer that can only produce a much lower quality of writing could not have written the questioned material. A person with a lower skill level attempting to produce a higher level of writing is for the most part abandoning his own handwriting and is attempting to fashion an artistic form of an imagined handwriting style. This is, in fact, a disguised form of writing.

Slant or Inclination

Slant refers to the angle of inclination of writing or a letter of writing from the base line of that writing. It may be forward and leaning to the right, or "backhand" if it leans to the left.

The slant of a writing may change from the beginning of a word to the end of a word, or from the beginning of a sentence, paragraph, or page to the end of that sentence, paragraph, or page. If this change in slant is reproduced habitually, it may be of itself an identifying characteristic. Often a forward or a backhand slant is thought of as indicative of a right-handed or left-handed writer. This is far from definitive. Although many left-handed individuals do maintain a backhand slant to their writing, this is not specific to just "lefties".

Writing slant, as an individual identifying characteristic, does not normally carry the weight that many other areas of examination would. However, a questioned body of writing that maintains a forward slant is obviously quite dissimilar from another body of writing that maintains a backhand slant.

Many graphologists actually attempt to quantitate slant by physically measuring the angles and putting the results into report form. They may then draw conclusions that slight differences are indicative of one writer because they are, after all, only slight differences, or different writers because there are differences. This is patently absurd.

Form

This is probably the most basic of individual characteristics. **Form** is the pictorial representation of a letter or writing movement. A highly visible dissimilarity in the form of the same letter found in both the questioned and standard material is an inherent difference in handwriting.

Form is the first of the individual characteristics that will receive the document examiner's close scrutiny. It is the lamppost that lights the way for the rest of the handwriting comparison.

Movement

This is the manner in which the pen moves in order to form a letter. Some parts of movement have been historically referred to as "Garland" if the pen moves overhand, or clockwise, producing rounded letter formations, or "Arcade" if the pen moves underhand, or counter-clockwise, producing saw-toothed letter formations. While correct these terms are often found in the speech patterns and report language of graphologists.

The importance of **movement** is readily apparent. Two letters that are correct in form and pictorially similar, can be quite different when it comes to the direction that the pen was moving when they were produced. Two similar appearing lower-case "t's" may have the crossing strokes made with the pen going left to right in one, and right to left in the other. While appearing similar, these two "t's" are, in fact, fundamentally different.

Direction of movement of the writing implement can often be determined by low-power microscopic observation of the ink or pencil line. A majority of ballpoint pens, because of normally occurring defects in the ball housing, leave behind striae in the ink line. During changes in pen direction these striae will move from the inside of the ink line to the outside. The shorter "leg" of the striation indicates where the pen came from, and the longer portion of the striation, where it is going.

Determining pencil direction is quite different but again relatively simplistic. While the surface of writing paper appears to be very smooth to the touch and naked eye, it is in reality made of fibrous material that has definite texture, albeit microscopic. These randomly crisscrossing fibers remove portions of the pencil "lead" as the pencil scrapes across the paper's surface. Microscopically, a buildup of the lead will be observed to be thicker on the trailing edges of the fibers than on the leading edges. This will indicate direction, the pencil moving from the direction of the heavy deposited sides of the fibers to the sides of lesser deposits.

Proportions

Proportions generally refers to the symmetry of an individual letter. Using the letter "B" as an example, is the top "bulb" the same size as the bottom "bulb?" Is one portion of the letter thinner than another? This concept usually develops a relationship between one portion of a letter to another portion of that same letter.

Height Ratios

Height ratios are a comparison or correlation of the height of one letter or letter segment to another letter, usually within the same word or signature. One would expect all capital letters in the same writing system to maintain the same height throughout a body of writing. However, the heights of capital letters in an individual's writing may vary from one letter to another. A capital "K" may always maintain a slight height advantage over a capital "L", or "Z" or other letter. The same concept is likewise utilized in a comparison of lower case letters, or in a comparison of lower case letters to upper case letters. Thus, combinations of various height ratios are often uniquely individual and habitual to a specific writer.

Of all individual characteristics, height ratios seem to be the most difficult characteristic for a forger to accurately reproduce.

The "i" dot

A portion of writing as small and as innocuous as an **"i" dot** may at times become a prominent identifying characteristic. "I" dots come in all sizes and shapes. They may be horseshoe shaped with the open end to the right, up, down or left, or be simply dots, circles, or dashes inclined up or down. In many teenage girls, they may be made in the shape of hearts.

The "t" crossing

"T" crossings occupy much the same weight, or more, for the document examiner as the "i" dot does. A **"t" crossing** may go from right to left, left to right, it may incline up, incline down, or be perfectly horizontal. It may be heavily shaded on the right or heavily shaded on the left. The "t" may be crossed at the top of the letter, near the bottom, or in the middle. It may be connected to an exit stroke from a terminal letter of a word in a hasty attempt by the individual to cross the "t" without lifting the pen from the paper.

Loops

Loops found in a cursively written letter may be symmetrical or may be flat on one side and therefore be asymmetrical. They may be thin or bulbous. They may be rounded at the apex or may be sharply pointed like a needle.

Pressure/Shading

This concept is the study of changing width of a line as pen pressure varies. It may indicate the direction of movement.

Alignment To Baseline

This is simply the relationship of the questioned writing to a baseline. It is the adherence of the writing to either a preformed (printed) or imaginary **baseline**. The writing may slant upward, downward, be concave or convex, or have a pattern of changes for different words, word portions, or signatures. It may follow the baseline, or go through the baseline, or be irregular with regard to the baseline.

Pen Lifts

Here we note where the writing implement lifts from the paper, usually interior to a word or signature. It may be a natural occurrence for a specific writer to lift the pen at an unusual point in the writing or it may be an indicator of spuriousness if it is in the form of patching or not found in the standard material.

Speed

Pen **speed** is often an essential element of the examination process. As will be discussed elsewhere, fast, fluid pen movement is difficult to duplicate by a forger. The following comparison depicts many of the indicators of fast or slow writing:

Fast

Smooth Writing Movements
Elongated & misplaced "i" dots & "t" crossings
Words or initials connected
A "flattened" appearance. Lessened legibility

Slow

Hesitation, tremor, more angular writing
"i" dots & "t" crossings in corrrect position
Sharp delineation between separate pen movements
Blunt starts and stops
Writing is made of individual letters and legible
Movements may be ornamental

Embellishments

Embellishments are most often located at the beginning of a letter, but may be throughout the written material. They usually take the form of an added movement that decorates the writing, such as swirls, added loops, concentric circles, flourishes, etc.

Entry/Exit Strokes

The entry and exit strokes of a letter may repeat themselves in similar letter formations such as "U's" and "V's" or perhaps "M's" and "N's". However, they may be in the form of a beginning or ending embellishment or a continuation from one letter to the next. Entry and exit strokes can be habitual movements and therefore identifying characteristics. The same may be said for connecting strokes from one letter to another in cursive writing. Some connecting strokes may be similarly found in hand printing where letters are quickly written creating a bridge between them. Connecting strokes tend to allow the individual to be more creative while developing individual characteristics as they may not have been emphasized to any great extent during the learning process.

Retracing

Retracing is the process wherein the pen reinks a written portion of the line, usually in the opposite direction, such as a downward movement followed by un upward movement over the existing line. While it usually is a natural part of the writing experience, if it occurs as a form of patching to correct the form of a letter, it may be indicative of forgery.

Spelling/Spacing

The simple act of misspelling words can, of themselves, be individual, in combination, to a specific individual. Take for example the actual case of a Lithuanian seaman who in the body of one questioned document spelled: "because"-"b'cause", "shoes"-"schoes, "tennis"-"tenis", "sweater"-"sweather", and "pajamas"-"pygemas". These same spelling errors were found in standard material that had been dictated to the suspect. Without looking any further the examiner already had a pretty firm grasp on who the writer of the disputed document was just from the similar misspellings.

Likewise, there are those writers who will put pen lifts and breaks between specific letter combinations. **Spacing** between adjacent letters or even words in a questioned writing may again display habitual characteristics of a specific writer.

Format

The **format** of a disputed document may additionally be an identifying characteristic. Using a personal check as an example, one individual may use the term "no cents", another may use "00/xxx" or perhaps "00/100." Ampersands, if used, also tend to be unique.

In much the same manner, dates appearing on checks may be in the form of numeral days, months, and years separated by dashes or diagonal lines. Abbreviations of the months of the year, or spelling the months out in their entirety may be habitual. Each of these different date formats may be the habitual characteristic of a specific writer. A writer asked to write exemplar material when the questioned document is a check, may disguise his writing admirably, perhaps even to the extent that a viable handwriting comparison is precluded, but he may then slip and duplicate the questioned format. While this in itself may not be enough for an identification, it may be enough to couch an opinion in probability.

Case

On occasion, a writer will use an upper case form of a letter in a place usually reserved for the lower case form, or vice versa. These characteristics, if found in both questioned and standard material may be highly significant.

EXAMINATION AND COMPARISON OF HANDWRITINGS AND ANALYSIS OF INK VARIOUS SAMPLES

Ink and paper analysis

Apart from the microscopic examination and the use of optical methods to examine various items (exhibits) that may reveal evidence about the document source or whether or not a nexus exits between various documents, there may be a need to chemically analyse the materials used in the document production.

This may involve analysis of the substrate (paper, film, etc.,) or the types of inks used on the documents which would include, writing, rubber stamp, seal pad ink, printing and any other substances that may be applied to the document surface (adhesive, correction fluids, lip stick).

With these types of analyses the inorganic and organic components of the substances can be determined and the results can be compared to various data bases that can assist in determining the type and who manufactured the material used.

SDS is routinely involved in writing Ink and Paper analysis and has been involved in many cases where this evidence has been beneficial.

Writing inks:

The analysis of the writing inks used on a document can produce useful information such as; type of ink used and who manufactured that ink, how many different types of inks have been used, have ink entries on a document been altered, added or substituted, could certain entries be written contemporaneously or at different times and when could the document have been signed or written?

Non destructive techniques are used in the first instance and involve microscopic, variable wavelength light source illumination techniques (Polilight etc.,) and lasers to examine the inks on the documents. The use of different wavelengths of the electromagnetic spectrum provides an examiner with a large number of different techniques to determine the optical properties and some of these techniques are used routinely to reveal, faded, erased and obliterated entries (pencil and ink) or used to examine damaged documents which have been burnt, water or solvent affected or even digested!

In situations where the inks have similar optical properties, and appear indistinguishable there will be a need to resort to further non destructive analysis (microspectrophotometry etc.,) or destructive techniques were inks samples are removed from the substrate and the dyes of the inks are chemically extracted and analysed using a variety of methods although different techniques are utilised for Gel inks.

SDS has access to a Writing Ink Library of over 8000 writing ink samples and this library can be used to identify the manufacturer of the ink and provide information concerning the use of this ink by various writing ink manufacturers.

These techniques are used and have been used in a number of prominent cases including the War Crimes Cases, Homicide Cases, Fraud cases and Pharmaceutical Extortion Cases (Panadol/Herron extortion case).

Paper examination and analysis:

A complete analysis of the substrate used to produce a document can be important aspect of an investigation into Extortion, Kidnapping, Terrorism, Counterfeiting and Product Tampering and Copyright issues.

Also this type of analysis can be used in paper document dating cases where changes in paper furnish formulation may determine whether or not a document could have been in existence at a particular time. Also the change in acid sizing to alkaline sizing at the various mills can be used for this purpose.

Initially, the examination will involve non-destructive testing whereby the physical and optical properties of one or more paper samples can be determined. Also the use of Beta Rays and X-rays can provide a great deal of information about watermarks, fibre distribution and sheet formation characteristics. An analysis of the organic and inorganic components can also be undertaken and a furnish analysis, although destructive; a small sample is required and can reveal a great deal about the pulps present and the method of paper production.

Information may be obtained that can determine the manufacturer of the substrate, whether or not two or more papers are different chemically and physically or are indistinguishable.

These techniques are used and have been used in a number of prominent cases including the Australian $50 note counterfeit currency case, major cases involving counterfeit US Currency and Traveller Cheques etc.

Important Questions

2 Marks

1. What are classifications of fire arms?
2. Define Ballistics.
3. Explain in short about the characteristics of handwriting.
4. How do you classify explosives
5. How do you examine handwriting?
6. Enumerate the situation where hand writing is compared.
7. What is ink analysis?
8. Comparison internal and external Ballistics.

08 Marks

1. Explain in details about explosives.
2. How do chemicals provide a clue for explosive analysis?
3. Explain the basis of ascertaining individual characteristics of handwriting.
4. Examination and comparison of handwriting and analysis of ink various samples.

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
Unit I					
Who was the forensic scientist?	Sherlock Holmes	Leon Lattes	Alphonse Bertillion	Francis Galton	Sherlock Holmes
Who was the first scientist to bring into account the idea of anthropometry	Calvin Goddard	Albert S. Osborne	Walter C. McCrone	Alphonse Bertillion	Alphonse Bertillion
Which of the following would most likely Not A purpose of phycial evidence	Establishing that a crime has been committed	Providing a link between a crime and its victim or a crime and its perpetrator	Tracing the original manufactures for the weapons present at a crime scene	Providing investigative leads for a case	Tracing the original manufactures for the weapons present at a crime scene
Which of the following would be a method of recording the crime scene	Note-taking	Sketching the crime scene	Note taking and Sketching	Having a witness describe the scene to a crime scene investigator	Note taking and Sketching
When taking photos of a crime scene, the most important thing to consider is that:	The scene should be photographed in an unaltered condition	he scene should be photographed in color	The points of entrance and exit should be photographed	Close ups of injured victims should be taken	The scene should be photographed in an unaltered condition
Whatis the method that is used when sketching a crime scene	The triangulation method	The fixed distance method	The Pythagorean Theorem	Direct Standard Comparison	The triangulation method
Which of the following is NOT an official crime scene organization	*The FDA*	The FB	The DEA	The ATF	*The FDA*
On the State level, crime labs	*Provide services to county and municipal agencies*	*Service state and local law enforcement*	Are financed by the local government	Must be put under the direction of an official crime scene investigation unit	*Service state and local law enforcement*
Which of the following is a basic unit of a crime lab	The Latent Fingerprint Unit	The Evidence Collection Unit	The Toxicology Unit	The Physical sciences unit	The Physical sciences unit
he Biology Unit of a crime lab Analyzes	DNA and body fluids	Hairs and fibers	The presence of poisons at a crime scene	More than oneof the above	More than oneof the above
The Document Examination Unit of a Crime Lab Will do which of the following	*Determine the authenticity*	Check for handwriting	*Use paper and ink analysis to analyze the documents*	*Source of Evidence*	*Use paper and ink analysis to analyze the documents*
Which of the following units at a crime lab would most likely be used to definitely convict a suspect in the commission of a crime	*The Firearms Unit*	The Polygraph Unit	*The Latent Fingerprint Unit*	The Voiceprint Analysis Uni	*The Latent Fingerprint Unit*
Which of the following is NOT a method when searching a crime scene	The Spiral Search Method	The Quadrant or Zone Search method	The Strip or Line Search method	The Geometric layout method	The Geometric layout method
Which of the following could be removed at the scene of a crime from an article of clothing?	*Hairs*	Blood	Fibers	Glass fragments	Blood
Which of the following would qualify as a legal allowance for a warrant-less search at a crime scene	*The existence of emergency circumstances*	The need to prevent the immediate loss or destruction of evidence	*A search made by the consent of the parties involved*	More than one of the above	More than one of the above
Which of the following needs to established if any evidence is to be presented in court?	The names of all potential suspects involved in the crime	*All victims that were harmed as a result of the crime*	*The continuity of possessio*	*The particular type of test that was used when testing evidence gathered from a crime scene*	*The particular type of test that was used when testing evidence gathered from a crime scene*
Conventional serology would involve:	Species identification and ABO grouping	Analyzing the direction	Identifying the type of vehicle	Identifying the type of vehicle	Species identification and ABO grouping
For toxicological analysis, which of the following is classified as a volatile compound?	Drugs of abuse and pharmaceuticals	Arsenic	Ethanol, methanol, isopropanol	Strychnine, cyanide	Ethanol, methanol, isopropano
The first step of gathering physical evidence involves	Packaging, conveying and storing it	Exhibit it to the lead investigator	Collecting, recording and identifying it	Discovering and Analysing	Discovering and Analysing
Rope and Cordage Identification (specifically) involves	Composition, construction, color and diameter of it	The presence of burn patterns	The presence of burn patterns	The presence of burn patterns and Composition, construction, color and diameter of it	The presence of burn patterns and Composition, construction, color and diameter of it
A lady died due to unnatural death within seven years after her marriage. The inquest in this case will be done by ?	Forensic medicine expert	Deputy Superintendent of Police	Sub-Divisional Magistrat	Coroner	Sub-Divisional Magistrat
The ideal place to record temperature in dead body is from ?	Axilla	Groin	Rectum	Rectum	Rectum
Diffusion of oxygen at the tissue level is affected in all the following poisonings, except ?	Carbon monoxide	Curare	Phosgene	Cyanides	Curare
n methyl alcohol poisoning there is CNS depression, cardiac depression and optic nerve atrophy. These effects are produced due to	Formaldehyde and formic acid	Acetaldehyde	Pyridine	Acetic acid	Formaldehyde and formic acid
In chronic arsenic poisoning the following samples can be sent for laboratory examination, except ?	Nail clippings	Nail clippings	Bone biopsy	Blood sample	Blood sample
In India, magistrate inquest is done in the following cases, except ?	Exhumation cases	Dowry deaths within 5 years of marriage	Murder cases	Death of a person in police custody	Murder cases
At autopsy, the cyanide poisoning case will show the following features, except ?	Characteristic bitter lemon smel	Congested organs	The skin may be pinkish or cherry red in colour	Erosion and haemorrhages in oesophagus and stomach	Characteristic bitter lemon smel
The minimum age at which an individual is responsible for his criminal act is ?	7 years	16 years	12years	20 years	7 years
The most reliable method of identification of an individual is ?	Dactylography	Scars	Anthropometry	Handwriting	Dactylography
Rule of Hasse is used to determine ?	The age of fetus	Height of an adult	Race of a person	Identification	The age of fetus
Which of the following tissue putrifies late ?	Brain	Prostate	Prostate	Stomach	Prostate
n a suspected case of death due to poisoning where cadaveric rigidity is lasting longer than usual, it may be a case of poisoning due to ?	Lead	Arsenic	Mercury	Copper	Arsenic
Contre-coup injuries are seen in?	Brain	Heart	Liver	Pancreas	Brain
A dead body is having cadaveric lividity of bluish green colour. The most likely cause of death is by poisoning due to ?	Hydrocyanic acid	Hydrogen sulphide	Oleander	Sodium nitrite	Hydrogen sulphide
When a surgeon wants to send the autopsy specimen for virological examination, it should be preserved in ?	50 % glycerin	10 % formalin	Rectified spirit	Saturated solution of common salt	50 % glycerin
The ideal place to record body temperature in dead body is ?	Rectum	Axilla	Mouth	Groin	Rectum
A child has 24 teeth all of them are permanent, the age of this child is	*9 years*	*10 years*	*11 years*	*13 years*	*11 years*
The commonest cause of death in lacerated wound is	Fat embolism	Air embolism	infection	Hemorrhage.	infection
postmortem rigidity, select the correct statement:	It involves the smooth muscles only	It is not sure sign of death	It does not involve the cardiac muscle.	It is due to chemical process	It is due to chemical process
Which of the following is not normally a function of Police Scientific Support departments?	Laboratory analysis of trace evidence from crime scenes.	Laboratory enhancement and comparison of fingerprints.	Lifting fingerprints from crime scenes.	Photographing crime scenes.	Laboratory analysis of trace evidence from crime scenes.
With reference to the investigation of a crime scene, what would normally be the correct chronological order of events?	Emergency first aid, protection, documentation, search.	Protection, search, documentation, emergency first aid.	Emergency first aid, documentation, protection, search.	Protection, emergency first aid, documentation, search.	Protection, search, documentation, emergency first aid.
One of the following is a sure external sign of drowning that can be found in postmortem examination	Goose skin	Washer woman's hands	Peeling of the skin	Fine froth at the mouth and nostrils	Fine froth at the mouth and nostrils
The most resistant body tissue to electrical injury is:	Dry skin	Muscles	Bones	Blood and body fluid	Bones
Unit II					
In a blast injury, which of the following organ is the least vulnerable to the blast wave ?	G.I. Tract	Lungs	Lungs	Ear drum	Lungs
Cheiloscopy is the study of	Foot	Finger	Foot	Lips	Lips
Patterned" abrasion is variety of ?	Linear abrasion	Pressure abrasion	Sliding abrasion	Superficial bruise	Pressure abrasion
The most common pattern of fingerprint is ?	Arch	Loop	Whorl	Composite	Loop
In Which of the following weapons empty cartridge case is ejected after firing ?	Shot gun	Revolver	Pistol	Rifle	Rifle
Exhumation is usually done in ?	Night	Early morning	Daytime	Any time during the day	Early morning
In India, the time limit for exhumation is ?	within 7 days	within 30 days	within 6 months	no time limit	no time limit
The fingerprint pattern may be impaired permanently in cases of ?	Eczema	Scalds	Scabies	Leprosy	Leprosy
The three basic types of fingerprint pattern are:	arches, loops and rings.	whorls, accidentals and loops	whorls, arches and accidenta	loops, arches and whorls	whorls, accidentals and loops
Which of the following is not one of the features that must be present in order for a fingerprint pattern to be classified as a loop pattern?	A core	A minimum ridge count of one	A single delta	A ridge ending	A ridge ending
In the comparison of a scene fingerprint with one held on the IDENT1 database, a full identification is made:	when a minimum number of 8 matching characteristics are found	when a minimum number of 16 matching characteristics are found	at the discretion of the fingerprint expert, who may later have to defend his or her decisior	when a minimum number of 10 matching characteristics are found.	at the discretion of the fingerprint expert, who may later have to defend his or her decision in court.
Which of the following statements is not true?	Plastic fingerprints are three dimensional.	Latent fingerprints require development in order to make them visible.	Plastic fingerprints involve the deposition of material onto a surface.	Latent fingerprints are invisible to the naked eye.	Plastic fingerprints involve the deposition of material onto a surface.
Which of the following fingerprint visualisation techniques is particularly effective on paper that has been wet, materials soaked in petrol and chip wrappers?	Physical developer	Superglue fuming	Gentian Violet	Sudan Black	Physical developer
The technique of casting may be used to recover impressions of:	bite marks, footwear and latent fingerprints.	bite marks, footwear and tyres.	footwear, tyres and visible fingerprints.	tyres, bite marks and impressions on textiles.	bite marks, footwear and latent fingerprints.
In the comparison of test impressions and scene impressions of footwear, which of the following is not a class characteristic?	Random damage marks.	Sole pattern.	Size of the shoe.	Type of shoe	Random damage marks.
Tyre prints impressed into deep snow are categorised as:	transfer prints.	latent prints.	plastic prints	plastic prints	plastic prints
The average fingerprint has approximately how many individual ridge characteristics?	75	150	225	300	150
What is the basis for the determination of the primary classification of fingerprints?	the presence or absence of arch patterns	*the presence or absence of whorl patterns*	*the presence or absence of loop patterns*	*the presence or absence of minutiae*	*the presence or absence of whorl patterns*
For most fingerprint examiners, the chemical method of choice for visualizing latent prints is	*ninhydrin*	*iodine*	*silver nitrate*	*chlorate*	*ninhydrin*
Handwriting which is joined up and in lower case is known as:	graphic.	cursive.	disconnected.	script.	cursive.
Which of the following statements is not true?	An individual's handwriting may show variation as a result of stress or illness.	The handwriting of an individual is unaffected by advancing years.	The influence of alcohol or drugs may cause variation in an individual's handwriting.	The handwriting of an individual shows natural variation.	The handwriting of an individual is unaffected by advancing years.
Which of the following is characteristic of genuine signatures (as opposed to forged signatures)?	Pen strokes with blunt ends.	Evidence of retouching	Unnatural pen lifts.	Pen strokes with tapering ends.	Pen strokes with tapering ends.
The traditional printing method of relief printing is also known as:	letterpress	gravure	intaglio	lithography	letterpress.
Which of the following is not a true meaning of the word 'bullet'?	A small sphere	One of those small arms projectiles fired one at a time from the barrel of a gun	The complete assembly of cartridge case, primer, propellant and projectile that is to be fi	A projectile used for a small calibre gun	The complete assembly of cartridge case, primer, propellant and projectile that is to be fired in a gun
The term 'self-loading pistol' is strictly synonymous with which one of the following?	Double-action revolver	Single-action revolver	Semi-automatic pistol	Automatic pistol	Semi-automatic pistol
Which of the following is not a term that is used to indicate the shape of a bullet?	Wadcutter	Round nose	Round nose	Cannelure	Cannelure
Which of the following are individualising characteristics that have the potential to establish the identity of the gun(s) involved?	The calibre of the spent cartridge case(s).	The exact relative positions of extractor and ejector marks on the spent cartridge case(s).	The twist direction of any rifling marks found on bullet(s) recovered from the scene	The pattern of minute parallel striations that make up the mark made by a particular rifling land on bullet(s) recovered	The pattern of minute parallel striations that make up the mark made by a particular rifling land on bullet(s) recovered from the scene.
Which one of the following is used to analyse for the presence of gunshot residues?	Scanning electron microscopy used in conjunction with energy dispersive X-ray analys	Microspectrophotometry	Refractive index measurements	Polarized light microscopy	Scanning electron microscopy used in conjunction with energy dispersive X-ray analysis.
An explosive that normally detonates is known as:	a high explosive	a primary explosive	a secondary explosive	a low explosive	a high explosive
A secondary explosive is, by definition	the main charge of an explosive device that is set off by a small quantity of explosive	a low explosive.	a dispersed explosive.	a deflagrating explosive.	the main charge of an explosive device that is set off by a small quantity of explosive that is relatively easier to initiate than itself
Unit III					
Which of the following statements is not true?	An alkaloid is any of a group of nitrogen-containing organic bases that occur in animal	A pesticide is a chemical agent that is used to kill pest organisms.	Cyanide is one of the most toxic anions.	A corrosive poison is one that causes destruction of the body tissues upon contact.	An alkaloid is any of a group of nitrogen-containing organic bases that occur in animals.
Which of the following toxins comes from the castor oil plant?	Strychnine.	Ricin	Digitalin.	Atropine.	Ricin
The term 'controlled drug' is applied to:	any drug that is subject to the Misuse of Drugs Act 1971.	any drug that is available only on prescription.	any prescription drug that is diverted to the black market for illegal usage.	any drug that is subject to the Intoxicating Substance (Supply) Act 1985.	any drug that is subject to the Misuse of Drugs Act 1971.
A drug that induces alterations in perception and mood (without either arousing or inhibiting brain activity) is known as:	an hallucinogen	a cutting agent	a stimulant	a depressant	an hallucinogen
Which of the following is commonly known as ecstasy?	Amphetamine.	Methamphetamine.	3,4-methylenedioxyamphetamine (MDA).	3,4-methylenedioxymethamphetamine (MDMA).	3,4-methylenedioxymethamphetamine (MDMA).
pH of seminal fluid is	6	7	7.4	8.2	7.4
Poroscopy is	Counting pores of sweat glands only	Counting pores of both sweat and sebaceous glands	Counting number of ridges	Counting number of ridges and sweat glands	Counting pores of sweat glands only
attoo marks destroyed, their presence can be inferred from presence of pigment in	Deep dermis	Subcutaneous tissue	Lymph nodes Regiona	Underlying Muscle	Lymph nodes Regiona
Bluish discolouration of neck of tooth due to	Cyanosis	Bismuth	Copper	Nicotine	Nicotine
Pathological jealousy is diagnostic of:	Cocaine intoxication	Cannabis intoxication	Alcoholic intoxication	Tobacco intoxication	Alcoholic intoxication
In case of acute CO poisoning, coma and death with lively red colour occur at a carboxy haemoglobin level of:	10-20%	20-30%	30-40%	50- 60 %	50- 60 %
One of the following manifestations is an indication of severe ethanol intoxication:	Euphoria and sense of well-being	Marked muscular incoordination	Increased confidence	Aggressive behaviour	Marked muscular incoordination
MAcEwen's sign is a manifestation of massive intake of:	Atropine	Opium	Methanol	Ethanol	Ethanol
In case of foodborne botulism, the toxin is:	Formed in the duodenum	Formed in the colon	Formed in the intestine	Formed in the canned food before consumption	Formed in the canned food before consumption
Benzodiazepines act on the CNS through the following mechanism:	Increasing catecholamines	Increasing serotonin	Increasing the activity of GABA	Decreasing the activity of GABA	Increasing the activity of GABA
Which of the following is specific antidote for acute acetaminophen toxicity:	BAL	Mucomyst	EDTA	DMSA	Mucomyst
The second stage of acute acetaminophen toxicity is characterized by:	Abnormalities of liver function tests	Bleeding tendencies due to coagulation defect	Nausea and malaise	Right upper quadrant pain and tenderness	Abnormalities of liver function tests
Prolonged prothrombin time occurs in cases of poisoning with:	Parathion	Warfarin	Paraquat	Zinc sulphide	Warfarin
Unit IV					
Which of the following statements about tandem repetitive DNA are correct?	STRs are the same as microsatellite DNA.	It is usually classified according to the number of repeats.	Tandem means two repeats next to each other.	VNTRs are not a type of minisatellite DNA.	STRs are the same as microsatellite DNA.
For the SGM+ system, which of the following are correct?	All the loci have many alleles (are multi-allelic).	It is based on multiplex PCR.	All the loci are on the different chromosomes.	All the loci are STRs.	It is based on multiplex PCR.
Most of the loci in the SGM+ system are present in regions of "junk" DNA or in the intron regions of genes – this results in	the alleles being selectively neutral.	the genotypes at these loci not indicating anything about the physical attributes of the person.	the phenotype of the person not being influenced by the genotype.	the genotype having no health implications for the carrier	the phenotype of the person not being influenced by the genotype.
In the SGM+ system, regarding the Amelogenin locus, which are true?	The locus examined is an STR	Two peaks in the analysis indicate that the sample probably originated from a male.	The allele on the Y chromosome is shorter than that on the X chromosome.	Two peaks in the analysis indicate the sample probably originated from a female	Two peaks in the analysis indicate that the sample probably originated from a male.
Which of the following points are correct for LCN DNA analysis?	It is not based on STR analysis	It increases the sensitivity of the DNA profiling	It decreases the amount of evidence needed to generate a profile.	It is used to analyse mtDNA.	It decreases the amount of evidence needed to generate a profile.
Using SGM+, a profile which is found in evidence and a suspect is calculated to have a frequency of 5 x 10-9. Which of the following statements are correct?	It is 2 x 10^8 times more likely that the evidence originated from the suspect than anot	One person in two-hundred million is expected to show the profile.	The likelihood ratio is 5 x 10^{-9}	The match probability is 1 in 2 x 10^8	The match probability is 1 in 2 x 10^8
A child has the genotype 12, 15 at the THO1 STR locus, which of the following couples could be its parents?	Woman 12, 15; man 8, 14	Woman 12, 12; man 8, 15	Woman 12, 10; man 8, 15.	Woman 3, 5; man 12, 10	Woman 12, 15; man 8, 14
Which of the following statements about mtDNA are true?	Individuals carry maternal and paternal mtDNAs.	Analysis is carried out using the SGM$^+$ system.	Genetic differences between individuals are mainly point mutations	Genes on the mtDNA are present in multi-copies whereas genes in nuclear DNA are present twice	Genetic differences between individuals are mainly point mutations
Comparing the HV1 and HV2 mtDNA sequences from a person to members of their family - which of the following statements are true?	Sisters would show identical sequences but brothers' sequences would be different	The mother's sequences would be identical.	All siblings would show the same sequence.	The sequences would be identical to the father's	The mother's sequences would be identical.
What is the maximum number of alleles a SNP can have?	12	2	4	20	4
A particular SNP locus can be A, C or T. How many genotypes can be expected to be found in the population?	3	6	9	12	9
For the SNP above, the allele frequencies for A, C and T are 0.03, 0.68 and 0.29, respectively. In a population of 10,000, the number of people expected to only ha	300	900		6	9
Comparing SNP markers to STR based analysis, which of the following are true?	There are many more SNP markers in the human genome than STR loci.	There are many more STR loci in the genome.	SNP loci generally have more alleles than STR loci.	The number of SNP loci is about the same as the number of STR loci in the genome.	There are many more SNP markers in the human genome than STR loci.
Comparing SNP markers to STR based analysis, which of the following are true?	For a given number of STR loci, it would require the same number of SNP loci to achie	SNP loci could not be used for DNA profiling.	For a given number of STR loci, it would require a higher number of SNP loci to achieve th	For a given number of STR loci, it would require a lower number of SNP loci to achieve the same discrimination.	For a given number of STR loci, it would require a lower number of SNP loci to achieve the same discrimination.
Acute toxicity of organophosphates causes	Urine retention	Oliguria	Urine incontinence	Anuria	Urine incontinence
The specific antidote in case of iron poisoning is:	DMSA	Deferoxamine	EDTA.	Penicillamine	Deferoxamine
Blue line in the gingival margin in case of lead poisoning is due to deposition of:	Lead chromate	Lead sulphide	Lead subacetate	Lead iodide	Lead sulphide
The dose of Na thiosulphate for treatment of cyanide poisoning in children is	112.5 mg/kg IV over 10-20 min.	412.5 mg/kg IV over 10-20 min	412.5 mg/kg IV over 2 min	412.5 mg/kg IV over 5 min	412.5 mg/kg IV over 10-20 min
In poisoning with hydrocyanic acid, nitrates are given in order to	Reduce cyanide	Induce vasodilatation	Produce methaemoglobin	Oxidise cyanide	Produce methaemoglobin
One of the following solvents is not metabolized in the body to cyanide	Isopropanol	Nitroprusside	Acetonitrile	Acrylonitrile	Isopropanol
Dry burn is caused by	Hot liquid or steam	Flame or hot metals	Deep x-ray or UV-rays	Strong acids or alkalies	Flame or hot metals
The presence of tache noire is suggestive that the time since death is:	One hour	2 hours	3 hours	8 hours	3 hours
The age of full criminal responsibility is	7 years	18 years			18 years
Unit IV					
Why would a hacker use a proxy server?	To create a stronger connection with the target.	To create a ghost server on the network.	To obtain a remote access connection.	To hide malicious activity on the network.	To hide malicious activity on the network.
What type of symmetric key algorithm using a streaming cipher to encrypt information?	RC4	Blowfish	SHA	MD5	RC4
Which of the following is not a factor in securing the environment against an attack on security?	The education of the attacker	The system configuration	The network architecture	The business strategy of the company	MITM
What type of attack uses a fraudulent server with a relay address?	NTLM	MITM	NetBIOS	SMB	SMB
What port is used to connect to the Active Directory in Windows 2000?	80	445	139	389	389
To hide information inside a picture, what technology is used?	Rootkits	Bitmapping	Steganography	Image Rendering	Steganography
Which phase of hacking performs actual attack on a network or system?	Reconnaissance	Maintaining Access	Scanning	Gaining Access	Gaining Access
Attempting to gain access to a network using an employee's credentials is called the ____________ mode of ethical hacking.	Local networking	Social engineering	Physical entry	Remote networking	Local networking
Which Federal Code applies the consequences of hacking activities that disrupt subway transit systems?	Electronic Communications Interception of Oral Communications	18 U.S.C. § 1029	Cyber Security Enhancement Act 2002	18 U.S.C. § 1030	Cyber Security Enhancement Act 2002
Which of the following is not a typical characteristic of an ethical hacker?	Excellent knowledge of Windows.	Understands the process of exploiting network vulnerabilities.	Patience, persistence and perseverance.	Has the highest level of security for the organization.	Has the highest level of security for the organization.
What is the proper command to perform an Nmap XMAS scan every 15seconds?	nmap -sX -sneaky	nmap -sX -paranoid	nmap -sX -aggressive	nmap -sX -polite	nmap -sX -sneaky
What type of rootkit will patch, hook, or replace the version of system call in order to hide information?	Library level rootkits	Kernel level rootkits	System level rootkits	Application level rootkits	Library level rootkits
What is the purpose of a Denial of Service attack?	Exploit a weakness in the TCP/IP stack	To execute a Trojan on a system	To overload a system so it is no longer operational	To shutdown services by turning them off	To overload a system so it is no longer operational
What is the sequence of a TCP connection?	SYN-ACK-FIN	SYN-SYN ACK-ACK	SYN-ACK	SYN-SYN-ACK	SYN-SYN ACK-ACK
What tool can be used to perform SNMP enumeration?	DNSlookup	Whois	Nslookup	IP Network Browser	IP Network Browser
Which ports should be blocked to prevent null session enumeration?	Ports 120 and 445	Ports 135 and 136	Ports 110 and 137	Ports 135 and 139	Ports 135 and 139
The first phase of hacking an IT system is compromise of which foundation of security?	Availability	Confidentiality	Integrity	Authentication	Confidentiality
How is IP address spoofing detected?	Installing and configuring a IDS that can read the IP header	Comparing the TTL values of the actual and spoofed addresses	Implementing a firewall to the network	Identify all TCP sessions that are initiated but does not complete successfully	Comparing the TTL values of the actual and spoofed addresses
Why would a ping sweep be used?	To identify live systems	To locate live systems	To identify open ports	To locate firewalls	To identify live systems
What are the port states determined by Nmap?	Active, inactive, standby	Open, half-open, closed	Open, filtered, unfiltered	Active, closed, unused	Open, filtered, unfiltered
What port does Telnet use?	22	80	20	23	23
Which of the following will allow footprinting to be conducted without detection?	PingSweep	Traceroute	War Dialers	ARIN	ARIN
Performing hacking activities with the intent on gaining visibility for an unfair situation is called ________.	Cracking	Analysis	Hacktivism	Exploitation	Hacktivism
What is the most important activity in system hacking?	Information gathering	Cracking passwords	Escalating privileges	Escalating privileges	Cracking passwords
A packet with no flags set is which type of scan?	TCP	XMAS	IDLE	NULL	NULL