SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur– 603203.

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK

VII SEMESTER

11909709-NON DESTRUCTIVE TESTING AND EVALUATION

Regulation – 2019

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UNIT-I OVERVIEW OF NDT

NDT Versus Mechanical testing, Overview of the Non Destructive Testing Methods for the detection of manufacturing defects as well as material characterization. Relative merits and limitations, Various physical characteristics of materials and their applications in NDT, Visual inspection – Unaided and aided.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1	List out the importance of using NDT.	BT1	Remember
2	Name the parameter that leads to failure of a material.	BT1	Remember
3	"Visual testing is inherently part of all other NDT methods". Justify the Statement.	BT 2	Understand
4	Discuss the objectives of non-destructive testing.	BT 2	Understand
5	Discriminate destructive testing and non-destructive testing.	BT 2	Understand
6	Examine the factors affecting mechanical properties of materials.	BT 2	Understand
7	Describe the limitations of the NDT method.	BT 2	Understand
8	Define the principle of LPT.	BT 1	Remember
9	Name two of the NDT techniques that can be used to detect internal defects of the materials.	BT 1	Remember
10	Describe visual inspection techniques.	BT 2	Understand
11	Why magnetic particle test method is not suitable for testing of plastics?	BT 1	Remember

12	Name the list of optical aids used for visual inspection.	BT 1	Remember
13	Describe the advantages and disadvantages of visual inspection.	BT 2	Understand
14	Discuss the need of material testing.	BT2	Understand
15	List the applications of thermography.	BT1	Remember
16	Define Borescope.	BT1	Remember
17	Classify the types of discontinuities.	BT 2	Understand
18	When would you use telescopes and periscopes as a visual Inspection aid?	BT1	Remember
19	Define Machine Vision Inspection.	BT1	Remember
20	Discriminate aided and unaided visual testing methods.	BT 2	Understand
21	How visual inspection done?	BT 1	Remember
22	List out 2 applications of NDT	BT 1	Remember
23	Name 2 physical characteristics of materials	BT 2	Understand
24	List out aided testing methods.	BT2	Understand
25	Point out unaided testing methods.	BT1	Remember

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	Differentiate between destructive and non-destructive testing.	13	BT3	Apply
2	With a case study discuss the applications of material characterization.	13	BT3	Apply
3	Discuss in detail about the different types of Borescopes used in visual inspection method with neat	13	BT4	Analyze

	sketches.			
4	Explain in detail about the factors influencing the selection of NDT methods.	13	BT4	Analyze
5	Classify the different types of destructive and non - destructive testing methods and applications of each technique.	13	BT3	Apply
6	Illustrate the working principle and types of visual inspection technique with suitable sketch.	13	BT3	Apply
7	Describe the following: (i) Application of visual inspection. (ii) Advantages and disadvantages of visual inspection.	 7 6	 BT3 BT4	 Apply Analyze
8	(i) Illustrate about discontinuities. Explain various types of discontinuitieswith examples.	7	BT3	Apply
	(ii) Describe with suitable sketch about the casting defects during castingProcess.	6	BT3	Apply
9	Explain with suitable sketch about the welding defects during weldingprocess.	13	BT4	Analyze
10	Examine the following with suitable sketch: (i) Elasticity (ii) Hardness (iii) Brittleness (iv) Ductility (v) Malleability	 3 3 2 2 2 1	BT4	Analyze
11	Differentiate between destructive and non-destructive testing.	13	BT3	Apply

12	With a case study discuss the applications of material characterization.	13	BT3	Apply
13	Summarize the principles of various non-destructive methods which are used to detect the material defects. State the advantage of any two NDT method.	13	BT3	Apply
14	Discuss about the application of visual inspection process with suitablecase study.	13	BT3	Apply
15	Narrate the principles of various destructive methods which are used to detect the material defects and compare the advantages of any two DT method.	13	BT4	Analyze
16	Discuss about the application of auditory inspection process with suitablecase study.	13	BT3	Apply
17	State how materials play a major role in NDT.	13	BT3	Apply
18	How physical characteristics of materials contrast with chemical properties	13	BT4	Analyze

PART-C (15 Marks)				
S.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	Illustrate the methodologies used to inspect the gear tooth profile and explain details of inspection procedure.	15	BT 5	Evaluate
2	Generalize about the attractive features and primary limitations of destructive testing methods. Explain the working principles of tensile and compression destructive tests in brief.	15	BT6	Create
3	Compare and contrast the principles, characteristics detected, advantages, limitations and applications of visual inspection, liquid penetrant testing, magnetic particle	15	BT 5	Evaluate

	testing and thermography testing methods.			
4	Compare and contrast the principles, characteristics detected, advantages, limitations and applications of eddy current testing, ultrasonic testing, acoustic emission testing and radiography testing methods.	15	BT 5	Evaluate
5	Present a case study NDT applied in defence systems.	15	BT 5	Evaluate

UNIT-II SURFACE NDE METHODS

Liquid Penetrant Testing - Principles, types and properties of liquid penetrants, developers, advantages and limitations of various methods, Testing Procedure, Interpretation of results. Magnetic Particle Testing- Theory of magnetism, inspection materials Magnetization methods, Interpretation and evaluation of test indications, Principles and methods of demagnetization, Residual magnetism.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	Discuss the principle of liquid penetrant testing.	BT-2	Understanding
2.	List the materials to be used as a developer in Liquid Penetrant Testing.	BT-2	Understanding
3.	Discuss various methods of cleaning method used for surface preparation in Liquid Penetrant Testing.	BT-2	Understanding
4.	Discuss various steps involved in Liquid Penetrant Testing.	BT-2	Understanding
5.	List different types of developer used in LPT.	BT-2	Understanding
6.	Define the terms "Dwell time and Developing time".	BT-1	Remembering
7.	Define capillary action.	BT-2	Understanding
8.	Compare Fluorescent penetrant and Visible penetrant.	BT-1	Remembering
9.	List out the merits and demerits of dry developers.	BT-1	Remembering
10.	Identify the desirable characteristics of developers used in LPT.	BT-2	Understanding
11.	Recommend the effect of size and shape of the magnetic particles on theinspection process.	BT-2	Understanding
12.	Magnetic particle inspection cannot be used to detect internal defects. Why?	BT-2	Understanding
13.	Differentiate between longitudinal and circumferential	BT-2	Understanding

	magnetism.		
14.	Why should the material be demagnetized after it is subjected to NDT?	BT-2	Understanding
15.	List the essential characteristics of magnetic particles.	BT-2	Understanding
16.	Express about residual magnetism in magnetic particle testing.	BT-2	Understanding
17.	Discuss various steps involved in magnetic particle testing.	BT-1	Remembering
18.	Describe the types of magnetic particles.	BT-1	Remembering
19.	List the methods used to magnetize the materials in MPT.	BT-2	Understanding
20.	Discuss about the applications of magnetic particle testing.	BT-1	Remembering
21.	List out 2 applications in magnetic particle testing.	BT-2	Understanding
22.	How the types of magnetic particles differentiated?	BT-1	Remembering
23.	List the methods used to magnetize the materials in NDT.	BT-1	Remembering
24.	Discuss about the non-applicability of magnetic particle testing.	BT-1	Remembering
25.	What is Residual magnetism?	BT-1	Remembering

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	Discuss about the principles of liquid penetrant testing with neat sketch. Also bring out the advantages and limitations of the liquid penetrant testing.	13	BT3	Apply
2	(i) Explain the Post-emulsifiable - lipophilie and solvent removable methods in liquid penetrant testing using process flow diagram. (ii) List the types of penetrant used in the LPT.	7 6	BT3 BT4	Apply Analyze

3	(i) Explain about various types of developers. (ii) List out various characteristics of developers.	7 6	BT3 BT4	Apply Analyze
4	Explain in detail about the following (i) Surface preparation methods. (ii) Excess penetration removal methods.	7 6	BT3 BT4	Apply Analyze
5	Explain the following (i) Principal requirements of penetrants. (ii) Properties of penetrants.	7 6	BT3 BT4	Apply Analyze
6	(i) Discuss about water washable and post emulsifiable-hydrophilie methods inliquid penetrant testing using process flow diagram. (ii) Differentiate Fluorescent Penetrants and Visible Penetrants.	7 6	BT3 BT4	Apply Analyze
7	(i) Describe about various defects and discontinuities inspect with the use ofLPT. (ii) List the applications of LPT.	7 6	BT3 BT4	Apply Analyze
8	(i) Discuss about the various ways of magnetizing the component for Magnetic Particle Testing. (ii) Limitations of Magnetic Particle Testing.	7 6	BT3 BT4	Apply Analyze
9	Explain about various steps involved in Magnetic particle inspection process with suitable flow diagram.	13	BT4	Analyze
10	Explain about dry and wet magnetic particle inspection techniques with neat diagram.	6	BT4	Analyze
	Discuss in detail about the following (i) Applications of Magnetic particle inspection process. (ii) Advantages of Magnetic Particle Testing.	4 3	BT3 BT4	Apply Analyze

11	Explain with suitable sketch about following (i) Circular Magnetization. (ii) Longitudinal Magnetization.	7 6	BT3 BT4	Apply Analyze
12	Summarize the following portable magnetization equipment (i) Permanent magnet. (ii) Electromagnetic yokes. (iii) Prods.	5 5 3	BT4	Analyze
13	Explain the following (i) Residual Magnetization. (ii)Properties of magnetic particle used in MPT.	8 5	BT3 BT4	Apply Analyze
14	Liquid Penetrant Testing - write down the steps in the selection of types	13	BT4	Analyze
15	Non applicability of LPT- Discuss.	13	BT4	Analyze
16	Principles and methods of magnetization-Narrate.	13	BT3	Apply
17	Principles and methods of Non- Residual magnetism- Present a case study	13	BT3	Apply
18	Discuss about the principles of liquid penetrant testing with neat sketch. Also bring out the advantages and limitations of the liquid penetrant testing.	13	BT3	Apply

PART-C (15 Marks)				
S.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	Identify the method used to inspect Pipe and piston head component and explain the steps involved during inspection.	15	BT6	Create

2	(i) List the main factors to be considered for penetrant fill in the flaws of materials. (ii)Describe health and safety precautions in LPT.	8 7	BT6 BT5	Create Evaluate
3	List and explain the steps involved for inspecting crankshafts by wet article magnetic particle inspection method.	15	BT6	Create
4	Explain with suitable sketch about following (i) Magnetization of irregular parts. (ii) Demagnetization	8 7	BT6 BT5	Create Evaluate
5	Present a case study of LPT in automobile sector	15	BT-4	Analyzing

UNIT III - THERMOGRAPHY AND EDDY CURRENT TESTING (ET)

Thermography- Principles, Contact and non-contact inspection methods, Techniques for applying liquid crystals, Advantages and limitation - infrared radiation and infrared detectors, Instrumentations and methods, applications. Eddy Current Testing-Generation of eddy currents, Properties of eddy currents, Eddy current sensing elements, Probes, Instrumentation, Types of arrangement, Applications, advantages, Limitations, Interpretation/Evaluation.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	Define thermography.	BT-1	Remembering
2.	State the basic principle involved in Thermography testing.	BT-1	Remembering
3.	List the advantage of thermography.	BT-2	Understanding
4.	Summarize the characteristics of Infrared waves.	BT-2	Understanding
5.	Define liquid crystal.	BT-2	Understanding
6.	Discriminate active and passive approach in thermography testing.	BT-1	Remembering
7.	Summarize the types of Infrared detectors.	BT-2	Understanding
8.	List the elements of thermography testing method.	BT-1	Remembering
9.	List the application of thermography.	BT-1	Remembering
10.	Classify thermography testing.	BT-2	Understanding
11.	Describe the principle of eddy current method.	BT-3	Applying
12.	Demonstrate the eddy current sensing elements.	BT-3	Applying
13.	List the disadvantage of eddy current inspection.	BT-2	Understanding
14.	Discuss the characteristics of eddy current.	BT-5	Evaluating
15.	List the types of probe used in eddy current inspection.	BT-2	Understanding

16.	Define the principle of hall effect.	BT-2	Understanding
17.	Describe the applications of eddy current inspection.	BT-1	Remembering
18.	How the depth of penetration of eddy current is affected by the frequency of the current?	BT-1	Remembering
19.	Describe eddy current in ET.	BT-2	Understanding
20.	Summarize the parameters to be considered for selection of probes in eddy current testing.	BT-1	Remembering
21.	Point out 2 conditions of in-applicabilility of Thermography	BT-2	Understanding
22.	List out 2 conditions of in-applicabilility liquid crystal	BT-2	Understanding
23.	Discuss the limitation of Infra red devices	BT-2	Understanding
24.	What are the limitations of Eddy Current Testing?	BT-2	Understanding
25.	Point out 2 conditions of in-applicabilility of Eddy Current Testing.	BT-2	Understanding

PART-B (13 Marks)				
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	(i) Explain with neat sketch about the principle of thermography test. (ii) List the advantages, limitations and applications of thermography test.	7 6	BT3 BT4	Apply Analyze
2	Describe in detail about the elements of infrared detection system with block diagram.	13	BT 3	Apply
3	Explain the principle of thermography testing by passive approach and state the application of it.	13	BT 4	Analyze
4	Explain the principle of thermography testing by active approach and Its application.	13	BT 4	Analyze

5	List and explain in detail about the laws of thermal imaging inThermography test.	13	BT 3	Apply
6	Classify Infrared sensors and explain any two sensors with neat sketchabout working principle of IR sensors.	13	BT 4	Analyze
7	Discuss with suitable sketch about the principle of (i) Vibro Thermography testing. (ii) Dynamic Thermographic inspection.	7 6	BT3 BT4	Apply Analyze
8	Illustrate about Contact and Non-Contact inspection methods inThermography with neat sketch.	6	BT 3	Apply
	(i) Explain the Eddy current principle of eddy current testing with neatsketch. (ii) List the advantage and limitation of eddy current test	4 3	BT3 BT4	Apply Analyze
9	Explain Eddy current instrumentation with aid of block diagram.	13	BT3	Apply
10	List the applications of Eddy current testing.	13	BT 3	Apply
11	Classify the eddy current probes on the basis of following (i) Mode of application. (ii)Mode of operation.	7 6	BT3 BT4	Apply Analyze
12	Explain the different types of method used for generation of magnetic fieldin eddy current testing.	13	BT 3	Apply
13	What are? (i) Eddy current probes (ii) Eddy current sensing elements	7 6	BT3 BT4	Apply Analyze
14	Describe Hall effect sensors in eddy current testing.	13	BT 3	Apply

15	Discuss SQUID sensor.	13	BT 4	Analysis
16	Illustrate the lens law with suitable sketch.	13	BT 3	Apply
17	Discuss the concept of Demagnetization.	13	BT 4	Analysis
18	Study a case of Thermography- Principles, Contact and non-contact inspection methods,	13	BT 3	Apply

PART-C (15 Marks)				
S.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	(i) Explain the Procedure for thermography testing of electrical Panels. (ii) List the factors identified by thermal testing method of NDT.	8 7	BT6 BT5	Create Evaluate
2	Explain in details about Image processing of thermography non destructive testing method in NDT.	15	BT6	Create
3	Write down the procedure of corrosion detection in Eddy current testing ofNon-destructive testing.	15	BT5	Evaluate
4	Evaluate the procedure for detecting fatigue crack in the materials by eddycurrent inspection technique.	15	BT 5	Evaluate
5	Present a case study of thermography in Foundries.	15	BT6	Create

UNIT IV - ULTRASONIC TESTING (UT) AND ACOUSTIC EMISSION (AE)

Ultrasonic Testing-Principle, Transducers, transmission and pulse-echo method, straight beam and angle beam, instrumentation, data representation, A-Scan, B-scan, C-scan. Phased Array Ultrasound, Time of Flight Diffraction. Acoustic Emission Technique – Principle, AE parameters, Applications.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	Describe ultrasonic testing.	BT-2	Understanding
2.	List the elements associated with ultrasonic testing.	BT-2	Understanding
3.	Discuss the principle of transmission through method in ultrasonic testing.	BT-2	Understanding
4.	Name the couplants used in ultrasonic testing.	BT-2	Understanding
5.	List the variables that are influencing the results in ultrasonic testing.	BT-2	Understanding
6.	Define transducer and List the types of ultrasonic transducer.	BT-1	Remembering
7.	Discriminate straight beam and angle beam transducer.	BT-2	Understanding
8.	Define attenuation and acoustic impedance.	BT-1	Remembering
9.	Describe piezo electric effect.	BT-1	Remembering
10.	What are the factors to be considered in selection of transducer?	BT-2	Understanding
11.	Explain the principle of acoustic emission testing.	BT-2	Understanding
12.	Discriminate transmission and pulse-echo methods in UT.	BT-2	Understanding
13.	What are the stages of acoustic emission technique?	BT-2	Understanding
14.	Name the source of Acoustic emission.	BT-1	Remembering
15.	Describe the properties of Acoustic waves.	BT-2	Understanding
16.	List the modes of AE signal.	BT-1	Remembering

17.	Narrate the Kaiser effect in acoustic waves.	BT-1	Remembering
18.	List the types of sensors used in acoustic emission technique.	BT-1	Remembering
19.	Explain the principle of pulse echo method.	BT-1	Remembering
20.	List the factors influencing acoustic wave propagation.	BT-1	Remembering
21.	Point out 2 conditions of in-applicabilility Ultrasonic Testing	BT-1	Remembering
22.	List out 2 conditions of in-applicabilility acoustic emission	BT-1	Remembering
23.	Point out 2 limitations of applicabilility Ultrasonic Testing	BT-1	Remembering
24.	List out 2 limitations of applicabilility acoustic emission	BT-1	Remembering
25.	How scans are useful in medical electronics?	BT-1	Remembering

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	(i) Describe the principle of ultrasonic testing with suitable block diagram. (ii) List the advantage and disadvantage of ultrasonic testing.	7 6	BT3 BT4	Apply Analyze
2	(i) Explain the principle of through transmission ultrasonic testing with neat sketch. (ii) Briefly explain the wave propagation of Ultrasonic sound.	7 6	BT3 BT4	Apply Analyze
3	Illustrate the principle of pulse echo method with neat sketch in ultrasonic testing method.	13	BT3	Apply
4	Describe the working principle with neat sketch of following (i)Piezo-Electric transducer. (ii)Electro Magnetic Acoustic Transducer (EMAT).	7 6	BT3 BT4	Apply Analyze

5	List and Illustrate with neat sketch about Ultrasonic transducers used in Ultrasonic testing method based on its applications.	13	BT3	Apply
6	Discuss the following Ultrasonic inspection technique with neat sketch. (i) Straight beam ultrasonic inspection method. (ii) Angle beam ultrasonic inspection method.	7 6	BT3 BT4	Apply Analyze
7	Discuss the following Ultrasonic inspection technique with neat sketch. (i) Time of flight diffraction inspection method. (ii) Phase array ultrasonic inspection method. (iii) Immersion ultrasonic inspectionmethod.	5 5 3	BT 3	Apply
8	Illustrate with neat sketch about the following A-scan , B-scan and C-scan	7	BT 3	Apply
	Explain with neat sketch about the data presentation methods in Ultrasonic test of non-destructive testing.	6	BT 4	Analyze
9	(i) Explain the principle of Acoustic emission test with neat sketch. (ii)List the applications of Acoustic emission test.	7 6	BT3 BT4	Apply Analyze
10	Describe the factors influencing acoustic wave propagation and data acquisition in Acoustic Emission test.	6	BT 4	Analyze
	(i) List the components of Acoustic emission test. (ii) Illustrate with neat sketch about the arrangement of Acousticemission testing setup.	4 3	BT3 BT4	Apply Analyze
11	Discuss the following with suitable diagram (i) Transient signal in AE. (ii) Continuous signals in AE.	7 6	BT3 BT4	Apply Analyze

12	Demonstrate the principle of four channel data acquisition in Acoustic Emission testing with neat sketch.	13	BT3	Apply
13	Study a case of ultrasonic- Principles, Contact and non-contact inspection methods.	13	BT3	Apply
14	Present a case study of accoustic emission Instrumentations and methods, applications.	13	BT3	Apply
15	Narrate a case study of Phased Array Ultrasound.	13	BT3	Apply
16	Study a case of Time of Flight Diffraction.	13	BT 3	Apply
17	Differentiate between, with neat sketch, the following A-scan , B-scan and C-scan	13	BT 3	Apply
18	Explain with neat sketch about the data presentation methods in Ultrasonic test of non-destructive testing.	13	BT 4	Analyze

	PART-C (15 Marks)			
S.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	Describe in detail about which method of Ultrasonic inspection technique is suitable for inspect the casting of materials with neat sketch.	15	BT 5	Evaluate
2	Illustrate the suitable Ultrasonic method to inspecting the following withsuitable sketch. (i) Thickness of material. (ii) Aircraft components.	 8 7	 BT6 BT5	 Create Evaluate
3	Explain about various parameters involved in Acoustic Emission Testing method of Non-destructive testing.	15	BT 5	Evaluate

4	Summarize the inspection of microstructure of weld by AE testing with suitable sketch.	15	BT6	Create
5	Narrate a case study of Phased Array Ultrasound in Medical applications.	15	BT5	Evaluate

UNIT-V RADIOGRAPHY (RT)

Principle, interaction of X-Ray with matter, imaging, film and film less techniques, types and use of filters and screens, geometric factors, Inverse square law, characteristics of films - graininess, density, speed, contrast, characteristic curves, Penetrameters, Exposure charts, Radiographic equivalence. Fluoroscopy- Xero- Radiography, Computed Radiography, Computed Tomography

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	Define inverse square law in radiography.	BT-1	Remembering
2.	Express the mathematical correlation between film density and intensity of incident light in X-ray test.	BT-1	Remembering
3.	Summarize the properties of X rays and Gamma rays.	BT-1	Remembering
4.	Describe about intensifying screens.	BT-2	Understanding
5.	Define Fluoroscopy.	BT-2	Understanding
6.	Describe X-ray beam attenuation?	BT-1	Remembering
7.	Define Film density?	BT-2	Understanding
8.	List the stages of “Radiography test”	BT-1	Remembering
9.	Write any four characteristics of X-ray.	BT-1	Remembering
10.	Discuss about Photoelectric effect.	BT-2	Understanding
11.	Describe Rayleigh Scattering.	BT-3	Applying
12.	What is isotope decay rate in gamma ray testing?	BT-3	Applying
13.	List the materials used for manufacturing of X-film.	BT-2	Understanding
14.	Examine "Half-value layer".	BT-2	Understanding
15.	Summarize "Film Graininess".	BT-2	Understanding
16.	Classify filters in radiographic testing.	BT-2	Understanding

17.	Discuss about the factors affecting film contrast.	BT-1	Remembering
18.	How x-ray radiography differs from film radiography?	BT-1	Remembering
19.	Define Image sharpness.	BT-2	Understanding
20.	Describe computed radiography.	BT-1	Remembering
21.	Define Computed Tomography.	BT-1	Remembering
22.	Discuss the Principle of interaction of X-Ray with matter	BT-1	Remembering
23.	Differentiate film and film less X-Ray techniques,	BT-1	Remembering
24.	What is a penetrameter?	BT-1	Remembering
25.	Define Radiographic equivalence.	BT-1	Remembering

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	Explain about the process of Neutron Radiography and Computed Tomography.	13	BT 4	Analyze
2	(i) Discuss about the safety aspects related to radiographic testing. (ii) Write short notes on the penetrometers and sensitivity in radiography testing.	7 6	BT3 BT4	Apply Analyze
3	Describe radiographic imaging techniques with suitable sketch.	13	BT 4	Analyze
4	Write elaborate notes on radiographic film.	13	BT 4	Analyze
5	(i) Explain the three step process of computed radiography and mention thesignificant advantages. (ii) State the various classes of films and explain their characteristics.	7 6	BT3 BT4	Apply Analyze
6	Illustrate the components of X-ray generator with	13	BT 3	Apply

	suitable sketch.			
7	Discuss the Radiography in detail.	13	BT 4	Analyze
8	Crank-out mechanism for Gamma ray radiographic exposure.	13	BT 3	Apply
9	List and explain the stages of film processing and development with flow diagram.	13	BT 4	Analyze
10	Discuss about four important processes when interaction of X-rays with matter.	13	BT 3	Apply
11	Summarize the following (i) Types of X-rays. (ii) Types of filtration.	7 6	BT3 BT4	Apply Analyze
12	Explain in detail about Xerography techniques with suitable sketch.	13	BT 4	Analyze
13	Explain about Computed Radiography with suitable sketch.	13	BT 4	Analyze
14	Describe about Fluoroscopy Testing with neat diagram.	13	BT 4	Analyze
15	Discuss in detail with sketches about Computed Tomography.	13	BT 3	Apply
16	Discuss with an example the Principle of interaction of X-Ray with matter.	13	BT 3	Apply
17	Compare and contrast film and film less X-Ray techniques,	13	BT 4	Analyze
18	Present a case study of a penetrameter.	13	BT 3	Apply

PART-C (15 Marks)

S.No	**Questions**	**Marks**	**BT Level**	**Competence**

1	How X-rays are produced in radiographic testing? Briefly write about twomethods of X-ray production.	15	BT6	Create
2	How computed radiography differs from conventional radiography and briefly write about the principle of operation of computed radiography.	15	BT5	Evaluate
3	Classify X-ray films used in industrial radiography and brief about Construction of film with simple line diagram.	15	BT6	Create
4	Explain the types of radiation produced by radioactive decay (gamma ray)and their application with neat sketch.	15	BT5	Evaluate
5	Case study the application of X-Ray in the field of Metallurgy	15	BT6	Create

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