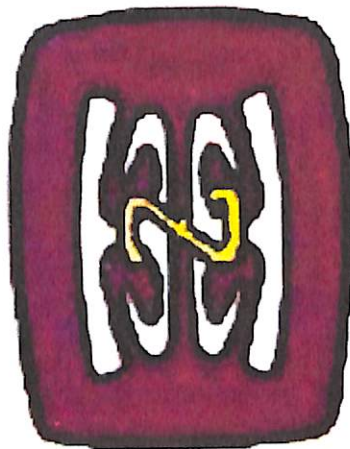


**PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING**

EXAMINATION QUESTION PAPERS



**ME 324
NON DESTRUCTIVE TESTING
SEMESTER TWO - 2022**

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

MECHANICAL ENGINEERING DEPARTMENT

2022 SEMESTER TWO – FINAL EXAMINATIONS

ME324 – NONDESTRUCTIVE TESTING

FRIDAY, OCTOBER 28th, 2022

TIME ALLOWED: TWO HOURS

INSTRUCTIONS TO STUDENTS:

- Answer all the question directly rather than writing too many unnecessary information.
- Write clearly, precisely and succinctly.
- Write your NAME and NUMBER clearly on the front page. Do it now.
- Mobile Phone, Calculators, Notes and Textbooks are not allowed.
- CHEATING WILL BE PUNISHED SEVERELY!!!!

MARKING SCHEME: 40

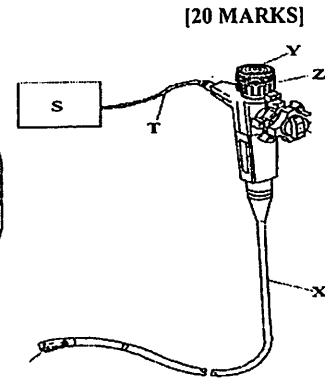
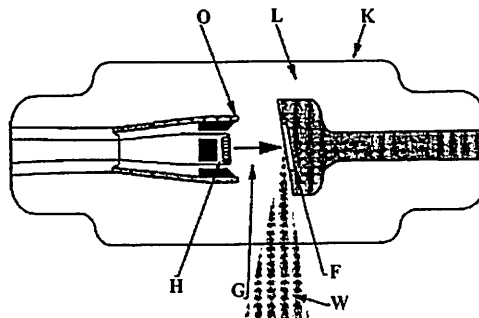
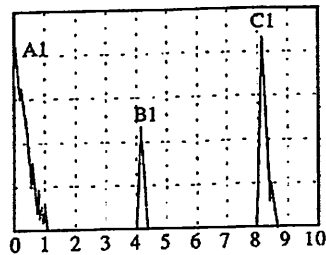
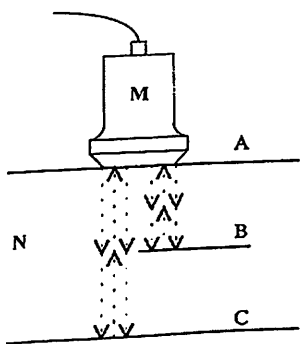
PART ONE: MULTIPLE CHOICES (CIRCLE ONE ANSWER)

[20 MARKS]

1. Non-destructive testing is used to determine
 - a) Location of defects
 - b) Chemical composition
 - c) Corrosion of metal
 - d) All of these.
2. Which of the following types of rays is used in radiography for the inspection of castings?
 - a) Infrared rays
 - b) Ultraviolet rays
 - c) Visible rays
 - d) X-rays.
3. In ultrasonic testing, a liquid coupling medium between the crystal surface and the part surface is necessary because:
 - a) An air interface between the crystal surface and the part surface would almost completely reflect the ultrasonic vibrations
 - b) Lubricant is required to minimize wear on the crystal surface
 - c) The crystal will not vibrate if placed directly in contact with the surface of the part being inspected
 - d) The liquid is necessary to complete the electrical circuit in the search unit.
4. The advantage that liquid penetrant testing has over an unaided visual inspection is that:
 - a) It makes defects easier to see for the inspector.
 - b) The depth of the defect can be measured
 - c) The cause of the impact can be seen
 - d) The actual size of the discontinuity can be measured.
5. The best detection of defects occurs:
 - a) When the lines of magnetic force are perpendicular to the longest dimension of the defect.
 - b) When the magnetic field is 10% beyond its saturation point
 - c) When the hysteresis loop shifts from positive to negative
 - d) When the lines of magnetic force are parallel to the longest dimension of the defect.
6. When a ferromagnetic material is in a unmagnetized state, the domains are:
 - a) Randomly organized
 - b) Aligned in a north and south direction
 - c) Aligned in an east and west direction
 - d) Balanced to produce a gauss rating of 2.
7. Which of the following statements is/are true for ultrasonic test?
 - a) Equipment used for ultrasonic testing is portable
 - b) Complicated shapes can be easily scanned
 - c) Waves generated are health hazardous
 - d) All the above statements are true.
8. Equipment used for inspection of inside portion of hollow chamber or narrow tube is known as
 - a) Endoscope
 - b) Telescope
 - c) Borescope
 - d) Flexiscope.
9. Which of the following nondestructive testing is used to detect change in composition of any material?
 - a) Liquid penetration test
 - b) Ultrasonic test
 - c) Radiography.
 - d) Eddy current test.
10. Eddy current test is used to detect
 - a) Cracks
 - b) Hardness
 - c) Conductivity
 - d) All of the above.
11. Which of the following discontinuity types could typically be found with a liquid penetrant test?
 - a) Internal slag in a weld
 - b) Internal slag in a casting
 - c) Sensitization in austenitic stainless steel
 - d) Fatigue cracks.
12. Which of the following may cause magnetic particle test indications?
 - a) A joint between two ferromagnetic materials of different permeability
 - b) A shrink fit joint in ferromagnetic materials
 - c) A brazed joint in ferromagnetic materials
 - d) All of the above.

13. Which of the following are ferromagnetic materials?
 - a) Aluminum, iron, copper
 - b) Iron, copper, nickel
 - c) Copper, aluminum, silver
 - d) Iron, cobalt, nickel.
14. The main advantage of having small focal spot on an X ray tube is:
 - a) Heat is conducted away more efficiently than with a large focal spot
 - b) A smaller focal spot is unlikely to be damaged from the required tube currents
 - c) Longer tube life
 - d) A smaller focal spot allows sharper radiographic images than does a larger focal spot.
15. An oscilloscope display in which the screen base line is adjusted to represent the one way distance in a test piece is called a:
 - a) A scan display
 - b) B scan display
 - c) C scan display
 - d) D scan display.
16. The penetrating power of an X ray machine is indicated by:
 - a) Milliamperage
 - b) Tube voltage
 - c) Filament current
 - d) Anode current.
17. A wire brush should be used for pre-cleaning:
 - a) When grease and oil must be removed
 - b) Only as a last resort
 - c) When rust is to be removed
 - d) When grinding burrs must be removed.
18. Most of the energy applied to an X ray tube is converted into:
 - a) X rays
 - b) Light
 - c) Heat
 - d) Ultraviolet radiation.
19. Which test can be performed without skilled labor?
 - a) Dye penetrant testing
 - b) Visual testing
 - c) Ultrasonic testing
 - d) Magnetic particle test.
20. Sound waves of a frequency beyond the hearing range of the human ear are referred to as ultrasonic waves or vibrations, and the term embraces all vibrational waves of frequency greater than approximately:
 - a) 20 kHz
 - b) 2 MHz
 - c) 2 kHz
 - d) 200 kHz

PART TWO: LABEL THE FOLLOWING ITEMS:



[20 MARKS]

#	ID	LABELLE ITEMS	#	ID	LABELLE ITEMS
1	A		11	K	
2	B		12	H	
3	C		13	G	
4	A1		14	F	
5	B1		15	W	
6	C1		16	S	
7	M		17	T	
8	N		18	Y	
9	O		19	Z	
10	L		20	X	