MECHANICAL MEASUREMENT METROLOGY AND RELIABILITY(MMM&R)

01-The degree of closeness of the measured value of a certain quantity with its true value is known as

a.Accuracy

b.Precision

c.Standard

d.Sensitivity

(Ans: a)

2-Error of measurement =

a.True value – Measured value

b.Precision – True value

c.Measured value – Precision

d.None of the above

(Ans: a)

3-The ability by which a measuring device can detect small differences in the quantity being measured by it, is called its

Damping

a.Sensitivity

b.Accuracy

c.None of the above

(Ans: b)

4-The following term(s) is (are) associated with measuring devices

Sensitivity

a.Damping

b.Both ‘a’ and ‘b’

c.None of the above

(Ans: c)

5-To compare an unknown with a standard through a calibrated system is called
Direct comparison

a.Indirect comparison

b.both ‘a’ and ‘b’

c.None of the above

(Ans: b)

6-The following is an internationally recognized and accepted unit system
a.MKS

b.FPS

c.SI

d.All of the above

(Ans: c)

7-One yard = _____ inch
a.36

b.38

c.40

d.42

(Ans: a)

8-The following is a line standard of measurement
Measuring tape

a.Slip gauge

b.Micrometer

c.End bars

(Ans: a)

9-The 'Wringing' is due to

a.Atmospheric pressure

b.Molecular attraction

c.both 'a' and 'b'

d.None of the above

(Ans: c)

10-The principle of 'Interchangeability' is normally employed for

a.Mass production

b.Production of identical parts

c.Parts within the prescribed limits of sizes

d.All of the above

(Ans: d)

11-Following is the theoretical size which is common to both the parts of a mating pair

a.Normal size

b.Actual size

c.Base size

d.All of the above

(Ans: c)

12-_____ is equal to the differences of the two limits of size of the part

Tolerance

Low limit

High limit

Design size

(Ans: a)

13-The amount by which the actual size of a shaft is less than the actual size of mating hole in an assembly

a.Clearance

b.Interference

c.Allowance

d.None of the above

(Ans: a)

14-The amount by which the actual size of a shaft is less than the actual size of mating hole in an assembly

a. Clearance

b.Interference

c.Allowance

d.None of the above

(Ans: b)

15-A positive allowance will always result in a _____ fit.

a. Clearance

b .Interference

c. both ‘a’ and ‘b’

d. Any of the above

(Ans: a)

16-A negative allowance will always result in a _____ fit.

a.Clearance

b.Interference

c.Transition

d.Any of the above

(Ans: b)

17-A shaft rotating in a bushed bearing is good example of
Sliding fit

a.Running fit

b.Push fit

c.Driving fit

(Ans: b)

18-Fitting of rim on a locomotive wheel is done by
a.Keying fit

b.Driving fit

c.Force fir

d.Any of the above

(Ans: c)

19-The following is used to check the diameters of holes
a.Plug gauge

b.Ring gauge

c.Slip gauge

d.Standard screw pitch gauge

(Ans: a)

20-To check external diameter of hole, we use
a.Plug gauge

b.Ring gauge

c.Slip gauge

d.Standard screw pitch gauge

(Ans: b)

21-'GO' and 'NO GO' gauge is a type of
a.plug gauge

b.slip gauge

c.ring gauge

d.limit gauge

(Ans: d)

22-The following is not a type of comparator
a.Electrical

d.Pneumatic

c.Optical

d.Hydraulic

(Ans: d)

23-'Electrolimit' gauge block comparator and 'Talyman' Electrical comparator work on the principle of
a.Kirchoff's law

b.Wheatstone bridge

c.Faraday,s law

d.Lenz,s law

(Ans: b)

24-The following is not used to measure angles
a.Bevel protectors

b.Calibrated levels

c.Clinometers

d.Optical flats

(Ans: d)

25-In v-shape method, the minor diameter of thread is given by

a.D ± (d2 – d1)

b.D ± (d1 – d2)

c.D ± (d2 + d1)

d.None of the above

Where, D = Diameter of cylindrical gauge, d1 = micrometer reading of cylindrical gauge, d2 = micrometer reading of threads, d = minor diameter

(Ans: a)

26-The following is not a method to find effective thread diameter

a.Thread micrometer

b.Two wire method

c.Three wire method

d.The v-piece method

(Ans: d)

27-The effective diameter (E) in three wire method is given by

a. E = M – C

b. E = M + C

c. E = M / C

d. E = M x C

ANS. b

28-Which of the following is correct for selective assembly?

a. not suitable for industrial purposes

b. cost increases due to automatic gauging

c. wastage is high due to selective selection

d. this method is followed in ball and roller bearing units

ANS. d

29. What is the maximum permissible error for class I micrometers?

a) 0.002 mm

b) 0.004 mm

c) 0.008 mm

d) 0.016 mm

Answer: b

30. Which of the following option is incorrect

about interchangeability?

a) Increase output

b) Increase cost of production

c) Useful in mass production

d) Assembly time increases

Answer: d

31.What are the main considerations for

deciding the limits of a particular part?

a) Functional requirement

b) Economics and interchangeability

c) Interchangeability and functional requirement

d) Interchangeability, functional requirementand economics

Answer: d

32.Which of the following is correct for

selective assembly?

a) Not suitable for industrial purposes

b) Cost increases due to automatic gauging

c) Wastage is high due to selective selection

d) This method is followed in ball and roller bearing units

Answer: d

33. Which of the following option is correct in given statements about interchangeability?

Statement 1: Standardisation is not so much of importance for interchangeability.

Statement 2: Interchangeability follows**'**normal distribution'.

a) F, T

b) T, T

c) F, F

d) T, F

Answer: a

34. Which of the following option is not correct for 'full interchangeability'?

a) This type of interchangeability is not feasible sometimes

b) Requires machine which can maintain low process capability

c) Machines with very high accuracy are necessary

d) For interchangeable production, this type of interchangeability is not must

Answer: b

35. What is the main use of automatic gauge in selective assembly?

a) Check accuracy of parts

b) Check parallelism of parts

c) Divide group of parts with some tolerance

36.What is the effect of improper alignment of each tooth?

a) Tooth thickness increases

b) Face width decreases

c) Load will not distributed evenly

d) Pitch of teeth reduced

Ans : c

37.Which of the following option is true about an analytical method of inspection of gears?

a) Analytical method is widely used for industries

b) This method is fast

c) All individual elements of gear teeth are checked

d) More accurate

Answer: c

38.What is the limitation of microscopic inspection to check surface finish?

a) An average value is needed

b) Small portion of surface can be detected at a time

c) A master finish surface is also needed

d) It is necessary to inspect whole surface together

Answer: b

39.In which type of system does power transmission takes place through compressed air?

a) Fluid power system

b) Hydraulic system

c) Pneumatic system

d) Stepper motors

Answer: c

40. **The compressed air flows to the actuator through ____**

a) Pipes and valves

b) Shafts

c) Motors

d) Flow control valve

Ans. d

41.Which among the following are not the main selection criteria for selection of hydraulic pumps?

a) Discharge

b) Pressure

c) Speed

d) Weight

Answer: d

42.The principle of Orificemeter is same as that of Venturimeter.

a) True

b) False

Answer: a

43.A nanometre is connected to a section which is at a distance of about 4 to 6 times the pipe diameter upstream from orifice plate.

a) True

b) False

Answer: b

44.Venturimeter is based on integral form of Euler's equation.

a) True

b) False

Answer: a

45.Orifice Meter can only be used for measuring rate of flow in open pipe like structure.

a) True

b) False

Answer: a

46.What is the relationship between Orificemeter diameter and pipe diameter

a) Orificemeter diameter is 0.5 times the pipe diameter

b) Orificemeter diameter is one third times the pipe diameter

c) Orificemeter diameter is one fourth times the pipe diameter

d) Orificemeter diameter is equal to the pipe diameter

Answer: c

47.Orifice meter consists of a flat rectangular plate.

a) True

b) False

Answer: b

48. Which of the following is used as indication instrument in a liquid expansion system?

a) Bellows

b) Bourdon tube

c) Ammeter

d) Thermometer

Answer: b

49.Which of the following can be used for measuring temperature?

a) Metallic diaphragm

b) Fluid expansion system

c) Capsule

d) Bourdon tube

Answer: b

50.Which of the following is true for bimetallic type thermometer?

a) Two metals have same temperature

coefficients

b) Two metals have different temperature

coefficient

c) One metal is cooled always

d) None of the mentioned

Answer: b

51.When bimetallic thermometer heated,curling occurs to the side of metal with least

temperature coefficients.

a) True

b) False

Answer: a

52.In liquid in steel bulb thermometer, which liquid can be used for measuring temperature up to 60000C?

a) Mercury

b) Ether

c) Water

d) None of the mentioned

Answer: a

53.Relation between temperature and resistance of a conductor is _____

a) Rt= R ref [1+t]

b) $Rt = R\ ref\ [1+\alpha\Delta t]$

c) $Rt = R\ ref\ [1-\alpha t]$

d) Rt = R ref [1-t]

Answer: b

54.Ratio of net amount of heat received and stored in the body for certain time interval is known as _____

a) Temperature

b) Thermal coefficient

c) Thermal storage capacity

d) None of the mentioned

Answer: c

55.Sensing element in the thermometer must provide _____

a) small change in resistance

b) no change in resistance

c) large change in resistance

d) infinite change in resistance

Answer: c

56.How can corrosion be prevented in a resistance thermometer?

a) by immersing the setup in oil

b) by enclosing the elements in a glass tube

c) by using guard rings

d) by painting the elements

Answer: b

57.Nickel and its alloys can be used over a temperature range of _____

a) 100 to 450 K

b) 10 to 50 K

c) 0 to 25 K

d) 5 to 15 K

Answer: a

58.Most metallic conductors have a _____

a) neutral temperature coefficient of resistance

b) negative temperature coefficient of resistance

c) positive temperature coefficient of resistance

d) zero temperature coefficient of resistance

Answer: c

59.Resistance thermometer provides the change in electrical resistance.

a) True

b) False

Answer: a

60.In which type of system does power transmission takes place through compressed air?

a) Fluid power system

b) Hydraulic system

c) Pneumatic system

d) Stepper motors

Answer: c

61. The Bathtub curve indicates failure probability, Which stage is NOT normally associated with the bathtub curve?_____

a. Normal-life where few failures occur

b. Wear-out where failure increases due to age

c. Infant-mortality where failures occur early

d.pulling the plug where production is halted due to unacceptable level of failures.

Ans. d

62. Failure occurs due to defective parts during the_____.

a. Wear out stage

b. Normal life stage

c.Early life stage

Ans ;c

63. What refers to wear out failure_____.

a. Increasing failure rate

b. Decreasing failure rate

c. Depends upon type of the experiment

d. Depends upon the subject

Ans : a

64. What is /are the major purpose/s of using a bath tub curve?

a. To determine the capital maintenance in defense equipments

b. To compute lifts in the distillation column

c. To decide the maintenance of equipment

d. All of the above

Ans : d

65. **What is the failure cost of a product possessing reliability R=1?**

a. Zero

b. Unity

c. Infinity

d. None of the above

Ans : a

66. **Which among the following exhibits inversely proportional relationship with the reliability?**

a. Production cost

b. Design and development cost

c. Maintenance and repair cost

d. All of the above

Ans : c

67. What is bath tub curve stands for?

a. maintenance schedule

b. failure rate

c. vibration chart

d. viscosity chart

Ans : b

68. Markov analysis is a technique that deals with the probabilities of future occurrences by_____.

a. Using Bayes' theorem

b. Analyzing presently known probabilities

c. Time series forecasting

d. The maximal flow technique

Ans : b

69. What is MTTF ?

a. Maximum time to failure

b. Mean time to failure

c. Minimum time to failure

d. None of the mentioned

Ans : b

70. What is MTTR ?

a. Mean Time To Restore

b. Mean Time To Repair

c. Mean Time To Recovery

d. Mean Time to Restoration

Ans : b

71. **Measure of reliability is given by _____ .**

a. Mean Time between success

b. Mean reliable

c. Mean Time between failure (MTBF)

d. MTTR

Ans : c

72. Mean Time To Repair (MTTR) is the time needed to repair a failed equipment/component.

a. True

b. False

c. Can't say

d. None

Ans :a

73. Which one of the below is measured by MTBF?

a. Tolerance

b. Life time

c. Reliability

d. Quality

Ans : c

74. The probability density function of a Markov process is_____.

a. p(x1,x2,x3.....xn) = p(x1)p(x2/x1)p(x3/x2).....p(xn/xn-1)

b. p(x1,x2,x3.....xn) = p(x1)p(x1/x2)p(x2/x3).....p(xn-1/xn)

c. p(x1,x2,x3.....xn) = p(x1)p(x2)p(x3).....p(xn)

d. p(x1,x2,x3.....xn) = p(x1)p(x2 *x1)p(x3*x2).....p(xn*xn-1)

Ans : a

75.What is the Major Key parameter of maintainability?

a) Accessibility
b) Survival
c) RCS
d) VulnerabilityView Answer & Solution

Ans: a