Written Test Paper, 2021

MASTER SKILL INSTRUCTOR (MECHATRONICS)

Test Booklet No.

Name of Applicant ....

Answer Sheet No. ....

Application No. : SVSU/2020/Estt/NT/ ....

Signature of Applicant : ....

Date of Examination : **26 / 12 / 2021**

Signature of the Invigilator(s)

1. ....

Time of Examination : ....

2. ....

Duration : 60 Minutes]

[Maximum Marks : 50

IMPORTANT INSTRUCTIONS

(i)   The question paper is in the form of Test-Booklet containing **50 (Fifty)** questions. All questions are compulsory. Each question carries four answers marked (A), (B), (C) and (D), out of which only one is correct.

(ii)   On receipt of the Test-Booklet (Question Paper), the candidate should immediately check it and ensure that it contains all the pages, i.e., **50** questions. Discrepancy, if any, should be reported by the candidate to the invigilator immediately after receiving the Test-Booklet.

(iii)   A separate Answer-Sheet is provided with the Test-Booklet/Question Paper. On this sheet there are **50** rows containing four circles each. One row pertains to one question.

(iv)   The candidate should write his/her Application number at the places provided on the cover page of the Test-Booklet/Question Paper and on the Answer-Sheet and NOWHERE ELSE.

(v)   No second Test-Booklet/Question Paper and Answer-Sheet will be given to a candidate. The candidates are advised to be careful in handling it and writing the answer on the Answer-Sheet.

(vi)   For every correct answer of the question **One (1) mark will be awarded.** For every unattempted question, Zero (0) mark shall be awarded. **There is no Negative Marking.**

(vii)   Marking shall be done only on the basis of answers responded on the Answer-Sheet.

(viii) To mark the answer on the Answer-Sheet, candidate should **darken** the appropriate circle in the row of each question with Blue or Black pen.

(ix)   For each question only **one** circle should be **darkened** as a mark of the answer adopted by the candidate. If more than one circle for the question are found darkened or with one black circle any other circle carries any mark, the question will be treated as cancelled.

(x)   The candidates should not remove any paper from the Test-Booklet/Question Paper. Attempting to remove any paper shall be liable to be punished for use of unfair means.

(xi)   Rough work may be done on the blank space provided in the Test-Booklet/Question Paper only.

(xii)   *Mobile phones (even in Switch-off mode) and such other communication/programmable devices are not allowed inside the examination hall.*

(xiii) No candidate shall be permitted to leave the examination hall before the expiry of the time.

DO NOT OPEN THIS QUESTION BOOKLET UNTIL ASKED TO DO SO.

1. The teeth of hacksaw blade are bent
   (A) Towards right
   (B) Towards left
   (C) Alternately towards right and left
   (D) Bent in any direction

2. In blanking operation, the clearance is provided on
   (A) Punch
   (B) Die
   (C) Half on the punch and half on the die
   (D) Either on punch or die depending upon designer's choice

3. For welding plates of thickness more than 12.5 mm, its edges
   (A) Do not require bevelling
   (B) Should be bevelled to a single-V or U-groove
   (C) Should have a double-V or U-groove on one side
   (D) Should have a double-V or U-groove on both sides

4. The workpiece motion and tool motion respectively in a horizontal boring machine are.......
   (A) Stationary and rotational
   (B) Rotational and translational
   (C) Translational and rotational
   (D) Stationary and rotational with translation

5. In machine tools, chatter is due to.........
   (A) Free vibrations
   (B) Self-excited vibrations
   (C) Random vibrations
   (D) Forced vibrations

6. The front rake required to machine brass by H.S.S. tool is ....
   (A) 15°
   (B) 10°
   (C) 5°
   (D) 0°

7. Which of the following is second hardest substance known?
   (A) Ceramics
   (B) Cermets
   (C) Cubic Boron Nitride (CBN)
   (D) Diamond

8. Which of the following tools are generally manufactured by Powder metallurgy?
   (A) Low carbon steel
   (B) Abrasives
   (C) High carbon steel
   (D) Cemented carbides

9. Following material is not a very good electrode in electric discharge machining (EDM) process
   (A) Graphite
   (B) Copper
   (C) Gray cast iron
   (D) Tungsten

10. Which of the following is having the highest material removal rate?
   (A) Electrical-discharge machining
   (B) Laser beam machining
   (C) Plasma arc machining
   (D) All of these having equal material removal rate

11. What is the first step of Quality Assurance?
    (A) Development of standards
    (B) Identification of customer need
    (C) Servicing
    (D) Material control

12. In how many groups, the quality system and management requirements are divided as per ISO-9001:2000?
    (A) 2
    (B) 3
    (C) 4
    (D) 5

13. What is the purpose of ISO standards created for quality management systems?
    (A) To certify the process
    (B) To certify the quality of a product
    (C) To certify the quality of service
    (D) To certify the quantity used for product

14. Which statistical technique integrates product design and manufacturing process?
    (A) Tree analysis
    (B) Problem solving techniques
    (C) Quality function deployment
    (D) Taguchi approach

15. Which tool is used to analyse the effects of a failure of individual components on the system?
    (A) FTA
    (B) FMEA
    (C) Quality circles
    (D) Fool proofing

16 Which of the following instrument is of the highest accuracy?
    (A) Digital length gauge
    (B) Inside micrometer
    (C) Universal measuring instrument
    (D) Universal height micrometer

17. Which of the following is correct for TQM?
    (A) Quality strategy in TQM emanates from top
    (B) TQM is a static process
    (C) It is a management approach to short-term success through customer
    (D) It is used to improve processes not products

18. What is the correct formula for average wavelength to describe surface roughness? (Where, Ra is the arithmetic mean deviation from the mean line of profile)
    (A) $2\pi \times Ra$ / Mean slope
    (B) $2\pi \times Ra \times$ Mean slope
    (C) 2π / $Ra \times$ Mean slope
    (D) 2π / Ra / Mean slope

19 A control chart displays
    (A) Whether workers are motivated
    (B) Inspectors are doing their job
    (C) Process variability
    (D) Process capability

20 Systematic problem solving requires
    (A) Motivating the worker
    (B) Defining the problem to be solved
    (C) Drawing control charts
    (D) All of the Above

21. Where and when was the word Mechatronics invented?
    (A) Japan (1960)
    (B) Japan (1980)
    (C) Europe (1960)
    (D) Europe (1980)

22. Example of 'Stand-alone System' is _____
    (A) Machining centres
    (B) Washing machine
    (C) Robots for parts handling
    (D) Automated inspection stations

23. The compressed air flows to the actuator through ____
    (A) Pipes and valves
    (B) Shafts
    (C) Motors
    (D) Flow control valve

24. What is the role of the second level in the mechatronics system design?
    (A) Integrates microelectronics into electrically controlled devices
    (B) Integrates electrical signal with mechanical action
    (C) Advanced control strategy level
    (D) Providing artificial intelligence

25. How is the integration of mechatronics system possible?
    (A) By use of control systems
    (B) By combining hardware and software
    (C) By providing built-in intelligence
    (D) By providing efficient high-level source code

26. What is the function of "analysis" in the modeling and simulation phase?
    (A) Database for maintaining project information
    (B) Sub models for eventual reuse
    (C) Contains Numerical methods
    (D) To produce high-level source code

27. Which among the following is not the type of a stepper motor?
    (A) Variable reluctance
    (B) Permanent magnet
    (C) Hybrid
    (D) Variable magnet

28. What is the common mode rejection ratio of an operational amplifier which has common mode gain = 0.6 and differential gain = 1000?
    (A) 650
    (B) 6500
    (C) 1666.66
    (D) 600

29. Ladder logic programming consists primarily of :
    (A) Virtual relay contacts and coils
    (B) Logic gate symbols with connecting lines
    (C) Function blocks with connecting lines
    (D) Text-based code

30. In a PLC, the scan time refers to the amount of time in which …..
    (A) The technician enters the program
    (B) Timers and counters are indexed by
    (C) One "rung" of ladder logic takes to complete
    (D) The entire program takes to execute

31. The shape of the output voltage waveform in a single PWM is
    (A) Square wave
    (B) Triangular wave
    (C) Quasi-square wave
    (D) Sine wave

32. Which elements are not present in the original McMurray inverter but are present in the modified McMurray inverters?
    (A) Two auxiliary thyristors and the *di/dt* inductor
    (B) Two auxiliary diodes and the damping resistor
    (C) One auxiliary SCR and one auxiliary diode
    (D) None of the mentioned

[P.T.O.

33. Which characteristic of IC in Digital Circuits represents a function of the switching time of a particular transistor?
    (A) Fan - out
    (B) Fan - in
    (C) Power dissipation
    (D) Propagation delay

34. How many bits are needed to store one BCD digit?
    (A) 2 bits
    (B) 4 bits
    (C) 3 bits
    (D) 1 bit

35. Which of these sets of logic gates are known as universal gates?
    (A) XOR, NAND, OR
    (B) OR, NOT, XOR
    (C) NOR, NAND, XNOR
    (D) NOR, NAND

36. Which of the following binary digits is equivalent to decimal number 24
    (A) 11000
    (B) 11001
    (C) 11100
    (D) 110011

37. Which is the major functioning responsibility of the multiplexing combinational circuit?
    (A) Decoding the binary information
    (B) Generation of all minterms in an output function with OR-gate
    (C) Generation of selected path between multiple sources and a single destination
    (D) Encoding of binary information

38. In ac - dc conversion, when the switch is closed then the sum of voltages around the loop is
    (A) Zero
    (B) Non zero
    (C) Equal to the sum of voltage when switch is open
    (D) Twice of the voltage when switch is open

39. Which one of the following is a Bidirectional semiconductor device is
    (A) Diode
    (B) BJT
    (C) SCR
    (D) TRIAC

40. A rectifier with an external low pass filter is an example of
    (A) Indirect switch matrix circuits
    (B) Direct switch matrix circuits
    (C) Embedded converters
    (D) All of these

41. The thermo-electric effect was first observed by
    (A) Seebeck
    (B) Thomas Young
    (C) Pirani
    (D) Thermus

42. Which of the following are the desirable dynamic characteristics of a measurement system?
    (A) Fast response, fidelity, measuring lag and dynamic error
    (B) Fast response and lag
    (C) Fidelity and measuring lag
    (D) Fast response and fidelity

43. Which one of the following devices cannot be used to measure pressure?
    (A) Strain gauges
    (B) LVDT
    (C) Piezoelectric crystal
    (D) Pyrometer

44. What is the name for space inside which a robot unit operates?
    (A) Environment
    (B) Spatial base
    (C) Work envelope
    (D) Exclusion zone

45. Which of the basic parts of a robot unit would include the computer circuitry that could be programmed to determine what the robot would do?
    (A) Sensor
    (B) Controller
    (C) Arm
    (D) End effector

46. Which is the correct order of the Product Life Cycle
    (A) Acquisition, distribution, disposal, processing, manufacturing, design, packaging, use
    (B) Use, Packaging, design, Manufacturing, processing, distribution, acquisition
    (C) Design, acquisition, processing, Manufacturing, Packaging, distribution, use, disposal
    (D) Acquisition, design, manufacturing, processing, packaging, distribution, use, disposal

47. The second level in the traditional automation pyramid is
    (A) ERP
    (B) Manufacturing Execution System (MES)
    (C) Process Level Control
    (D) Production Level

48. Supervisory Control And Data Acquisition is
    (A) a business management software used for business planning, order processing, supply chain management, sales and distribution, accounting, etc.
    (B) a computer system collecting & analyzing real-time data and it monitor, control & optimize industrial plants.
    (C) used for controlling or regulating a machine or system
    (D) a device, which communicates with the machine controls

49. Which material is NOT available for LOM process?
    (A) Paper
    (B) Plastic
    (C) Metal
    (D) Glass

50. LENS stands for
    (A) Laser Engineered Net Shaping
    (B) Laser Emitted Net Shaping
    (C) Laser Elictted net shaping
    (D) None of above

ROUGH WORK

Answers   **MASTER SKILL INSTRUCTOR (MECHATRONICS)**

1. C	26. C
2. A	27. D
3. D	28. C
4. D	29. B
5. B	30. D
6. D	31. C
7. C	32. B
8. D	33. D
9. C	34. B
10. C	35. D
11. B	36. A
12. D	37. B
13. A	38. B
14. D	39. D
15. B	40. B
16. C	41. A
17. A	42. D
18. A	43. D
19. C	44. C
20. B	45. B
21. A	46. C
22. B	47. B
23. A	48. B
24. A	49. D
25. B	50. A