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Question Booklet Alpha Code

A

	Question Booklet Sl. No.
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A

Total Number of Questions : 100	Time : 90 Minutes
Maximum Marks : 100	

INSTRUCTIONS TO CANDIDATES

1. The Question Paper will be given in the form of a Question Booklet. There will be four versions of Question Booklets with Question Booklet Alpha Code viz. **A, B, C & D.**
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the Question Booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a Question Booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator **IMMEDIATELY.**
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your Question Booklet is un-numbered, please get it replaced by new Question Booklet with same alpha code.
6. The Question Booklet will be sealed at the middle of the right margin. Candidate should not open the Question Booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the Question Booklet supplied to him/her contains all the 100 questions in serial order. The Question Booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the Question Booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices **(A), (B), (C)** and **(D)** having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

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1. Thermocouple is an example for
 - A) Active transducer
 - B) Passive transducer
 - C) Photo conductive transducer
 - D) Photo voltatic transducer
2. Residual voltage in LVDT is due to
 - A) Presence of Harmonics in input supply voltage
 - B) Presence of Harmonics in output voltage
 - C) Stray magnetic field
 - D) All of the above
3. Gauge factor is highest for
 - A) Semiconductor strain gauge
 - B) Nichrome
 - C) Constantan
 - D) Foil gauge
4. Piezoelectric transducer is a
 - A) Active transducer
 - B) Passive transducer
 - C) Inductive transducer
 - D) Capacitive transducer
5. The change in Magnetic property of certain materials when they are mechanically stressed is known as
 - A) Doppler effect
 - B) Thomson effect
 - C) Coriolis effect
 - D) Villari effect
6. Very large value of Hall effect emf is observed in
 - A) Metals
 - B) Bakelete
 - C) Semiconductors
 - D) Ceramic
7. Change in resistivity due to strain is known as
 - A) Hall effect
 - B) Photo electric effect
 - C) Piezoelectric effect
 - D) None of the above
8. A sensor which is able to detect the presence of nearby objects without any physical contact is called
 - A) Proximity sensor
 - B) Active sensor
 - C) Passive sensor
 - D) Smart sensor
9. In a capacitive transducer the capacitance can be increased by
 - A) Reducing the distance of separation of parallel plates
 - B) Reducing the overlapping area of parallel plates
 - C) Reducing the dielectric constant
 - D) None of these

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10. In order to get high sensitivity a potentiometer should have
A) High input voltage
B) High value of wire length
C) Only A
D) Both A and B
11. The undesirable characteristic for a strain gauge is
A) Low resistance temperature coefficient
B) Should have high hysteresis
C) Good linear characteristics
D) High frequency response
12. Variable inductance transducer works on
A) Change in self inductance
B) Change of mutual inductance
C) Production of eddy currents
D) All of the above
13. Which among the following is a synthetic piezoelectric material ?
A) Quartz
B) Lithium sulphate
C) Rochelle salt
D) Both B and C
14. Hall effect transducer can be used for the measurement of
A) Current
B) Flow
C) Humidity
D) Capacitance
15. Extremely low levels of luminous intensity can be detected using
A) Photo diodes
B) Photo transistors
C) Photomultiplier tubes
D) None of these
16. Which of the following is not a unit of pressure ?
A) bar
B) psi
C) Rankine
D) Torr
17. Which one of the following fluid is used in manometer ?
A) Water
B) Red oil
C) Mercury
D) All the above
18. Thermal conductivity gauge used for pressure measurement is
A) McLeod gauge
B) Pirani gauge
C) Capsule gauge
D) Piezoelectric gauge
19. Rapid changes of pressure can be measured using
A) Barometer
B) Piezoelectric pressure gauge
C) Bourdon tube pressure gauge
D) Diaphragm gauge

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20. Displacer type level detector works on
A) Pascals Law
B) Archimedes principle
C) Bernoulli's principle
D) None of the above
21. For non contact method of level measurement which one of the following is most suited ?
A) Float type level measurement
B) Displacer level measurement
C) Capacitive level measurement
D) Radiation level measurement
22. Which one of the following is not a direct level measuring method ?
A) Hook-type level measuring instrument
B) Sight Glass
C) Float type indicator
D) Capacitive level measurement
23. $40^{\circ}\text{C} =$ _____
A) 98°F
B) 110°F
C) 104°F
D) 108°F
24. Which one of the following is suitable for non contact temperature measurement ?
A) Thermocouple
B) RTD
C) Radiation Pyrometer
D) Thermistor
25. The conductor commonly used for the construction of RTD
A) Copper
B) Platinum
C) Silver
D) Aluminum
26. In electromagnetic flow meters induced voltage is
A) Directly proportional to flow velocity
B) Proportional to the square of flow velocity
C) Inversely proportional to flow velocity
D) Proportional to the square root of flow velocity
27. Cylinder and Piston type flow meter is a
A) Variable area flow meter
B) Magnetic flow meter
C) Differential pressure flow meter
D) Thermal flow meter
28. "Stokes" is the unit of
A) Density
B) Kinematic Viscosity
C) Humidity
D) Absolute Viscosity

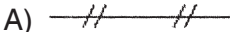
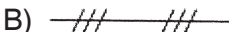


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29. Hot Wire Anemometer is used for
A) Temperature measurement B) Humidity measurement
C) Liquid level measurement D) Flow measurement
30. Weirs are used for
A) Absolute viscosity measurement B) Open channel flow measurement
C) Pressure measurement D) None of the above
31. Compared to open loop system closed loop systems are
A) Less sensitive to disturbances B) Complex and Expensive
C) A and B both D) Only A
32. In force – current analogous system velocity is analogous to
A) Current B) Voltage
C) Flux D) Capacitance
33. Product of all branch gains in a closed loop, in signal flow graph is known as
A) Path gain B) Transmittance
C) Loop gain D) None of the above
34. The highest power of “s” in the denominator of transfer function is known as
A) Order of the system B) Zeros of the system
C) Poles of the system D) Type of the system
35. The system response during which the output changes from one value to another value is called
A) Steady state response B) Transient response
C) Damped response D) None of these
36. The ratio of actual damping to critical damping is called
A) Gain of the system B) Damping ratio
C) Time constant D) Settling time
37. For a critically damped system, the damping ratio is
A) 1 B) 0
C) Less than 1 D) Greater than 1
38. If each term of the first column of the Routh array are positive the system is
A) Unstable B) Marginally stable
C) Stable D) Conditionally stable

A

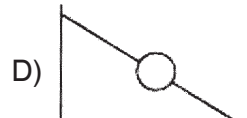
39. Nichols chart can be used to determine
- A) Steady state response
 - B) Closed loop frequency response
 - C) Time response
 - D) Open loop frequency response
40. State variable approach is applicable to
- A) Linear time invariant systems
 - B) Linear time variant systems
 - C) Non linear systems
 - D) All the above systems
41. If gain margin of a system is 0 dB, then the system is
- A) Stable
 - B) Marginally stable
 - C) Conditionally stable
 - D) Unstable
42. The root locus originates from
- A) Open loop zeros
 - B) Closed loop zeros
 - C) Open loop poles
 - D) Closed loop poles
43. Alcohol is pumped through a pipe of 10 cm diameter at 4 m/s flow velocity. Find the volume flow rate.
- A) $0.0314 \text{ m}^3/\text{s}$
 - B) $1.6 \text{ m}^3/\text{s}$
 - C) $0.0016 \text{ m}^3/\text{s}$
 - D) $314 \text{ m}^3/\text{s}$
44. The standard measuring range of a sensor is 4–20 mA. If we have a set point value of 13 mA and a measurement of 12.5 mA, calculate the percent of span error.
- A) 3.125
 - B) – 3.125
 - C) 2.5
 - D) – 2.5
45. Controller with maximum stabilising time
- A) P
 - B) PI
 - C) PD
 - D) PID
46. In a proportional controller offset can be decreased by
- A) Larger differential gain
 - B) Smaller proportional gain
 - C) Larger proportional gain
 - D) Smaller differential gain
47. Which of the following statements are true regarding flashing ?
- A) Valve outlet pressure is greater than the vapour pressure of the process liquid
 - B) Valve outlet pressure is less than or equal to the vapour pressure of the process liquid
 - C) Independent of vapour pressure
 - D) None of the above

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48. In air-to-close pneumatic valve, if the air supply above the diaphragm is lost, the valve will
A) fail open
B) fail close
C) either open or close
D) none of the above
49. An equal percentage valve has maximum flow of $25 \text{ cm}^3/\text{s}$ and minimum of $1 \text{ cm}^3/\text{s}$. If full travel is 2 cm, find the flow at 1 cm opening
A) $12.5 \text{ cm}^3/\text{s}$
B) $5 \text{ cm}^3/\text{s}$
C) $25 \text{ cm}^3/\text{s}$
D) $50 \text{ cm}^3/\text{s}$
50. Control system which has more than one controller is
A) feedback
B) cascade
C) ratio
D) split range
51. Control algorithm with one controlled output and more than one manipulated variable is
A) ratio control
B) split range control
C) cascade
D) feedback
52. With increase in proportional gain speed of control system response will
A) remains the same
B) decrease
C) increases
D) oscillate
53. PLC can be programmed using
A) FBD
B) Ladder logic
C) Structured text
D) All of the above
54. Green colour indicates which wire type in LABVIEW ?
A) Numeral
B) Boolean
C) String
D) Hardware resource
55. Which of the following is not true regarding an ideal opamp ?
A) Infinite gain
B) Infinite output impedance
C) Null voltage offset
D) None of the above
56. Symbol for continuous pneumatic symbol in P and I diagram.
A)  B) 
C)  D) 

A

57. Symbol of gate valve is



58. A telemetry system using synchro transmitter and receiver is an example of

- A) voltage telemetry system
- B) current telemetry system
- C) position telemetry system
- D) radio frequency telemetering systems

59. Which of the following is not true about landline telemetry system ?

- A) is free from transmission link distortions
- B) the effects of thermo-electric emfs are substantial
- C) the frequency response is limited
- D) signal multiplexing tends to be impracticable

60. In long distance telemetry data is transmitted in form of

- A) current
- B) voltage
- C) position
- D) frequency

61. End devices at telemetry receiver cannot be

- A) detector
- B) recorder
- C) display
- D) controller

62. Force balance system is a type of

- A) position telemetry system
- B) current telemetry system
- C) voltage telemetering systems
- D) radio frequency telemetering systems

63. Beer-Lambert's law holds good only for

- A) white light
- B) dichromatic light
- C) polychromatic light
- D) monochromatic light

64. In a paramagnetic oxygen analyser highest point for which dry air is used to set the span point.

- A) 21 percent
- B) 25 percent
- C) 12 percent
- D) 28.8 percent

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65. The material that cannot be used for construction of filament in hot wire thermal conductivity analyser is
- A) Tungsten
B) Magnanin
C) Kovar
D) Platinum
66. Which of the following is a classification of liquid chromatography ?
- A) Paper chromatography
B) Column chromatography
C) Thin layer chromatography
D) All of the above
67. _____ is known as heart of a gas chromatograph, where the fundamental process of separation takes place.
- A) Injection system
B) Column
C) Thermal compartment
D) Platinum
68. Ions of different m/e ratio are separated by the difference in time they take to travel over an identical path from the ion source to the collector. This is the working principle of
- A) Magnetic deflection mass spectrometer
B) Time-of-flight mass spectrometer
C) NMR spectrometer
D) Raman effect spectro photometer
69. In which part of the flame photometer aerosol is produced and fed into the flame
- A) Burner
B) Atomiser
C) Flame
D) Regulator
70. Reference electrode that is used at high temperatures in pH measurement
- A) Ag/AgCl electrode
B) Mercury/mercurous electrode
C) Hydrogen electrode
D) Glass electrode
71. If identical solutions are placed inside and outside the bulb of the glass electrode, it is found that in spite of the apparent symmetry of the cell so formed, there exists an emf of a few millivolt. This potential difference is called the
- A) Asymmetry potential
B) Symmetry potential
C) Acid error
D) Alkali error

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72. Detector used in infrared spectrophotometer when a response time of 0.5 ms is required
- A) Photoconductive cell B) Golay cell
C) Thermocouple D) Bolometer
73. In ECG waveform _____ wave represents repolarisation of both ventricles.
- A) QRS complex B) P wave
C) T wave D) U wave
74. In EEG m/m number of electrode locations in the 10/20 system is
- A) 24 B) 15 C) 5 D) 21
75. _____ is not a part of emg machine.
- A) Amplifier B) CRO
C) Montage selector D) Loud speaker
76. Natural pacemaker of heart is
- A) Sinoatrial node B) Atrioventricular node
C) Bundle of HIS D) Purkinje fibre
77. The magnitude of the voltage picked up in an electromagnetic blood flow meter is not directly proportional to the
- A) strength of the magnetic field
B) the diameter of the blood vessel
C) the velocity of blood flow
D) polarity of magnetic field
78. The electrical shock that reaches to the heart directly and is highly concentrated is called
- A) Micro shock B) Macro shock
C) Extracorporeal shock D) Cardiogenic shock
79. Process of changing from resting potential to action potential is known as
- A) Repolarisation B) Depolarisation
C) Polarisation D) Sodium pump
80. In CT scanners the impact of an X-ray photon with an electron is accompanied by a transfer of energy and a fall in the X-ray frequency. This is known as
- A) Compton effect B) Planks effect
C) Newton effect D) Einsteen effect

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81. Which phenomenon causes polarization of light ?
A) Total internal reflection B) Interference
C) Double refraction D) None of these
82. In a Newton's ring experiment, diameter of 10th dark ring due to a wavelength of 500 nm in water ($\mu = 1.5$) is 5 mm. The radius of curvature of lens is
A) 157 cm B) 187 cm
C) 193 cm D) 167 cm
83. Match the following :
- | | |
|---------------------------|-------------------------|
| i. Photodiode | a. High sensitivity |
| ii. PIN diode | b. Microwave switch |
| iii. Avalanche photodiode | c. Low output response |
| iv. LED | d. Fast output response |
| v. Phototransistor | |
- A) i-c, ii-b, iv-a, v-d
B) i-d, ii-b, iii-a, v-c
C) i-d, iii-a, iv-c, v-b
D) None of these
84. Which of the following is true about Numerical Aperture (NA) ?
i. NA determines the light gathering ability of fibre
ii. It depends only on the refractive indices of core and cladding
iii. It's value ranges from 0.5 to 1
iv. It is defined as sine of critical angle
A) Only i, ii and iv are true
B) Only i, ii and iii are true
C) Only i and ii are true
D) All the above are true
85. Match the following :
- | | |
|-------------------------|------------------|
| i. Ruby Laser | a. T.H. Maiman |
| ii. Argon Laser | b. 2 level laser |
| iii. He-Ne Laser | c. ion laser |
| iv. Semiconductor laser | d. 632.8 nm |
- A) i-a, ii-c, iii-b, iv-d
B) i-d, ii-a, iii-c, iv-b
C) i-a, ii-c, iii-d, iv-b
D) None of these

A

86. Which of the following is true ?
- Oscilloscope is basically a voltmeter
 - CRO is a fast x-y plotter
 - Effect of negative voltage to the grid is an attractive force
 - Focusing and accelerating anodes are cylindrical
 - During flyback period, voltage is very high
- A) All are true
 B) Only i, ii and iv are true
 C) Only i and ii are true
 D) Only i and iv are true
87. The inductance of a moving iron instrument is given by :
- $L = (40 + 2\theta - \theta^2)\mu\text{H}$, where θ is the deflection in radians from zero position. The spring constant is 12×10^{-6} Nm/rad. Estimate the deflection for a current of 2A.
- A) 0.5 rad
 B) 0.25 rad
 C) 0.15 rad
 D) 0.75 rad
88. A simple equal arm voltage sensitive bridge is initially balanced. Three of the arms consists of ordinary resistors, while the fourth is a thermistor. Each arm has a nominal resistance of $1\text{K}\Omega$ and the bridge is energised with a 10V dc source. If a temperature change causes a + 15% change in thermistor resistance, what output voltage (approximately) will be indicated from the bridge ?
- A) 349 mV
 B) 35 mV
 C) 215 mV
 D) None of these
89. Which of the following is true ?
- An ammeter is used for measuring magnitude and direction of current flow
 - D' Arsonval galvanometer is used to measure small voltage and current in the circuit
 - Galvanometer connected with high resistance in series is used as ammeter
 - A galvanometer also is known as PMMC instrument
- A) Only i, ii and iv are true
 B) Only i and iv are true
 C) Only ii, iii and iv are true
 D) Only ii and iv are true
90. The two-wattmeter method is used to measure power in a balanced 3-phase circuit, drawing lagging current. The power factor if one of the wattmeters reads twice the value of the other wattmeter.
- A) $1/\sqrt{2}$
 B) 1
 C) 1/2
 D) $\sqrt{3}/2$

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91. A (0-120)V voltmeter has an accuracy of 1% full scale reading. The voltage is 60 V. The limiting error is
A) 2% B) 0.2%
C) 1.2% D) None of these
92. An ammeter has a current range of 0–10A, and its internal resistance is 0.5 Ω . In order to change the range to 0–50A, we need to add a resistance of
A) 0.125 Ω in parallel with the meter
B) 0.125 Ω in series with the meter
C) 0.1 Ω in parallel with the meter
D) 0.1 Ω in series with the meter
93. A stationary closed Lissajous pattern on an oscilloscope has 5 horizontal tangencies and 3 vertical tangencies for a vertical input with frequency 8 kHz. The frequency of horizontal input is
A) 4.8 kHz B) 13.3 kHz
C) 8 kHz D) 1 kHz
94. An amplifier has an open loop voltage gain of – 300. This gain is reduced to – 100 when negative feedback is applied. The reverse transmission factor β of this system is
A) – 0.0033 B) – 0.0066
C) 0.0033 D) 0.0066
95. Match the following :
- | | |
|----------------|--------------------------------------|
| i. SCR | a. bidirectional switch |
| ii. Transistor | b. switch |
| iii. TRIAC | c. bidirectional uncontrolled device |
| iv. DIAC | d. switch and amplifier |
- A) i-a, ii-b, iii-d, iv-c
B) i-b, ii-d, iii-a, iv-c
C) i-b, ii-d, iii-c, iv-a
D) i-d, ii-b, iii-c, iv-a
96. Simplify the expression :
 $Y = \bar{A}B + (A + \bar{B})\bar{C}$
A) $\bar{A}B + \bar{C}$ B) $\bar{A}B$
C) \bar{A} D) None of these

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Space for Rough Work



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