



61715

ROLL No.

--	--	--	--	--	--

TEST BOOKLET No.

29

TEST FOR POST GRADUATE PROGRAMMES

INSTRUMENTATION

Time: 2 Hours

Maximum Marks: 450

INSTRUCTIONS TO CANDIDATES

1. You are provided with a Test Booklet and an Optical Mark Reader (OMR) Answer Sheet to mark your responses. Do not soil the Answer Sheet. Read carefully all the instructions given on the Answer Sheet.
2. Write your Roll Number in the space provided on the top of **this page**.
3. Also write your Roll Number, Test Code, and Test Subject in the columns provided for the same on the **Answer Sheet**. Darken the appropriate bubbles with a **Ball Point Pen**.
4. The paper consists of 150 objective type questions. All questions carry equal marks.
5. Each question has four alternative responses marked **A, B, C** and **D** and you have to **darken** the bubble corresponding to the correct response fully by a **Ball Point Pen** as indicated in the example shown on the Answer Sheet.
6. Each correct answer carries 3 marks and each wrong answer carries 1 minus mark.
7. Space for rough work is provided at the end of this Test Booklet.
8. You should return the Answer Sheet to the Invigilator before you leave the examination hall. However, you can retain the Test Booklet.
9. Every precaution has been taken to avoid errors in the Test Booklet. In the event of any such unforeseen happening, the same may be brought to the notice of the Observer/Chief Superintendent in writing. Suitable remedial measures will be taken at the time of evaluation, if necessary.



61715

INSTRUMENTATION

1. Wire-wound resistors are used only when
 - (A) Precision is essential
 - (B) Low values are required
 - (C) High power rating is necessary
 - (D) Costly equipments are manufactured

2. An LED made using GaAs emits radiation in
 - (A) Visible region
 - (B) UV region
 - (C) Infra-red region
 - (D) Microwave region

3. The material which has the property of becoming electrically polarised in response to an applied mechanical stress is termed as
 - (A) Ferroelectric
 - (B) Piezo-electric
 - (C) Optoelectronic
 - (D) Superconducting

4. Which one of the following materials is a ceramic material?
 - (A) Mica
 - (B) Zinc sulphate
 - (C) Antimony
 - (D) Copper

5. Magnetic cores required for RF applications have
 - (A) high hysteresis and eddy current losses
 - (B) high hysteresis and low eddy current losses
 - (C) low hysteresis and high eddy current losses
 - (D) low hysteresis and eddy current losses

6. Ferrites are the materials which have
 - (A) low permeability and low dielectric loss
 - (B) low permeability and high dielectric loss
 - (C) high permeability and low dielectric loss
 - (D) high permeability and high dielectric loss



61715

- 7. The mean free path of electron drift increases with
 - (A) purity
 - (B) strain hardening
 - (C) elastic modulus
 - (D) temperature

- 8. As per Curie-Weiss law, the magnetic susceptibility of a material varies as
 - (A) T^{-2}
 - (B) $1/T$
 - (C) T
 - (D) T^2

- 9. For small size, high frequency coils, the most common material is
 - (A) Air
 - (B) Ferrite
 - (C) Powdered iron
 - (D) Steel

- 10. Germanium and Silicon photosensors have their maximum spectral response in the
 - (A) IR region
 - (B) UV region
 - (C) Visible region
 - (D) X-ray region

- 11. The speed of response of a first order system is judged by
 - (A) Time constant
 - (B) Transient response
 - (C) Steady state value
 - (D) Rise time

- 12. A second order system would be critically damped when
 - (A) damping ratio is less than 1
 - (B) damping ratio is equal to 1
 - (C) damping ratio is greater than 1
 - (D) damping ratio tends to infinity

- 13. What represents the departure of the observed reading from the arithmetic mean of the group readings?
 - (A) Dispersion
 - (B) Deviation
 - (C) Variance
 - (D) Median



61715

14. An ammeter reads 10.7A and the true value of current is 10.54A. Determine the error and correlation for this instrument.
- (A) 0.8, -0.8 (B) 0.08, -0.08
(C) 0.16, -0.16 (D) None of the above
15. The maximum percentage quantization error for a 12-bit analog to digital converter is
- (A) $\pm 0.0076\%$ (B) $\pm 0.012207\%$
(C) $\pm 3.125\%$ (D) $\pm 4.17\%$
16. If the numerator of a second-order transfer function $F(s)$ is a constant, then the filter is a
- (A) Band pass filter (B) High pass filter
(C) Band stop filter (D) Low pass filter
17. The inverse Fourier transformation of $\delta(t)$ is
- (A) $U(t)$ (B) 1
(C) $\delta(t)$ (D) $e^{j2\pi t}$
18. If a unit step current is passed through a capacitor what will be the voltage across the capacitor?
- (A) 0 (B) A step function
(C) A ramp function (D) An impulse function
19. For a network of 11 branches and 6 nodes, what is the number of independent loops?
- (A) 4 (B) 5
(C) 6 (D) 11
20. Which of the following theorems can be applied to any network - linear or nonlinear, active or passive, time-variant or time-invariant?
- (A) Thevenin theorem (B) Norton theorem
(C) Tellegen theorem (D) Superposition theorem

21. Specify the photoelectric device which converts the light information to resistance information
- (A) Photo-emissive cell (B) Photo-conductive cell
(C) Photo-voltaic cell (D) All of the above
22. High vacuum pressure is most commonly expressed as
- (A) cm of water (B) pascal
(C) torr (D) micron
23. Radioactive pyrometers are used for the measurement of temperature in the range of
- (A) -200°C to 500°C (B) 0°C to 1200°C
(C) 500°C to 1200°C (D) 1200°C to 2500°C
24. Doppler effect principle is used in the measurement of
- (A) Temperature (B) Frequency
(C) Speed (D) Pressure
25. Measurement of viscosity involves measuring
- (A) Frictional force (B) Coriolis force
(C) Centrifugal force (D) Buoyant force
26. A sound intensity level of 60 dB corresponds to
- (A) 10^{-6} W/cm^2 (B) 10^{-10} W/cm^2
(C) 10^{-16} W/cm^2 (D) 10^{-62} W/cm^2
27. The Gunn diode is made from
- (A) Silicon (B) Germanium
(C) Gallium Arsenide (D) Selenium



28. The voltage gain of a given common source JFET amplifier depends on its
- (A) Input impedance (B) Amplification factor
(C) Dynamic drain resistance (D) Drain and load resistance
29. The junction capacitance of a pn junction depends on
- (A) Doping concentration
(B) Applied voltage
(C) Both doping concentration and applied voltage
(D) Barrier potential only
30. Which of the following will serve as a donor impurity in silicon?
- (A) Boron (B) Indium
(C) Germanium (D) Antimony
31. A differential amplifier is invariably used in input stage of all OPAMPs. This is done basically to provide the OPAMPs with a very high
- (A) CMRR (B) Bandwidth
(C) Slew rate (D) Open loop gain
32. The Fourier transform of a Gaussian time pulse is
- (A) Uniform (B) A pair of impulse
(C) Gaussian (D) Rayleigh
33. In an amplitude modulated system, the total power radiated is 600W. The power of the carrier is 400 W. What is the modulation index?
- (A) 1 (B) 0.5
(C) 0.75 (D) None of the above
34. One decibel represents a power ratio of
- (A) 1.26:1 (B) 2:1
(C) 10:1 (D) 20:1

61715

35. Frequency shift keying is used mostly in
- (A) Radio transmission (B) Telegraphy
(C) Telephony (D) None of the above
36. The number of flip-flops required in a decade counter is
- (A) 2 (B) 3
(C) 4 (D) 10
37. The switching time of LEDs is of the order of
- (A) 1s (B) 1ms
(C) 1 μ s (D) 1ns
38. The wavelength of the electron is given by
- (A) $\lambda = h/2\pi$ (B) $\lambda = h/mv$
(C) $\lambda = h/mv$ (D) $\lambda = nh/4\pi$
39. If air resistance is neglected and the initial speed of a projectile is doubled, its range
- (A) doubles.
(B) decreases by a factor of four.
(C) increases by a factor of four.
(D) does not change.
40. If you apply the same force to objects with masses M and $4M$, the acceleration of the mass M is
- (A) the same as for the mass $4M$
(B) four times the acceleration of the mass $4M$
(C) one-fourth the acceleration of the mass $4M$
(D) twice the acceleration of the mass $4M$



41. If two metal blocks of different masses slide freely down the same frictionless incline, which one of the following is true?
- (A) They have equal accelerations
 - (B) They have unequal accelerations, but the forces acting on them are equal
 - (C) The more massive block reaches the bottom first
 - (D) The less massive block reaches the bottom first
42. When a particle moves in a circle with constant speed, its acceleration is
- (A) constantly increasing
 - (B) constantly decreasing
 - (C) constant in direction
 - (D) constant in magnitude
43. If you double the speed of an object, its kinetic energy is
- (A) the same
 - (B) doubled
 - (C) tripled
 - (D) quadrupled
44. The condition necessary for the conservation of momentum in a given system is that
- (A) energy is conserved
 - (B) internal forces equal external forces
 - (C) the net external force is zero
 - (D) None of the above
45. A particle of mass $2m$ is moving to the right in projectile motion. At the top of its trajectory, an explosion breaks the particle into two equal parts. After the explosion, one part falls straight down with no horizontal motion. What is the direction of the motion of the other part just after the explosion?
- (A) up and to the left
 - (B) straight up
 - (C) up and to the right
 - (D) down and to the right

46. When light strikes the p-type semiconductor in a pn junction solar cell,
- (A) only free electrons are created
 - (B) positive protons are created
 - (C) both electrons and holes are created
 - (D) None of the above
47. Forward biasing of a pn junction
- (A) lowers the potential across a junction and increases the diffusion of holes and electrons
 - (B) raises the potential across a junction and increases the diffusion of holes and electrons
 - (C) raises the potential across a junction and decreases the diffusion of holes and electrons
 - (D) lowers the potential across a junction and decreases the diffusion of holes and electron
48. A Josephson junction is a junction of
- (A) two ordinary conductors
 - (B) an ordinary conductor and a superconductor
 - (C) an insulator and a superconductor
 - (D) two superconductors
49. The reduced mass of a system of two particles whose masses are m_1 and m_2 is
- (A) $\mu = (m_1 + m_2)/m_1 \cdot m_2$
 - (B) $\mu = m_1 \cdot m_2/m_1$
 - (C) $\mu = (m_1 + m_2)/m_1$
 - (D) $\mu = m_1 \cdot m_2/(m_1 + m_2)$
50. Which of the following characteristic X-ray lines results from the least energetic transition?
- (A) K_α
 - (B) K_β
 - (C) K_γ
 - (D) All of these characteristic X-ray lines are the same



51. In the photoelectric effect, the work function depends on the
- (A) incident wavelength (B) metal the light strikes
(C) applied voltage (D) current
52. The wavelength of a light beam is doubled. Which one of the following is correct for the momentum of photons for that light beam?
- (A) It is halved (B) It stays the same
(C) It is doubled (D) It is reduced by one-fourth
53. Four unequal resistors are connected in a parallel circuit. Which one of the following statements is correct about this circuit?
- (A) The total resistance is less than the smallest resistor
(B) The total resistance is equal to the average of the resistance of all the resistors
(C) The total resistance is equal to average of the four resistors
(D) The total resistance is more than the largest resistor
54. In a single-slit diffraction experiment, the width of the slit through which light passes is reduced. What happens to the central bright fringe?
- (A) It stays the same
(B) It becomes narrower
(C) It becomes wider
(D) We must know the wavelength of the light to answer
55. Which one of the following experiments is the justification for the wave theory of light?
- (A) Frank-Hertz experiment
(B) Newton's rings experiment
(C) Huygens' experiment
(D) Young's double slit experiment



56. A resistor is connected to an AC power supply. On this circuit, the current
- (A) leads the voltage by 90°
 - (B) lags the voltage by 90°
 - (C) is in phase with the voltage
 - (D) leads the voltage by 45°
57. A pure capacitor is connected to an AC power supply. In this circuit, the current
- (A) leads the voltage by 90°
 - (B) lags the voltage by 90°
 - (C) lags the voltage by 180°
 - (D) is in phase with the voltage
58. In a RLC circuit, a second capacitor is connected in series with the capacitor previously in the circuit. What is the effect of this change on the impedance of the circuit?
- (A) It increases
 - (B) It decreases
 - (C) It does not change
 - (D) It increases for frequencies below resonance and decreases for frequencies above resonance
59. Resonance in a series RLC circuit occurs when
- (A) X_L is greater than X_C
 - (B) X_C is greater than X_L
 - (C) $(X_L - X_C)^2$ is equal to R^2
 - (D) X_C equals X_L
60. Consider a series circuit in which the capacitive reactance equals the inductive reactance. What is the phase angle between current and voltage?
- (A) $+180^\circ$
 - (B) $+90^\circ$
 - (C) -180°
 - (D) 0°



61. If the magnetic field applied to a loop of wire is doubled, what happens to the induced emf in that loop assuming all the other parameters remain unchanged?
- (A) It is doubled (B) It stays the same
(C) It is reduced by a factor of 2 (D) It is quadrupled
62. The energy stored in a coil of self-inductance, L , and traversed by current I , is E_1 . A second coil is made with the same length of wire, but its radius is twice the radius of the first coil and it is twice as long as the first coil. If the second coil also has twice the current of the first coil, how does the energy stored in the first coil, E_1 , related to the energy stored in the second coil, E_2 ?
- (A) $E_1 = E_2$ (B) $E_1 = E_2/8$
(C) $E_1 = 4 E_2$ (D) $E_1 = E_2/2$
63. A transformer works on a principle of
- (A) self inductance (B) capacitance
(C) direct current (D) mutual inductance
64. The length of a certain wire is doubled and at the same time its radius is tripled. What is the change in the resistance of this wire?
- (A) It stays the same
(B) It is reduced by a factor of 4.5
(C) It is doubled
(D) It is tripled

65. Which one of the following is a correct statement for a number of resistors connected in series or parallel?
- (A) The total resistance in a series circuit decreases as more resistors are added
 - (B) The flow of current is different through resistors connected in a series circuit
 - (C) The voltage is different across resistors connected in a parallel circuit
 - (D) The total resistance in a parallel circuit decreases as more resistors are added
66. A capacitor C is connected in series with a resistor R across a battery and an open switch. If a second capacitor of capacitance $2C$ is connected in parallel to the first, the time constant of the new RC circuit will be
- (A) the same as before
 - (B) twice as large as before
 - (C) three times as large as before
 - (D) one-half as large as before
67. Four unequal resistors are connected in a parallel circuit. Which one of the following statements is correct?
- (A) The total resistance is less than the smallest resistor
 - (B) The total resistance is equal to the average of the resistance of all the resistors
 - (C) The total resistance is equal to average of the four resistors
 - (D) The total resistance is more than the largest resistor
68. The temperature transducers exhibit non linear behavior. The order in which they exhibit non linearity (highest to lowest) is
- (A) Thermocouple, RTD and Thermistors
 - (B) Thermistors, thermocouples and RTDs
 - (C) RTDs, thermocouples and thermistors
 - (D) Thermistor, RTDs and thermocouples



69. What occurs if the temperature of the thermocouple measuring junction is lower than the reference junction?
- (A) There is no emf output
 - (B) The output voltage polarity is reversed
 - (C) The polarity stays the same, but voltage increases
 - (D) The emf remains the same when temperature changes
70. Optical pyrometer is used for the measurement of
- (A) Light intensity
 - (B) Low temperature
 - (C) High temperature
 - (D) All of the above
71. Electrical resistance of the thermistor
- (A) increases with temperature
 - (B) decreases with temperature
 - (C) remains unaltered
 - (D) increases or decreases with temperature depending on the material used
72. A bimetallic thermometer is made of two metals A and B with thermal coefficients as, $\alpha_A = 20 \times 10^{-6}/^{\circ}\text{C}$ and $\alpha_B = 10 \times 10^{-6}/^{\circ}\text{C}$. If the temperature raises from 10°C to 30°C , along which metal the bimetallic strip bends?
- (A) Towards metal A
 - (B) Towards metal B
 - (C) Elongates
 - (D) Get twisted
73. Thermocouples
- (A) are most commonly used as temperature transducer
 - (B) require reference junction compensation
 - (C) have low output voltage
 - (D) All of the above

74. The third wire of a RTD (in three lead configuration) for temperature measurement by RTD is used
- (A) to complete the bridge
 - (B) to balance the current flowing in the bridge
 - (C) to balance the null voltage of the bridge
 - (D) to compensate the errors due to lead resistance
75. The best way to specify accuracy of an instrument is
- (A) percentage of full scale deflection
 - (B) percentage of true value
 - (C) percentage of a specific value
 - (D) percentage of the error
76. Precision is
- (A) closeness of the indicated value to the true value
 - (B) agreement within a group of measurements of same measurand
 - (C) both (A) and (B)
 - (D) None of the above
77. Which one of the following acts as an inverse transducer?
- (A) Resistance potentiometer
 - (B) LVDT
 - (C) Capacitance transducer
 - (D) Piezo-electric transducer
78. A transducer has an output impedance of $1\text{k}\Omega$ and a load resistance of $1\text{M}\Omega$. The transducer behaves as
- (A) a constant current source
 - (B) a constant voltage source
 - (C) a constant impedance source
 - (D) None of the above



61715

15

79. A measurement system with input $x(t)$ and output $y(t)$ is described by the differential equation $3dy/dt + 5y = 8x$. The static sensitivity of the system is
- (A) 0.60 (B) 1.60
(C) 1.67 (D) 2.67
80. A quantity whose magnitude has a definite repeating time cycle is called as
- (A) transient (B) steady state periodic
(C) steady state aperiodic (D) transient periodic
81. The damping constant in a second order moving coil voltmeter will be
- (A) 1 (B) 0.5
(C) 0.707 (D) Any of the above
82. Time constant is defined as
- (A) time taken to reach the final value with initial slope of the response
(B) time taken to reach 63.2% of the final value
(C) time taken to fall to 36.8% of its initial value
(D) All of the above
83. A resistance potentiometer is a
- (A) zero order instrument (B) first order instrument
(C) second order instrument (D) None of the above
84. The random error in a measurement can be treated by
- (A) statistical analysis (B) calibration
(C) periodic check (D) All of the above



61715

85. The purpose of a dummy gauge in strain gauge based measurement is to
- (A) increase the sensitivity of the measurement system
 - (B) nullify the error due to temperature
 - (C) measure strain along X and Y direction
 - (D) increase the stability of the measurement system
86. The speed of a gear having 60 teeth is measured using a proximity sensor. The output of the proximity sensor is fed to a counter with a gating time of 1s. The counter indicates a value of 120. The speed at which the gear is rotating is
- (A) 60 rpm
 - (B) 120 rpm
 - (C) 600 rpm
 - (D) 1200 rpm
87. Why is it important to maintain an impedance match from the source to the load when sending signals?
- (A) To reduce external noise
 - (B) To keep the line balanced
 - (C) To reduce reflected energy
 - (D) To reduce attenuation
88. The threshold and resolution is
- (A) smallest measurable input and input change
 - (B) smallest measurable output and output change
 - (C) smallest measurable input change and input
 - (D) None of the above
89. Capacitive transducers are normally used for
- (A) static measurement
 - (B) dynamic measurement
 - (C) both static and dynamic measurements
 - (D) transient measurement



90. The low frequency response of the Piezo-electric transducer can be improved by using
- (A) an electrometer amplifier
 - (B) a charge amplifier
 - (C) proper selection of material for Piezo-electric transducer
 - (D) short cables
91. In LVDT both the direction and magnitude of the displacement can be obtained by using
- (A) demodulator circuit
 - (B) amplitude modulator circuit
 - (C) phase sensitive demodulator circuit
 - (D) All of the above
92. LVDT can be used for measuring
- (A) displacement
 - (B) level and flow
 - (C) pressure
 - (D) All of the above
93. The dynamic characteristics of a capacitive transducer are similar to those of
- (A) low pass filter
 - (B) high pass filter
 - (C) notch filter
 - (D) band stop filter
94. What is the number of significant figures in the following numbers, 0.00030Ω and $0.000030\text{ M}\Omega$?
- (A) 5 and 6
 - (B) 5 and 2
 - (C) 2 and 6
 - (D) 6 and 7
95. A transducer measures a range of 0-200 N force with a resolution of 0.15% of full scale. What is the smallest change which can be measured by this transducer?
- (A) 0.1N
 - (B) 0.3N
 - (C) 0.4N
 - (D) 0.03N



96. A variable air gap type capacitor with two parallel plates separated by a distance x . If a potential is applied across two plates, the force of attraction F is related to x as
- (A) F proportional to x^2 (B) F proportional to $1/x^2$
(C) F proportional to $1/x$ (D) F proportional to x
97. A linear variable differential transformer (LVDT) is
- (A) an auto transformer
(B) an impedance matching transformer
(C) a displacement Transducer
(D) step down transformer
98. Identify the correct set of matches from the following
- | | |
|-------------------------|---------------------------------|
| (a) Pirani gauge | (1) Temperature measurement |
| (b) Venturi meter | (2) Vacuum pressure measurement |
| (c) Radiation pyrometer | (3) Force measurement |
| (d) Load cell | (4) Flow measurement |
- (A) a-2, b-1, c-4, d-3 (B) a-4, b-3, c-2, d-1
(C) a-2, b-4, c-1, d-3 (D) None of the above
99. Poisson's ratio for a metal is 0.2. Neglecting Piezo-resistive effect, the gauge factor of a strain gauge of this metal is
- (A) 1 (B) 2
(C) 1.75 (D) 4
100. In a potentiometer transducer, if the resistance of the potentiometer is reduced to improve the linearity, the sensitivity of the transducer
- (A) increases (B) decreases
(C) remains same (D) cannot be determined



61715

101. The Reynolds number determines
- (A) Venturi effect
 - (B) The Coriolis acceleration
 - (C) The fluid velocity
 - (D) Whether the flow is laminar or turbulent
102. Name the flow meter used to measure blood flow.
- (A) Ultrasonic
 - (B) Rotameter
 - (C) Positive displacement meter
 - (D) Pitot Tube
103. A Reynold's number of 1000 indicates
- (A) Turbulent flow
 - (B) Laminar flow
 - (C) Either turbulent or laminar
 - (D) None of the above
104. A flow meter that measures flow which is independent of density is
- (A) Rotameter
 - (B) Electromagnetic flowmeter
 - (C) Venturimeter
 - (D) Orifice meter
105. Which of the following flow meters has the lowest pressure drop for a given range of flow?
- (A) Orifice
 - (B) Venturi
 - (C) Rotameter
 - (D) Flow nozzle
106. In a venturimeter what is the relation between flow and pressure?
- (A) $Q \propto \sqrt{\frac{1}{P}}$
 - (B) $Q \propto \sqrt{P}$
 - (C) $Q \propto \frac{1}{P}$
 - (D) $Q \propto P$
107. The primary standard for calibrating vacuum is
- (A) McLeod gauge
 - (B) Dead weight tester
 - (C) Thermocouple gauge
 - (D) Kundsén gauge



61715

108. A pressure gauge is used to measure vacuum and indicates a gauge pressure of 5 KPa. If the atmospheric pressure is 100 KPa, the absolute pressure is
- (A) 105 KPa (B) 0.05 KPa
(C) 95 KPa (D) 20 KPa
109. Manometers measures unknown pressure by
- (A) measuring liquid level
(B) measuring height of liquid columns
(C) balancing the unknown force produced by pressure against a known force
(D) None of the above
110. A Pirani gauge measures vacuum pressure and works on the principle of
- (A) change in ionizing potential
(B) change in thermal conductivity
(C) deformation of elastic body
(D) change of self-inductance
111. Statement (P): 1 bar=14.5037738 PSI (pounds per square inch)
Statement (Q): 1 mm of Hg=0.133322368 Kilo Pascal's
- (A) P is True and Q is false (B) Q is True and P is false
(C) Both P and Q are true (D) Both P and Q are false
112. In ionization type of vacuum gauges, the pressure P is directly proportional to
- (A) grid current/plate current (B) plate current/grid current
(C) grid current * plate current (D) None of the above



113. A voltmeter with an internal resistance of $100\text{k}\Omega$ is used to measure a 10V source having an internal resistance of $2\text{k}\Omega$. What is the source error in the measurement due to loading?
- (A) 1% (B) 1.5%
(C) 2% (D) 3%
114. The input resistance of a CRO is in the order of
- (A) Tens of ohms (B) Megohms
(C) Kilo ohms (D) Milli ohms
115. The resonant frequency of an RLC series circuit is 1.5MHz with the tuning capacitor set at 150pF . The bandwidth is 10kHz . The effective resistance of the circuit is
- (A) 29.5 Ohms (B) 22.2 Ohms
(C) 9.4 Ohms (D) 4.7 Ohms
116. The purpose of providing a mirror behind the pointer in a measuring instrument is to
- (A) illuminate the scale
(B) check whether the pointer is bent
(C) avoid parallelax error
(D) None of the above
117. Which of the following is one of the functions performed by a diode?
- (A) Filter (B) Amplifier
(C) Rectifier (D) Inverter
118. The frequency of a signal is inversely proportional to
- (A) Period (B) Amplitude
(C) Phase (D) Power



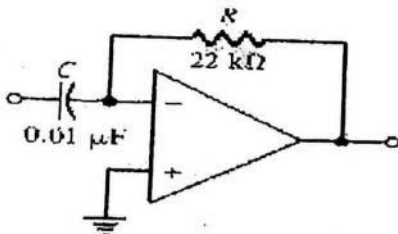
119. One coulomb-per-second is equal to one

- (A) Watt
(B) Joule
(C) Volt
(D) Ampere

120. The power Factor is

- (A) ratio of true power to apparent power
(B) peak power times .707
(C) sine of the phase difference between E and I
(D) cos of the phase angle between true power and apparent power

121. This circuit is



- (A) Non Inverting Amplifier
(B) Inverting Amplifier
(C) Differentiator
(D) Integrator

122. An op-amp integrator has a square-wave input. The output should be

- (A) A sine wave
(B) A triangle wave
(C) A square wave
(D) Pure DC

123. Under normal conditions a diode conducts current when it is

- (A) reverse-biased
(B) forward biased
(C) avalanched
(D) saturated

124. The voltmeter range can be increased by

- (A) a low resistance connected in series
(B) a low resistance connected in parallel
(C) a high resistance connected in series
(D) a high resistance connected in parallel



125. In Piezo-resistive strain gauge, the change in resistance with strain is mainly due to
- (A) change in length
 - (B) change in cross sectional area
 - (C) change in resistivity
 - (D) change in diameter
126. A full subtractor circuit has
- (A) two inputs and two outputs
 - (B) two inputs and three outputs
 - (C) three inputs and one output
 - (D) three inputs and two outputs
127. The output of an OR gate is LOW when
- (A) all inputs are LOW
 - (B) any input is LOW
 - (C) any input is HIGH
 - (D) all inputs are HIGH
128. Convert the fractional binary number 0000.1010 to decimal
- (A) 0.625
 - (B) 0.50
 - (C) 0.55
 - (D) 0.10
129. The parallel transmission of digital data
- (A) is much slower than the serial transmission of data
 - (B) requires only one signal line between sender and receiver
 - (C) requires as many signal lines between sender and receiver as there are data bits
 - (D) is for transmission over large distance
130. In a certain digital waveform, the period is four times the pulse width. The duty cycle is
- (A) 0%
 - (B) 25%
 - (C) 50%
 - (D) 100%



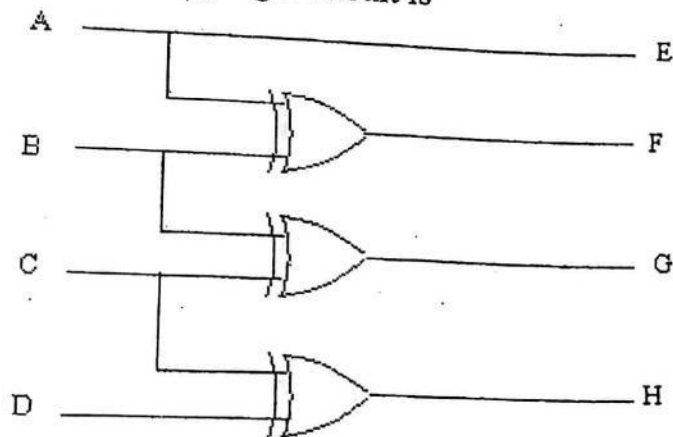
131. What kind of logic device or circuit is used to store information?

- (A) Counter
(B) Register
(C) Inverter
(D) Buffer

132. If a high voltage level is assigned to logic '0' and a low voltage level is assigned to logic '1', the logic is called

- (A) negative logic
(B) positive logic
(C) invalid logic
(D) assertion-level logic

133. The following logic circuit is



- (A) gray to binary converter
(B) equality checker
(C) binary to gray converter
(D) even parity checker

134. The sum of 2096_{10} and 0110110101101110 using hexadecimal arithmetic is

- (A) 759E
(B) 830
(C) 6D6E
(D) 1F20

135. For the Boolean expression $f = a' b' c' + a' b c' + a b' c' + a b c + a b c'$, the minimised Product of Sum (POS) expression is

- (A) $(b + c')(a + c')$
(B) $(b' + c)(a' + c)$
(C) $(b' + c)(a + c')$
(D) $c' + a b c$



136. How many bits are used in the data bus of 8085?
- (A) 7
(B) 8
(C) 9
(D) 16
137. The register in the 8085 that is used to keep track of the memory address of the next op-code to be run in the program is the
- (A) stack pointer
(B) program counter
(C) instruction pointer
(D) accumulator
138. Which is a hardware interrupt in 8085?
- (A) INTA
(B) INTR
(C) RST0
(D) RST1
139. Command used to transfer data from the memory location pointed by the register pair to the accumulator is
- (A) MOV M,A
(B) MVI B,40H
(C) MVI A,40H
(D) MOV A,M
140. A Meggar is used for measurement of
- (A) low value resistance
(B) medium value resistance
(C) high value resistance
(D) All of the above
141. IEEE-488 interface allows up to instruments or devices to communicate with each other under the control of a master unit
- (A) 2
(B) 1
(C) 15
(D) 8
142. Maximum data transfer rate possible with USB is
- (A) 1.2 Mbps
(B) 12 Mbps
(C) 480 Mbps
(D) 520 Mbps



143. ICs are known for their high switching speeds and good noise immunity
- (A) DTL (B) TTL
(C) CMOS (D) ICL
144. If the clock frequency is 5MHz, how much time is required to execute an instruction of 18 T states?
- (A) 3 micro sec (B) 3.6 micro sec
(C) 3 milli sec (D) 8.6 milli sec
145. MS Excel allows creation of what type of documents by default?
- (A) XLS (B) .JPG
(C) .TXT (D) .AVI
146. Software or hardware that limits certain kinds of access to a computer from a network or other outside source is called
- (A) Gateway (B) Firewall
(C) Modem (D) Multiplexer
147. The value of systolic and diastolic blood pressure of a healthy subject in normal condition is
- (A) 80/120 mm Hg (B) 120/80 ml Hg
(C) 80/120 ml Hg (D) 120/80 mm Hg
148. The material with almost zero temperature co-efficient
- (A) Nichrome (B) Isoelastic
(C) Constantan (D) Manganin



61715

149. The ratio of output change for a given input in a measuring system is referred to as

- (A) Sensitivity
- (B) Linearity
- (C) Stability
- (D) Fidelity

150. Which of the following instruments is a rate meter?

- (A) Venturi meter
- (B) Hot wire anemometer
- (C) Nutating disk meter
- (D) Current meter
