

069/2016

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. The first printing in Malayalam was done by :
(A) Jovannes Gonsalves (B) Herman Guntert
(C) Rev. Dawson (D) Rev. Meed
2. Who issued orders allowing the Channar women to wear jacket?
(A) Macaulay (B) Thomas Warden
(C) Col. Munroe (D) Wellesley
3. Which is the first travelogue in Malayalam :
(A) Rajyasamacharam (B) Samshepavedatarkam
(C) Vedatarkam (D) Varthamana Pusthakam
4. Kerala Sahitya Charitram was written by :
(A) Vallathol (B) Ullur
(C) Cherussery (D) Ezhuthachan
5. The first Keralite who had participated in the activities of the Congress was :
(A) G.P. Pillai (B) K. Kelappan
(C) C. Sankaran Nair (D) S. K. Nair
6. Who organized the literary association called Vidyaposhini?
(A) T.K. Madhavan (B) C. Krishan
(C) K.P. Kesava Menon (D) K. Ayyappan
7. The Sheetankan Tullal was the art form of :
(A) Parayas (B) Kaniyans
(C) Pulayas (D) Vellalas
8. Who was the first national leader to articulate the idea 'Constituent Assembly'?
(A) B.R. Ambedkar (B) Jawaharlal Nehru
(C) Rajendra Prasad (D) Mahatma Gandhi
9. Who was the founder of the Kochi Pulaya Mahasabha?
(A) Ayyankali (B) C. Krishnan
(C) K. Kelappan (D) K.P. Karuppan

10. _____ took the initiative of spreading the English education in the area of Malabar.
- (A) C.M.S (B) LMS
(C) B.E.M (D) Salvation Army
11. For any square matrix A , $A - A^T$ is a :
- (A) Skew - symmetric matrix (B) Diagonal matrix
(C) Symmetric matrix (D) Unit matrix
12. If $\sin A = \cos A$, $0^\circ < A < 90^\circ$, then A equal to :
- (A) 30° (B) 15°
(C) 45° (D) 60°
13. The cofactor of the element 8 in the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 9 & 8 & 7 \\ 4 & 5 & 6 \end{bmatrix}$ is :
- (A) 6 (B) 2
(C) -2 (D) -6
14. The coefficient of x^5 in the expansion of $(x+3)^8$ is :
- (A) 412 (B) 1112
(C) 1512 (D) -202
15. The derivative of $\log \sqrt{x}$ w.r.t x is :
- (A) $\frac{1}{\sqrt{x}}$ (B) $\frac{1}{2x}$
(C) $\frac{1}{2}$ (D) $\frac{1}{x}$
16. The equation of the line parallel to the line $3x - 4y + 2 = 0$ and passing through the point $(-2, 3)$ is :
- (A) $3x + 4y - 6 = 0$ (B) $3x + 4y = 18$
(C) $3x - 4y + 18 = 0$ (D) $3x - 4y = 18$
17. If $\lim_{x \rightarrow 3} \frac{x^n - 3^n}{x - 3} = 108$, the value of n is :
- (A) 6 (B) 8
(C) 2 (D) 4
18. The area of the region bounded by the parabola $y = x^2 + 2$, x -axis, $x = 0$ and $x = 3$:
- (A) 30 (B) -15
(C) -30 (D) 15

19. If $\sin A = \frac{1}{2}$, $0^\circ < A < 90^\circ$, the $4 \cos^3 A - 3 \cos A$ is equal to :
- (A) 1 (B) 0
(C) $\frac{\sqrt{3}}{2}$ (D) $\frac{1}{\sqrt{2}}$
20. The value of $\int_{-1}^2 x dx$ is :
- (A) $\frac{3}{2}$ (B) $\frac{-2}{3}$
(C) $\frac{2}{3}$ (D) $\frac{-3}{2}$
21. A storey of house below ground level is called :
- (A) Lower floor (B) Cellar
(C) Sub floor (D) Store
22. The zero of the graduated circle in a prismatic compass is located at the :
- (A) North end (B) East end
(C) South end (D) West end
23. Hooking in steel reinforcement is always done :
- (A) towards top (B) towards bottom
(C) towards compression side (D) none of these
24. Combined correction for curvature and refraction is to be applied when :
- (A) equalising BS and FS
(B) equalising RL
(C) bubble tube not in centre
(D) station point is more than 100 meters away from instrument
25. The bricks or stones which are laid perpendicular to face or direction of wall :
- (A) is headers (B) is stretchers
(C) is frog (D) none of these
26. In a four stroke diesel engine, one cycle is completed in :
- (A) 180° of crank rotation (B) 540° of crank rotation
(C) 360° of crank rotation (D) 720° of crank rotation
27. Which one is most suitable in differential mechanism?
- (A) Compound gear train (B) Epicyclic gear train
(C) Reverted gear train (D) Constant mesh gear train

28. Compression ratio is the ratio of :
- (A) Stroke volume to Clearance volume
 - (B) Clearance volume to Stroke volume
 - (C) Sum of Stroke volume and Clearance volume to Clearance volume
 - (D) Clearance volume to sum of Stroke volume and Clearance volume
29. Draft tube is used in :
- (A) Hydroelectric power plant
 - (B) Gas turbine power plant
 - (C) Nuclear power plant
 - (D) Diesel engine power plant
30. Rear axle is placed in between :
- (A) Gear box and fly wheel
 - (B) Differential and gear box
 - (C) Differential and wheel
 - (D) Differential and propeller shaft
31. A 100 W Bulb, a 40W Fluorescent lamp and a 60W Fan in a room operates for an average duration of 5 hours in a day. What will be the total energy consumed during the month of April 2016?
- (A) 3 kwh
 - (B) 30 kwh
 - (C) 300 kwh
 - (D) 3000 kwh
32. An alternating current is represented by $i = 141 \sin 314t$. What is the rms value of this current?
- (A) 314 A
 - (B) 141 A
 - (C) 100 A
 - (D) 70.5 A
33. Which one of the following bare copper conductor is best suited for earthing in a small residential installation?
- (A) 4 SWG
 - (B) 6 SWG
 - (C) 10 SWG
 - (D) 14 SWG
34. One kwh is equal to :
- (A) 860 kcal
 - (B) 800 kcal
 - (C) 746 kcal
 - (D) 736 kcal
35. Resistance of a wire is 50Ω . If the length of that wire is doubled, keeping the volume same, what will be the new resistance?
- (A) 25Ω
 - (B) 50Ω
 - (C) 100Ω
 - (D) 200Ω
36. The ripple frequency of the output wave form of bridge rectifier with a 60 Hz sine wave is :
- (A) 100 Hz
 - (B) 120 Hz
 - (C) 30 Hz
 - (D) 60 Hz

37. In microcontrollers which registers are used as pointers, to point the internal memory address :
- (A) A and B registers (B) DPTR
(C) R_0 and R_1 in bank zero (D) Program counter and Stack pointer
38. What are the health hazards which can be caused by E waste, if it is not properly treated or disposed off?
- (A) Brain damage (B) Lung Cancer
(C) DNA damage (D) All of the above
39. LEDs are made out of :
- (A) Silicon (B) Germanium
(C) Gallium Arsenide (D) Silicon and Germanium
40. All CDMA based technologies 2G and 3G have _____ handovers.
- (A) Soft handover (B) Hard handover
(C) Blind handover (D) Soft and Hard handover
41. Which of the following material is not used to make strain gauges?
- (A) Nichrome (B) Pure platinum
(C) Bronze (D) Karma alloy
42. Which of the following is an inductance variable type transducer?
- (A) LVDT (B) Load cell
(C) Thermistor (D) Carbon microphone
43. Thermocouple works on the principle of :
- (A) Seebeck effect (B) Piezoelectric effect
(C) Photo-voltaic effect (D) Faraday effect
44. Which of the following is not a mode of operation of piezoelectric transducer?
- (A) Transverse (B) Longitudinal
(C) Shear (D) Elastic
45. Change in the resistance caused by strain is ΔR , the resistance of the undeformed gauge is R_G and ϵ is the strain. Then the gauge factor is :
- (A) $\frac{\Delta R / R_G}{\epsilon}$ (B) $\frac{\epsilon \Delta R}{R_G}$
(C) $\frac{\epsilon}{\Delta R R_G}$ (D) $\frac{\Delta R R_G}{\epsilon}$

46. A Remote Terminal Unit (RTU) in a telemetry system is used for :
- (A) Providing power to the remote sensors
 - (B) Converting the output of the sensor to digital data and transmit to the base station
 - (C) Managing the health condition of the sensors
 - (D) Remote control the base station
47. The radio range of a telemetry system can be augmented by :
- (A) Providing repeater
 - (B) Increasing the antenna gain
 - (C) Minimizing the transmission loss
 - (D) All of the above
48. Which of the following statements is not applicable to land line telemetry system?
- (A) Land line telemetry system is affected by EMI effects
 - (B) Land line telemetry system has limited frequency response
 - (C) Land line telemetry system is very effective for short distance transmission
 - (D) Distortions in transmission lines do not affect the performance of the telemetry system
49. A force balance current telemetering system
- (i) Make use of a portion of the output current which is feedback to the input to oppose the motion of the input variable
 - (ii) Shows good linearity
 - (iii) Have better accuracy as smaller motions are required
- (A) Only (i) is true
 - (B) Only (iii) is true
 - (C) (i), (ii) and (iii) are true
 - (D) None of the above are true
50. Which of the following is not a possible cause for optical fiber loss?
- (A) Impurities
 - (B) Attenuation in glass
 - (C) Stepped index operation
 - (D) Micro-bending
51. Light traveling in an optical fiber follows which of the following principle?
- (A) Huygens principle
 - (B) Light theory
 - (C) Snells law
 - (D) Fermat's principle
52. The term critical angle describes :
- (A) The point at which light is refracted
 - (B) The point at which light becomes invisible
 - (C) The point at which light has gone from refractive mode to the reflective mode
 - (D) The point at which light has crossed the boundary layers from one index to another

53. Which of the following is not an instrument recommended by International Practical Temperature Scale (IPTS-90) for assigning values to seventeen phase equilibrium states of pure substances?
- (A) Gas thermometer (B) Radiation pyrometer
(C) Platinum resistance thermometer (D) Quartz crystal thermometer
54. In electromagnetic radiation spectrum, the wavelength range for thermal radiation is :
- (A) $0.01 \mu m$ to $100 \mu m$ (B) $0.001 \mu m$ to $0.01 \mu m$
(C) $100 \mu m$ to $1000 \mu m$ (D) $1000 \mu m$ to $2000 \mu m$
55. Which of the following thermistors are suitable in measurement of temperature in cryogenic range?
- (A) Zirconia based thermistors (B) Iron-Oxide based thermistors
(C) Barium titanate based thermistor (D) Strontium titanate based thermistor
56. Which of the following is a typical range of liquid level measurement for a float type level measuring system?
- (A) 10 cm – 20 m (B) 10 mm – 10 cm
(C) 0.1 cm – 1 m (D) 0.1 mm – 1 cm
57. A simple pressure gauge is attached to the bottom of the tank. If P is the indicated pressure ρ is the density of the liquid and h is the liquid level. Then the relationship among these can be expressed as :
- (A) $P = \frac{h}{\rho}$ (B) $\rho = \frac{h}{P}$
(C) $h = \frac{P}{\rho}$ (D) $P = \frac{\rho}{h}$
58. A pressure of 1 atmosphere is equal to :
- (A) 76 cm of mercury of density 13.59 g/cm^3
(B) 14.696 pounds per Sq.in absolute
(C) 1 Kg/cm^2
(D) All of the above
59. A pressure of 1mm of Hg is equal to :
- (A) $1333.22 \mu \text{ bar}$ (B) 1.013 bars
(C) $10 \mu \text{ bars}$ (D) $1000 \mu \text{ bars}$
60. Which of the following is not an elastic type pressure measurement system?
- (A) Ring balance manometer (B) Bourdon tube
(C) Bellows (D) Diaphragms

61. The ratio of the full scale flow to the minimum flow that can be measured within the stated accuracy of a flow measuring device is known as :
- (A) Rangeability (B) Turn-down
(C) Precision (D) Selectivity
62. A hot wire type flow meter is :
- (A) Usable in very viscous fluids
(B) A low range instrument
(C) Usable in steady as well as unsteady flow of liquid and gases
(D) Having better accuracy and independent of viscosity
63. The reciprocal of the viscosity is called :
- (A) Relative viscosity (B) Specific viscosity
(C) Fluidity (D) Kinematic viscosity
64. Psychrometer is used to measure :
- (A) Humidity (B) Speed
(C) Torque (D) Acceleration
65. Given a plant which cannot be altered by the designer, the disturbance variable refers to a variable :
- (A) That influences the plant and which can be manipulated
(B) That influences the plant but cannot be manipulated
(C) That we wish to control
(D) That is measured by means of a sensor
66. The deviation of the transient period of control, which starts at the beginning of the control process and terminates when the controlled variable approximately reaches its prescribed value, will be referred to as :
- (A) Rise time (B) Fall time
(C) Settling time (D) Peak time
67. In proportional mode feedback control, increased loop gain :
- (A) Improves the steady state accuracy (B) Increases disturbance signal rejection
(C) Improves relative stability (D) All of the above
68. Which of the following is TRUE for an OPAMP?
- (A) Low input resistance (B) Very high output resistance
(C) Very high input resistance (D) Low open circuit voltage gain

69. If R_F is the resistance connected in the feedback path and R_1 is a series resistance connected between inverting terminal and source of an OPAMP, then the voltage gain of the OPAMP inverting amplifier is :
- (A) $-\frac{R_1}{R_F}$ (B) $-\frac{R_F}{R_1}$
 (C) $1-\frac{R_F}{R_1}$ (D) $1+\frac{R_F}{R_1}$
70. In a typical instrumentation amplifier that uses 3 OPAMPs :
- (A) OPAMPs connected to the inputs are voltage followers and the OPAMP connected to the output is a differential amplifier
 (B) OPAMPs connected to the inputs are inverting amplifiers and the OPAMP connected to the output is a summing amplifier
 (C) OPAMPs connected to the inputs are voltage followers and the OPAMP connected to the output is a summing amplifier
 (D) OPAMPs connected to the inputs are non-inverting amplifiers and the OPAMP connected to the output is a summing amplifier
71. A device that automatically monitor and indicate whether the movement limits of a particular device have been exceeded is :
- (A) Proximity switch (B) Safety switch
 (C) Transfer switch (D) Limit switch
72. Which of the following actuators converts energy formed by vacuum or compressed air at high pressure into linear or rotatory motion :
- (A) Hydraulic (B) Electric
 (C) Pneumatic (D) Thermal
73. Which of the following is not a requirement for a cascade control system?
- (A) The inner loop has influence over outer loop
 (B) The inner loop is faster than the outer loop
 (C) The inner loop disturbances are severe than the outer loop disturbances
 (D) The inner loop is slower than the outer loop
74. The value of the learning rate parameter in a Multi-Layer Feed Forward Neural Network (MLFFNN) ranges between :
- (A) 0 - 1 (B) 0 - 10
 (C) 0.1 - 0.5 (D) 1 - 100

75. A SCADA system performs :
- (i) Data acquisition
 - (ii) Network data communication
 - (iii) Data presentation and control
- (A) (i) and (iii)
 (B) (iii) only
 (C) (i) and (ii)
 (D) (i) (ii) and (iii)
76. Which of the following controller exhibit integral wind up when overdriven?
- (A) Proportional controller (B) Integral mode feedback controller
 (C) Derivative mode feedback controller (D) All of the above
77. The temperature at which the water vapor in a sample of air at constant barometric pressure condenses into liquid water at the same rate at which it evaporates is called :
- (A) Freezing point (B) Dew point
 (C) Evaporation point (D) Melting point
78. Rack and pinion gear train is an example of :
- (A) Rotatory-to-rotatory motion conversion
 (B) Rotatory-to-translatory motion conversion
 (C) Translatory-to- translatory motion conversion
 (D) Translatory-to-rotatory motion conversion
79. Which of the following belt drives provide the best combination of traction, speed of movement, load of the bearings and long service life ?
- (A) Round belts (B) Flat belts
 (C) V belts (D) Film belts
80. Which of the following is not an essential characteristics of robot?
- (A) Sensing (B) Human friendly
 (C) Movement (D) Intelligence
81. Which of the following is TRUE for a robot?
- (i) All robots have some mechanical construction
 - (ii) All robots are autonomous
 - (iii) Robots have electrical components which power and control machinery
 - (iv) All robot contain some level of computer programming
- (A) (i), (ii) and (iii) (B) (i), (iii) and (iv)
 (C) (iii) and (iv) (D) All of the above

82. Linear system obeys :
- (A) Super position theorem (B) Maximum power transfer theorem
(C) Thevenin's theorem (D) Norton's theorem
83. For an LTI system, the convolution of the input to the system with its impulse response gives :
- (A) Transfer function of the system (B) The output of the system
(C) The gain of the system (D) The frequency response of the system
84. The damping ratio is strictly less than 1 for a system. Then the system is :
- (A) Under damped (B) Over damped
(C) Critically damped (D) Undamped
85. The Routh-Hurwitz criterion is a mathematical test that is necessary and sufficient condition for :
- (A) Flat response of a LTI system (B) Stability of LTI system
(C) Consistency of a LTI system (D) Integrity of a LTI system
86. Which of the following is not a mode of operation of SCR?
- (A) Forward blocking mode (B) Forward conduction mode
(C) Reverse blocking mode (D) Reverse conduction mode
87. The minimum current that must pass the circuit in order for the SCR to remain in the ON state is :
- (A) Latching current (B) Reverse saturation current
(C) Holding current (D) Leakage current
88. A switching device that converts fixed DC input to a variable DC output voltage directly is :
- (A) Chopper (B) Inverter
(C) Regulator (D) Stabilizer
89. A heart rate slower than 60 beats per minute is said to be :
- (A) Tachycardiac (B) Bradycardiac
(C) Arrhythmia (D) Hypothermia
90. Delivering therapeutic dose of electrical energy to the heart with a device is called :
- (A) Tranquilizing (B) Defibrillation
(C) Angioplasty (D) Stent procedure
91. Which of the following is used to diagnose epilepsy and sleep disorders?
- (A) ECG (B) EEG
(C) EMG (D) MRI

92. Which of the following is/are advantages of CT over traditional 2D medical radiography?
- (A) Completely eliminates the superposition of images of structures outside the area of interest
 - (B) High contrast resolution
 - (C) Multi-planar reformatted images
 - (D) All of the above
93. The device or implants that are completely non-magnetic, non electrically conductive, non RF reactive are called :
- (A) MR-safe
 - (B) MR-conditional
 - (C) MR-unsafe
 - (D) None the above
94. Ultrasound devices operates with frequencies in the range :
- (A) 20 KHz – several GHz
 - (B) 20 KHz – several MHz
 - (C) 20 Hz – 20 KHz
 - (D) 20 Hz – 2000 Hz
95. Which of the following technique is used in chemistry to provide a fingerprint by which molecules can be identified?
- (A) Infrared spectroscopy
 - (B) Fourier transform spectroscopy
 - (C) Raman spectroscopy
 - (D) Czerny-turner monochromator
96. Which of the following relates the attenuation of light to the properties of the material through which the light is traveling?
- (A) Snells law
 - (B) Raman effect
 - (C) Beer's law
 - (D) Huygens-Fresnel equation
97. Solutions with a pH less than 7 are :
- (A) Alkaline
 - (B) Organic
 - (C) Neutral
 - (D) Acidic
98. Lasers differ from other sources of light in such a way that the light emitted by laser is :
- (A) Pure
 - (B) Coherent
 - (C) Intense
 - (D) Monochromatic
99. Frequency doubled diode pumped solid state lasers are used to make :
- (A) Bright red laser Pointers
 - (B) Fiber lasers
 - (C) Crystal lasers
 - (D) Bright green laser pointers
100. Ruby used in ruby laser is made off :
- (A) Yttrium lithium fluoride
 - (B) Chromium doped corundum
 - (C) Yttrium aluminium garnet
 - (D) Neon- Copper