

**36/2019**

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Babur wrote his autobiography, 'Tuzuki-Babari' is \_\_\_\_\_ language.  
(A) Persian (B) Arabic  
(C) Pushto (D) Turkish
2. The key note of Asoka's policy of 'Dhamma' was :  
(A) self control (B) kindness  
(C) moderation (D) charity
3. At which of the following places was the Revolt of 1857 particularly encouraged by Moulavis and Pandits alike?  
(A) Assam (B) Bihar  
(C) Bengal (D) Rajasthan
4. Mahathma Gandhi gave the title of 'Sardar' to Vallabai Patel for his great organisational skill is :  
(A) Bardoli Satyagraha (B) Kheda Satyagraha  
(C) Salt Satyagraha (D) Individual Satyagraha
5. In which state in India was "Panchayathi Raj" first introduced?  
(A) Kerala (B) Andhra pradesh  
(C) UP (D) Rajasthan
6. Which of the following is not included in "Aintinai" prevailed in ancient Tamilakam?  
(A) Kurunji (B) Karai  
(C) Palai (D) Mullai
7. Number of signaturies in 'Malayali Memorial' :  
(A) 10028 (B) 10128  
(C) 10228 (D) 10328
8. Who is the author of the book, "Enmakaje" portrays the life of the victims of Endosulfan pesticides in Kasargod?  
(A) C.V. Balakrishnan (B) Subash Chandran  
(C) Ambikasutan Mangad (D) Santhosh Eachikkanam

A

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[P.T.O.]

9. Mamburam Thangal came to Kerala from :
- (A) Yemen (B) Saudi Arabia  
(C) Syria (D) Egypt
10. Who is the author of 'Viswa darshanam'?
- (A) Vallathol Narayana Menon (B) G. Sankara Kurup  
(C) Kumaran Asan (D) Ulloor S. Parameswara Iyer
11. Who started Panthibhojanam (Inter-dining) in Kerala?
- (A) Sri Narayana Guru (B) Sahodaran Ayyappan  
(C) Thycaud Ayya (D) Dr. Palpu
12. Who started the newspaper 'Mithavadi'?
- (A) Mohamed Abdurahiman Sahib (B) Moorkoth Kumaran  
(C) K.P. Kesava Menon (D) C. Krishnan
13. Expand VVPAT :
- (A) Voter Verifiable Paper Audit Trial  
(B) Voter Verifiable Personal Audit Trial  
(C) Voter Verifiable Permanent Audit Trial  
(D) Voter Verifiable Personal Account Trial
14. Right to Information Bill passed by the parliament on :
- (A) 12<sup>th</sup> June 2005 (B) 15<sup>th</sup> June 2005  
(C) 22<sup>nd</sup> June 2005 (D) 12<sup>th</sup> October 2005
15. The fundamental duties of the citizens were added to the constitution by \_\_\_\_\_ Amendment.
- (A) 40<sup>th</sup> Amendment (B) 41<sup>st</sup> Amendment  
(C) 42<sup>nd</sup> Amendment (D) 43<sup>rd</sup> Amendment
16. Who is the director of the film, "A.K.G. Athi Jeevanathinte Kanal Vazhikal"?
- (A) Priyanandan (B) Lenin Rajendran  
(C) P.T. Kunhi mohamed (D) Shaji. N. Karun
17. Who was the founder of 'Swadeshabhimani' Newspaper?
- (A) Vakkom Abdul Kader Moulavi (B) Ramakrishna Pillai  
(C) E. Moidu Moulavi (D) K.M. Moulavi Sahib

18. Who is the founder of “Antharjana Samajam”?
- (A) Arya Pallam (B) A.V. Kutty Malu Amma  
(C) Lalithambika Antharjanam (D) Parvathi Nenmeni Mangalam
19. Who is the author of ‘Mathilukal’?
- (A) M.T. Vasudevan Nair (B) N.P. Mohamed  
(C) Vaikom Mohamed Basheer (D) Perumbadavam Sreedharan
20. Who wrote, ‘Anukambadasakam’?
- (A) Sankaracharya (B) Sri Narayana Guru  
(C) Sukumar Azhikode (D) Nithya Chaithanya Yathi
21. If three forces acting at a point are in equilibrium, each force is proportional to the sine of the angle between the other two. This statement is called :
- (A) Converse of the Law of Triangle of forces  
(B) Lamie’s Theorem  
(C) Law of Triangle of forces  
(D) None of these
22. When a body is about to slide down, the inclination of the plane to the horizontal is :
- (A) Equal to the angle of friction (B) More than the angle of friction  
(C) Less than the angle of friction (D) None of these
23. The ratio of shear stress to shear strain is called :
- (A) Young’s modulus (B) Bulk Modulus  
(C) Modulus of rigidity (D) Modulus of elasticity
24. In the case of stress strain curve for mild steel bar when conducted a tensile test, strain goes on increasing without an appreciable load, the stress corresponding to this is :
- (A) Ultimate stress (B) Fracture stress  
(C) Nominal stress (D) Yield stress
25. A simply supported beam of length ‘L’ is having a point load ‘W’ acting at the center, the maximum value of bending acting at the center is :
- (A)  $WL^2/4$  (B)  $WL/4$   
(C)  $WL/2$  (D)  $WL^2/8$

26. The maximum strain energy stored per unit volume at elastic limit is :
- (A) Stiffness (B) Modulus of resilience  
(C) Resilience (D) Proof resilience
27. For a solid rectangular column the slenderness ratio is :
- (A) Height of column/Maximum width of the column  
(B) Length of the column/Height of the column  
(C) Height of column/Least side of column  
(D) None of these
28. Under torsion, every section of the shaft is subjected to :
- (A) Tensile stress (B) Shear stress  
(C) Compressive stress (D) Normal stress
29. Find the power transmitted by a solid shaft of diameter 0.1 m, rotating at a speed of 100 rpm. The maximum permissible stress is  $100 \text{ N/m}^2$ . Torque developed is 5 Nm :
- (A) 52.33 W (B) 5.23W  
(C) 0.52 kW (D) 523.3W
30. The internal resistance of a body to external forces/loads that the body is subjected to is called:
- (A) Load (B) Pressure  
(C) Strain (D) Stress
31. The coefficient of viscosity is expressed as:
- (A)  $\text{N/m}^2$  (B)  $\text{m}^2/\text{s}$   
(C) Stoke (D)  $\text{N s/m}^2$
32. When mercury is spilled over a smooth horizontal surface, it tends to gather in to droplets why?
- (A) Cohesive force is more than adhesive force  
(B) Adhesive force is more than cohesive force  
(C) Both cohesion and adhesion are equal  
(D) Mercury is a metal
33. Convert a pressure of 1.5 bar into meters of water. Take the specific weight of water as  $10 \text{ kN/m}^3$
- (A) 1.5 m (B) 15 m  
(C) 150 m (D) 0.66 m

34. Kaplan turbine is an example for :
- (A) Tangential flow (B) Radial flow  
(C) Mixed flow (D) Axial flow
35. For a normal runner Francis turbine, the specific speed is in the range of :
- (A) 25 – 30 (B) 250 – 850  
(C) 100 – 150 (D) 250 – 400
36. The power developed by a jet of water with a flow rate of 40 m<sup>3</sup>/s from a height of 200 m is :
- (A) 78.48 MW (B) 7.85 MW  
(C) 0.785 MW (D) 784.8 MW
37. The ideal position of a surge tank in a hydro power station to avoid water hammer in penstocks :
- (A) Very near to the reservoir  
(B) Very near to the power station  
(C) Midpoint of the penstock  
(D) At the junction of the tunnel and penstock
38. What type of pump is preferred for pumping drainage water?
- (A) Plunger pump (B) Centrifugal pump  
(C) Jet pump (D) Diaphragm pump
39. When centrifugal pumps are connected in parallel :
- (A) Discharge increases (B) Total head increases  
(C) Discharge decreases (D) Total head decreases
40. The velocity of flow in a pipe line can be measured by :
- (A) Piezometer (B) Rotameter  
(C) Pitot tube (D) Orifice meter
41. A system in which there is no interaction between system and its surroundings is:
- (A) Closed system (B) Open system  
(C) Ideal system (D) Isolated system
42. The coordinates to describe the state of a system is called :
- (A) Cycle (B) Property  
(C) Path (D) Process

43. In the absence of any unbalanced force within the system itself and also between the system and surroundings, the system is said to be in :
- (A) Thermal equilibrium (B) Chemical equilibrium  
(C) Mechanical equilibrium (D) Thermodynamic equilibrium
44. Latent heat of sublimation is the amount of heat transferred to convert a unit mass from :
- (A) Vapour to liquid (B) Solid to vapour  
(C) Liquid to vapour (D) Vapour to solid
45. A fluid is been throttled through a valve fitted in an insulated pipe, what remains constant?
- (A) Pressure (B) Internal energy  
(C) Enthalpy (D) Entropy
46. It is impossible to construct a device which, operating in a cycle, will produce no effect other than the transfer of heat from a cooler to a hotter body. Who proposed this statement?
- (A) Clausius (B) Kelvin - Plank  
(C) Carnot (D) J.P. Joule
47. The part of the low grade energy which, according to second law must be rejected is :
- (A) Available energy (B) Gibb's free energy  
(C) Exergy (D) Anergy
48. The region inside the inversion curve where Joule - Kelvin coefficient is positive :
- (A) Cooling region (B) Heating region  
(C) Unchanged region (D) Both (B) and (C)
49. It is impossible by any procedure, no matter how idealized, to reduce any system to the absolute zero of temperature in a finite number of operations. This statement corresponds to :
- (A) Zeroth law (B) Third law  
(C) First law (D) Second law
50. A process always occurs in such a direction to cause the entropy of the universe :
- (A) Remains same (B) Decreases  
(C) Increases (D) Unpredictable
51. In a Face Centered Cubic (FCC) structure the effective number of lattice points in unit cell is :
- (A) 2 (B) 4  
(C) 1 (D) 3

52. What property of materials is used to make wire by drawing it out through a hole?  
(A) Elasticity (B) Plasticity  
(C) Malleability (D) Ductility
53. What is the crystal structure of gold?  
(A) Body centered cubic (B) Face centered cubic  
(C) Hexagonal closed packed structure (D) None of these
54. In the free electron model, the outermost electrons of an atom are not bound to that atom but are free to move through the whole solid. These electron clouds are called :  
(A) Fermi gas (B) Phonons  
(C) Meissner effect (D) None of these
55. An ion displaced from a regular site to an interstitial site is called :  
(A) Schottky imperfection (B) Frenkel imperfection  
(C) Dislocation (D) Twinning
56. In a phase diagram, alloy compositions to the left of the eutectic mixture are called :  
(A) Hypereutectic alloys (B) Peritectic alloy  
(C) Eutectic alloy (D) Hypoeutectic alloy
57. Fe-C alloys with more than 2 % carbon are called :  
(A) Cast irons (B) Alloy steels  
(C) High carbon steels (D) Stainless steels
58. A process in which steel is heated to a temperature above the critical point and quenched in oil or water is known as :  
(A) Normalising (B) Annealing  
(C) Hardening (D) Tempering
59. The property of a material by which the material weakly magnetized in a direction opposite, to the external magnetic field :  
(A) Paramagnetic (B) Diamagnetic  
(C) Ferrimagnetic (D) Ferromagnetic
60. Which is the most suited material for the fabrication of boiler riser tubes?  
(A) Alloy steel (B) Carbon steel  
(C) Mild steel (D) High carbon steel

61. The critical temperature and pressure of steam are :
- (A) 375°C, 225 bar (B) 323°C, 252 bar  
(C) 348°C, 184 bar (D) 409°C, 165 bar
62. The mechanical efficiency of a 60 kW engine is 80%. What is the mechanical efficiency at 50% of rated load, if the frictional power is assumed as constant with load?
- (A) 66.7% (B) 76.7%  
(C) 50% (D) 80%
63. The relation for volumetric efficiency of a reciprocating compressor with clearance volume ratio  $C$  :
- (A)  $1 - C - C(P_2 / P_1)^n$  (B)  $1 - C + C(P_2 / P_1)^n$   
(C)  $1 + C - C(P_2 / P_1)^{n-1}$  (D)  $1 + C - C(P_2 / P_1)^{1/n}$
64. The output of a gas turbine is 800 kJ/kg. What is the thermal efficiency, if the compressor work and the heat supplied are 500 kJ/kg and 100 kJ/kg respectively?
- (A) 80% (B) 30%  
(C) 40% (D) 50%
65. A refrigerating machine working on Reversed Carnot Cycle takes 3 kW from a space with temperature 150 K. What is the power required to run the system in kW and the COP, if the heat is rejected at 300 K?
- (A) 5, 1 (B) 5, 2  
(C) 3, 1 (D) 1, 3
66. What is the specific humidity in kg/kg of dry air of the given air which is under a pressure of 100 kPa and with DBT 35°C, DPT 20°C and the corresponding saturation pressure 5 kPa and 2 kPa respectively?
- (A) 0.0226 (B) 0.0216  
(C) 0.0236 (D) 0.0126
67. In a room, the latent heat load and the sensible heat load are 50 kJ/sec and 30 kJ/sec respectively. Then the sensible heat factor is :
- (A) 0.375 (B) 0.6  
(C) 1.5 (D) 0.25
68. Which dimension less number has a significant role in forced convection?
- (A) Prandtl number (B) Reynolds number  
(C) Peclet number (D) Mach number



69. What is the increase in energy radiated, when the surface temperature of the solid is doubled?
- (A) 50% (B) 200%  
(C) 1600% (D) 2000%
70. The inlet and outlet temperatures of hot and cold fluid in a heat exchanger is 200, 170 and 40, 100 respectively. What is the capacity ratio of the heat exchanger?
- (A) 0.5 (B) 1.5  
(C) 0.25 (D) 0.3
71. Which of the following is not the inversion of a double slider crank mechanism?
- (A) Scotch-yoke mechanism  
(B) Whitworth quick return mechanism  
(C) Elliptical trammel  
(D) Oldham's coupling
72. The module of two numbers of  $20^\circ$  full depth involute profiled gears which are in mesh is 5. What is the centre distance between the gears, if the number of teeth are 20 and 40?
- (A) 150 (B) 200  
(C) 300 (D) 100
73. What is the maximum pressure in  $\text{N/m}^2$  in a plate clutch, with inner and outer radii of 60 mm and 120mm, when the axial force is 4000 N. Assume uniform wear.
- (A) 0.176 (B) 0.1176  
(C) 0.076 (D) 0.126
74. The linear velocity of a flat belt is 6 m/s. What is the power transmitted, if the tension on the tight and slack side are 1000 N and 500 N respectively?
- (A) 9 kW (B) 5 kW  
(C) 3 kW (D) 6 kW
75. The speed of an engine changes from 400 to 420 in a cycle. What is the coefficient of fluctuation of speed?
- (A) 0.5 (B) 0.048  
(C) 0.05 (D) 0.041
76. What is the stiffness of the spring for a Hartwell Governor in  $\text{N/cm}$  having the lowest and highest equilibrium speeds of 1000 N and 100 N respectively, if the height of the governor is 2 cm?
- (A) 500 (B) 450  
(C) 900 (D) 1100

77. The number of masses rotating in different planes will be in dynamic balance if :
- (A) Net force equal to zero
  - (B) Resultant couple equal to zero
  - (C) Both force and resultant couple equal to zero
  - (D) None of these
78. A rotary shaft overhangs on a bearing like a cantilever carrying a flywheel. If the mass of a flywheel is reduced to half of its original mass, the wheeling speed will be :
- (A) Half of the speed
  - (B) Double the speed
  - (C)  $\sqrt{2}$  times the speed
  - (D)  $1/\sqrt{2}$  times the speed
79.  $T$  be the permissible twisting moment in a circular shaft as per maximum stress theory. What will be its value according to maximum principle stress theory?
- (A)  $T$
  - (B)  $T/2$
  - (C)  $\sqrt{2}T$
  - (D)  $2T$
80. The thickness of the strap in single strap butt joint to join two plates of thickness  $t$  is :
- (A)  $1.125 t$
  - (B)  $\sqrt{2} t$
  - (C)  $0.75 t$
  - (D)  $1.5 t$
81. Loam sand is mixture of :
- (A) 60% sand and 40% clay
  - (B) 70% sand and 30% clay
  - (C) 40% sand and 60% clay
  - (D) 50% sand and 50% clay
82. Filler material is used in :
- (A) Spot welding
  - (B) Seam welding
  - (C) Gas welding
  - (D) Projection welding
83. Spinning is a process comprising :
- (A) Bending and drawing
  - (B) Bending and rolling
  - (C) Stretching and rolling
  - (D) Bending and stretching
84. The best extrusion method for high-strength super alloys :
- (A) Hydrostatic extrusion
  - (B) Indirect extrusion
  - (C) Direct extrusion
  - (D) Impact extrusion

85. Discontinuous chips in metal cutting operations are produced in machining :
- (A) Ductile material (B) Brittle material  
(C) Hard material (D) Soft material
86. The tool life of a single point cutting tool at a cutting speed of 0.5 m/s is 1000 sec. How many pieces can be produced within one tool life, if the length and diameters of the portion of the piece to be turned are 60 mm and 100 mm respectively? Feed and speed of cutting are 0.314 mm/rev and 0.5 m/sec respectively :
- (A) 25 (B) 30  
(C) 12.5 (D) 10
87. In the turning operation, corresponding to cutting speeds of 30 m/min and 15 m/min, the tool lives are 75 min and 300 min respectively. What is the Taylorian exponent?
- (A) 0.5 (B) 0.6  
(C) 0.2 (D) 0.1
88. The standard tapers used for drill spindle is :
- (A) Sellers taper (B) Morse taper  
(C) Chapman tapers (D) Brown and sharper taper
89. The twist drill is specified by :
- (A) Shank, material, diameter (B) Shank, material, lip angle  
(C) Shank, flute size, diameter (D) Diameter flute size, lip angle
90. Auto-collimator is used to check :
- (A) Roughness (B) Flatness  
(C) Parallelism (D) Angle
91. Which one of the following types of layout is used for vehicle manufacturing?
- (A) Product layout (B) Process layout  
(C) Group layout (D) Fixed position layout
92. Standard time is obtained from normal time by adding the policy allowance and :
- (A) Personal and fatigue allowance  
(B) Personal delay allowance  
(C) Delay allowance and fatigue allowance  
(D) Personal, fatigue and delay allowance

93. ABC analysis is used in :
- (A) Job analysis (B) Production schedule  
(C) Inventory control (D) Cost analysis
94. What is the expected time in PERT activity if optimistic time, most likely time and pessimistic time are 10, 12 and 16 minutes respectively?
- (A) 12.66 (B) 12.33  
(C) 12 (D) 12.99
95. Which one is a qualitative technique of demand forecasting?
- (A) Delphi technique (B) Regression analysis  
(C) Exponential smoothing (D) Time series analysis
96. The demand and forecast for April are 10,000 and 8000 respectively. If the smoothing coefficient is 0.25, forecast for May using single exponential smoothing method :
- (A) 10500 (B) 9500  
(C) 11000 (D) 8500
97. Which of the following would lead to interchangeability?
- (A) Product design (B) Process planning  
(C) Operation planning (D) Quality control
98. Which of the following is not a control chart used in statistical quality control?
- (A) X-chart (B) P-chart  
(C) SIMO chart (D) R-chart
99. What is the reliability of a system when its subsystems are put in series and having reliability 0.7, 0.6 and 0.9?
- (A) 0.61 (B) 0.73  
(C) 0.37 (D) 0.35
100. Simplex method of solving linear programming problems uses :
- (A) All the points in the feasible region  
(B) Only the corner points of the feasible region  
(C) Intermediate points within the non-feasible region  
(D) Interior points in the feasible region

**SPACE FOR ROUGH WORK**

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