Technical Superintendent Question Paper with Provisional Answer Key

012/2020

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Ohm's law is not applicable to :
   - (A) Semiconductors
   - (B) DC circuits
   - (C) Small resistors
   - (D) High currents

2. 2J work is done in taking a charge of 20 C from one point to the other at a distance of 0.2m. The potential difference between the points is :
   - (A) $2 \times 10^{-2}\,V$
   - (B) $4 \times 10^{-1}\,V$
   - (C) $8\,V$
   - (D) $1 \times 10^{-1}\,V$

3. The ratio of the resistances of l00W and 40W bulbs of the same rated voltage is :
   - (A) 2:5
   - (B) 5:2
   - (C) 25:4
   - (D) 4:25

4. A metal plate of thickness half the plate separation is introduced between the plates of parallel plate capacitor. The capacitance :
   - (A) Remains unchanged
   - (B) Gets doubled
   - (C) Gets halved
   - (D) Becomes infinite

5. The dissipation factor of a good dielectric is of the order of :
   - (A) 0.0002
   - (B) 0.002
   - (C) 0.02
   - (D) 0.2

6. The magnetic susceptibility is negative for :
   - (A) Diamagnetic materials only
   - (B) Paramagnetic materials only
   - (C) Ferromagnetic materials only
   - (D) Paramagnetic and ferromagnetic materials

7. A 3-phase delta connected symmetrical load consumes P watts of power from a balanced supply. If the same load is connected in star to the same supply then what is the power consumption?
   - (A) P/3
   - (B) P
   - (C) $\sqrt{3}P$
   - (D) 3P

A

8. The core of an iron cored coil is replaced by air, the inductance of the coil will :

    (A) Increase   (B) Decrease

    (C) Remain the same   (D) None of the above

9. The potential difference across the resistance, inductance and capacitance are 80V, 40V and 100V respectively in an L-C-R circuit. The power factor of the circuit is :

    (A) 1.0   (B) 0.4

    (C) 0.5   (D) 0.8

10. Form factor of a half rectified sine wave is :

    (A) 1.11   (B) 1.57

    (C) 1.414   (D) 1

11. The power measurement in an unbalanced 3-phase circuit can not be done by :

    (A) Single wattmeter method   (B) Two wattmeter method

    (C) Three wattmeter method   (D) Any one of the above methods

12. An instrument capable of measuring only dc quantities :

    (A) Moving coil   (B) Moving iron

    (C) Induction type   (D) None of the above

13. Kelvin double bridge is best suited for the measurement of :

    (A) Inductance   (B) Capacitance

    (C) Low resistance   (D) High resistance

14. The material used for making standard resistance is :

    (A) Manganin   (B) Aluminium

    (C) Copper   (D) Platinum

15. Creeping in energy meter can be eliminated by :

    (A) Brake magnets

    (B) Drilling diametrically opposite holes in the disc

    (C) Using lag adjustment devices

    (D) None of the above

16. The value of load factor is :

    (A) Less than 1   (B) Greater than 1

    (C) Equal to 1   (D) None of the above

17. Transposition of overhead transmission line is done to :
- (A) To reduce to conductor material
- (B) To make the voltage drop in each line the same
- (C) To reduce the cost of supporting structures
- (D) None of the above

18. Ferranti effect can be reduced by :
- (A) Adding capacitors
- (B) Adding reactors
- (C) Adding resistors
- (D) None of the above

19. Which power plant is not suited to supply peak loads?
- (A) Nuclear power plant
- (B) Diesel power plant
- (C) Pumped storage plant
- (D) Gas turbine plant

20. A conductor which connects the substation to the area where power is to be distributed :
- (A) Service main
- (B) Distributor
- (C) Feeder
- (D) None of the above

21. The area of cross section of the neutral conductor is ——————————— as that of any line conductor.
- (A) Same
- (B) Double
- (C) Half
- (D) One fourth

22. The accurate method of load flow analysis is :
- (A) Gauss - Siedal method
- (B) Newton Raphson method
- (C) Fast decoupled method
- (D) Dc load flow

23. The power system is stable if the synchronising power co-efficient is :
- (A) Positive
- (B) Negative
- (C) Positive or Negative
- (D) None of the above

24. The surge impedance of a 60 km cable is 40 Ohms. For a 30 km line, it will be :
- (A) 20 Ohms
- (B) 80 Ohms
- (C) 40 Ohms
- (D) None of the above

25. The inertia constant, H of a turbo generator of 200 MVA is 6. The value of H corresponding to a base of 300 MVA will be :
- (A) 4
- (B) 6
- (C) 9
- (D) 13.5

26. A 6.9 kV transmission line is connected to a transformer having 1500 turns on the primary and 24 turns on the secondary. If the load across the secondary has an impedance of 5 Ohms. then the secondary voltage is :
    - (A) 220.8 V
    - (B) 110.4 V
    - (C) 55.2 V
    - (D) None of the above

27. A 4 pole, 250 kW, 750V dc generator has a lap winding on the armature. The current carried by the armature coils is :
    - (A) 83.25 A
    - (B) 100 A
    - (C) 50 A
    - (D) 41.63 A

28. A dc shunt motor is used in :
    - (A) Lifts
    - (B) Cranes
    - (C) Lathe
    - (D) None of the above

29. A 4 pole dc motor with armature winding resistance of 0.5 Ohm receives a supply of 220 V. If the back emf produced during running condition is 210 V, the armature current is :
    - (A) 10 A
    - (B) 20 A
    - (C) 5 A
    - (D) 40 A

30. The nominal speed of a three phase, 12 pole induction motor is excited by a 60 Hz source at a full load slip of 6% is :
    - (A) 600 rpm
    - (B) 564 rpm
    - (C) 636 rpm
    - (D) None of the above

31. The incorporation of synchronous condenser in the power system :
    - (A) Has no effect on power system stability
    - (B) Decreases power system stability
    - (C) Improves power system stability
    - (D) None of the above

32. If the input to the prime mover of an alternator is kept constant and the excitation is changed, then the :
    - (A) Reactive component of the output is changed
    - (B) Active component of the output is changed
    - (C) Power factor of the load remains constant
    - (D) Power factor of the load is reduced

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A

33. An under excited synchronous generator operates at :
  (A) Lagging power factor   (B) Leading power factor
  (C) Unity power factor   (D) Lagging or leading power factor

34. A synchronous generator having E = 1 pu is feeding an infinite bus with voltage, V = 1.0 pu through a transfer reactance of 0.5, the steady state power limit is :
  (A) 2 pu   (B) 1 pu
  (C) 0.5 pu   (D) 0.25 pu

35. The number of turns in the starting winding of a capacitor start motor as compared to that for split phase motor is :
  (A) same   (B) more
  (C) less   (D) none of the above

36. The current gain of a common base configuration where $I_E = 5$ mA and $I_C = 4.5$ mA is :
  (A) 1.11   (B) 0.11
  (C) 0.9   (D) 9

37. In a UJT, p-type emitter is ——————— doped.
  (A) Lightly   (B) Heavily
  (C) Moderately   (D) None of the above

38. Holding current of a thyristor is :
  (A) Less than latching current   (B) More than latching current
  (C) Equal to latching current   (D) Zero

39. The structure of IGBT is :
  (A) P-N-P structure connected by a MOS gate
  (B) N-N-P-P structure connected by a MOS gate
  (C) P-N-P-N structure connected by a MOS gate
  (D) N-P-N-P structure connected by a MOS gate

40. The controlling parameter in a MOSFET is :
  (A) V_{ds} (B) I_g
  (C) V_{gs} (D) I_s

41. How many XOR gates are used in a 2 bit full adder circuit?
  (A) 2   (B) 3
  (C) 4   (D) 5

42. Which of the following circuits is used to convert multiple signals to a single output?
- (A) 2 XOR gates in parallel
- (B) 3 AND gates in parallel
- (C) Multiplexer
- (D) Flip flop

43. Which of the following is an asynchronous circuit?
- (A) Latch
- (B) Flip Flop
- (C) Both (A) and (B)
- (D) None of the above

44. What is the Binary Coded Decimal conversion of decimal 147?
- (A) 011101000001
- (B) 010001110001
- (C) 010000010111
- (D) 000101000111

45. Which of these gates are called universal gates?
- (A) NAND gate
- (B) NOR gate
- (C) Both (A) and (B)
- (D) None of the above

46. Which of the following gates give output as 1 for different inputs?
- (A) XOR gate
- (B) AND gate
- (C) XNOR gate
- (D) Both (A) and (C)

47. If A and B are given as input to a NAND gate, what is the output?
- (A) $|A.B|'$
- (B) $A'.B'$
- (C) $A + B$
- (D) $A.B$

48. Convert BCD 0001 0010 0110 to binary :
- (A) 1111101
- (B) 1111110
- (C) 1111000
- (D) 1111111

49. How many data select lines are required for selecting N inputs in a multiplexer?
- (A) N/2
- (B) $\sqrt{(N)}$
- (C) $\log_2(N)$
- (D) N

50. Which of the following statements accurately represents the two BEST methods of logic circuit simplification?
- (A) Boolean algebra and actual circuit trial and error evaluation
- (B) Karnaugh mapping and circuit waveform analysis
- (C) Actual circuit trial and error evaluation and waveform analysis
- (D) Boolean algebra and Karnaugh mapping

51. Waiting time in production, for manpower planning purposes should be assumed as :
    (A) 2-5%
    (B) 10-15%
    (C) 1-1.5%
    (D) 20-30%

52. In arc welding the voltage supplied is :
    (A) A.C.
    (B) D.C.
    (C) A.C. and D.C. both
    (D) Something else

53. Rotary indexing is required for :
    (A) drilling
    (B) milling
    (C) surface grinding
    (D) all the above

54. For drilling holes in long strip use :
    (A) plate jigs
    (B) channel jigs
    (C) leaf jigs
    (D) box and tumbling jigs

55. If a distribution is skewed to left the median will always be :
    (A) less than the mean
    (B) greater than the mode
    (C) between the mean and mode
    (D) equal to the mean

56. General design process of CAD does not consist of use phase :
    (A) synthesis
    (B) presentation
    (C) implementation (maintenance)
    (D) Optimisation

57. The equation of motion of a laminar flow of a real fluid are known as :
    (A) Euler's equations
    (B) Bernoulli equation
    (C) Navier – stokes equation
    (D) Hagen – Poisewille equation

58. Oil of viscosity 1.5 Pa.S and relative density 0.9 flows through a circular pipe of diameter 5 cm with a mean velocity of 1.2 m/s. The shear stress at the wall in Pa is :
    (A) 360
    (B) 288
    (C) 180
    (D) 144

59. For flow under a shrice gate where the upstream depth is 1.2 m and the depth at the vena contracta is 0.3 m, the discharge per metre width would be nearly :
    (A) 0.36 m^3/s
    (B) 1.25 m^3/s
    (C) 1.45 m^3/s
    (D) 4.0 m^3/s

60. Identify the incorrect statement :

A flow nozzle

    (A)   has a contraction co-efficient of unity

    (B)   is less costly than a venturimeter

    (C)   is more efficient than an orifice meter

    (D)   has overall losers much smaller than in a venturimeter

61. A gas has a molecular weight of 44. The gas constant R for the gas, in $(J/Kg.K)$:

    (A)   189   (B)   0.045

    (C)   1854   (D)   1130

62. An air plane is cruising at a speed of 800 km/h at an altitude where the air temperature is 0°C. The flight mach number at this speed is nearly :

    (A)   1.33   (B)   0.25

    (C)   2.4   (D)   0.67

63. The unit speed Nu of a turbine of rotational speed N and head H is equal to :

    (A) $N\sqrt{H}$ (B) $N/\sqrt{H}$

    (C) $\sqrt{H}/N$ (D) $\sqrt{HN}$

64. A fast centrifugal pump impeller will have :

    (A)   forward facing blades

    (B)   radial blades

    (C)   backward facing blades

    (D)   propeller type blades

65. The indicator diagram of a reciprocating pump is a plot of :

    (A)   work done Vs stroke length

    (B)   acceleration head Vs stroke length

    (C)   angular displacement Vs stroke length

    (D)   pressure head Vs stroke length

66. The following parameters relate to flow in a penstock :

1. Water level in the reservoir

2. Density of water

3. Elasticity of water

4. Roughness of the pipe

Pressure rise due to water hammer in a penstock depends upon
(A) 1, 2, 3 and 4   (B) 1 and 2
(C) 3 and 4   (D) 2 and 3

67. Consider the following statements :

1. Pumps is series operation allows the head to increase

2. Pumps in series operation increases the flow rate

3. Pumps in parallel operation increase the flow rate

4. Pumps in parallel operation allows the head to increase of these statements

(A) 1 and 2 are correct   (B) 1 and 3 are correct
(C) 2 and 3 are correct   (D) 1 and 4 are correct

68. Taper usually provided on cotter is :
(A) 1 in 5   (B) 1 in 10
(C) 1 in 24   (D) 1 in 50

69. Iron is :
(A) Ferromagnetic   (B) Paramagnetic
(C) Dielectric   (D) None of the above

70. Which of the following is used for bearing liner?
(A) gum metal   (B) brass
(C) bell metal   (D) babbit metal

71. Air is normally dehumidified by :
(A) injecting water   (B) passing steam
(C) heating   (D) cooling

72. The relative humidity during sensible cooling process :

(A) increases   (B) decreases

(C) remains same   (D) unpredictable

73. The capacity of compressor will be highest when its intake temperature is :

(A) highest   (B) atmospheric

(C) lowest   (D) none of the above

74. All radiations in a black body are :

(A) reflected   (B) absorbed

(C) transmitted   (D) refracted

75. Which of the following has least value of conductivity?

(A) air   (B) water

(C) plastic   (D) glass

76. Turbo propeller has the following additional feature over the turbo jet :

(A) propeller   (B) diffuser

(C) inter cooler   (D) after cooler

77. Gas turbines use following type of air compressor :

(A) Centrifugal type   (B) Reciprocating type

(C) Lobe type   (D) Axial flow type

78. In SHM the acceleration is proportional to :

(A) Velocity   (B) Displacement

(C) Rate of change of velocity   (D) All the above

79. The number of dead centres in a crank driven slider crank mechanism are :

(A) 0   (B) 4

(C) 2   (D) 6

80. Resistance to fatigue of a material is measured by :

(A) Young's modulus   (B) Co-efficient of elasticity

(C) Elastic limit   (D) Endurance limit

81. ―――――― valve diverted-flow of milk if it does not achieve preset cut- in pasteurization temperature in holding tube.
    (A) Gate   (B) Flow diversion
    (C) Ball   (D) Butterfly

82. Full form of PTFE is :
    (A) Poly tetra fluoro ethylene   (B) Poly tetra floride ethylene
    (C) Poly tetra fluoro ethanol   (D) None of the above

83. Approximate diameter of manhole in a Silo is :
    (A) Clean in place   (B) Cleaning in place
    (C) Clean in position   (D) Clear in place

84. Plate and frame filter press is a :
    (A) Batch process
    (B) Continuous process
    (C) Cannot be used where high throughput is required
    (D) Both (A) and (C)

85. Sanitary pipes in which milk comes into direct contact are made up of ―――――― material :
    (A) Iron   (B) Stainless steel (SS)
    (C) Plastic   (D) Copper

86. Cr:Ni ratio of 18:8 is present in which of the following material :
    (A) SS-316   (B) SS-304
    (C) SS-420   (D) SS-302

87. Maximum temperature at which EPDM rubber can withstand is :
    (A) 65°C   (B) 165°C
    (C) 265°C   (D) 365°C

88. Effectiveness of cleaning is effected by :
    (A) Contact time of cleaning   (B) Temperature of cleaning solution
    (C) Concentration of cleaning solution (D) All of the above

89. Milk can be stored in milk storage tank for maximum of ―――――― hours.
    (A) 72   (B) 48
    (C) 36   (D) 12

90. ―――――― can washer has higher washing capacity of 12 cans/min :
    (A) Rotary can washers   (B) Straight-through can washers
    (C) Both (A) and (C)   (D) None of the above

91. Three processes i.e. separation, standardization and clarification when done in a single unit is called :
    (A) Tri processor   (B) Clarifier
    (C) Homogenizer   (D) None of the above

92. For milk treatment, the time temperature combination used 71.5°C for 16 seconds is called :
    (A) HTST pasteurization   (B) UHT
    (C) Batch pasteurization   (D) None of the above

93. Heating process of milk at 105-120°C with effective processing times of 10-30 minutes is called :
    (A) Homogenization   (B) Standardization
    (C) Sterilization   (D) None of the above

94. For fabrication of plates of plate heat exchangers, CIP tanks, evaporator tubes which needs higher corrosion resistance ——————— metal is used :
    (A) AISI 304   (B) Carbon steel
    (C) AISI 316   (D) Mild steel

95. Milk storage tank has atleast ————— slope towards outlet for dispensing of milk :
    (A) 1:5   (B) 1:12.5
    (C) 1:2   (D) 1:1

96. Unit operations like Crystallization, Leaching, Gravity sedimentation, Filtration are _____ separation processes :
    (A) Gas-solid   (B) Liquid-solid
    (C) Solid-Soild   (D) Gas-Liquid

97. The process of separation of microorganisms from milk by using centrifugal force is called :
    (A) Sedimentation   (B) Sterilization
    (C) Bactofugation   (D) Pasteurization

98. Process of dividing fat globules into smaller ones with diameters down to $<1\,\mu m$, depending on the operating pressure is called :
    (A) Sedimentation   (B) Clarification
    (C) Standardization   (D) Homogenization

99. The storage tanks are usually over capacity than the nominal capacity of the tank by :
    (A) 2%   (B) 15%
    (C) 5%   (D) 1%

100. The tanks that do not need insulation are :
    (A) Milk storage tanks   (B) Silos
    (C) Railway tanker   (D) CIP tanks

——————————

Medium of Question- ENGLISH

Technical Superintendent (Engineering)
in
Kerala Co-operative Milk Marketing Federation Limited
Date of Test: 19 02 2020

Q No.		Q. No.	
		QUESTION BOOKLET ALPHACODE A	
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2	D	52	B
3	A	53	D
4	B	54	A
5	A	55	C
6	A	56	C
7	B	57	C
8	B	58	B
9	D	59	B
10	B	60	D
11	A	61	A
12	A	62	D
13	C	63	B
14	A	64	C
15	B	65	D
16	A	66	A
17	B	67	B
18	B	68	C
19	A	69	A
20	C	70	D
21	C	71	D
22	B	72	A
23	A	73	C
24	C	74	B
25	A	75	A
26	B	76	A
27	A	77	D
28	C	78	B
29	B	79	C
30	B	80	D
31	C	81	B
32	A	82	A
33	B	83	B
34	A	84	D
35	B	85	B
36	C	86	B
37	B	87	B
38	A	88	D
39	C	89	A
40	B	90	B
41	B	91	A
42	C	92	A
43	A	93	C
44	D	94	C
45	C	95	B
46	A	96	B
47	A	97	C
48	B	98	D
49	C	99	B
50	D	100	D

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