

PSC Assistant Engineer - Electrical - Harbour Engineering Examination Previous Year Question Paper

***Exam Name: Assistant Engineer - Electrical -
Harbour Engineering***

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Medium of Questions: English



030/2016

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Three resistances each having a value of a Ohm are connected to form a Y structure. If a 3 phase balanced supply with a line voltage of A volts is applied, then the power drawn per phase from the supply is :
(A) $A^2/3a$ (B) $3A^2/a$
(C) A^2/a (D) None of the above
2. A 230V, 50Hz, 1ϕ supply is connected to the series combination of a pure resistance of 50Ω a pure variable capacitor of $25\mu F$ and a pure variable inductor of $1.5mH$. By properly adjusting the component values, it is made that the current through the circuit is maximum. What is the power factor of the circuit now?
(A) 0.866 (B) 0.5
(C) Zero (D) 1
3. In 3ϕ power measurement using 2 Wattmeter method, both the Wattmeters are reading positive and equal. This is because :
(A) The load is purely resistive (B) The load power factor is 0.5
(C) The phase sequence is RBY (D) The load is purely capacitive
4. A dc source of EMF E Volts and internal Resistance, R Ohms is connected to a variable load and it is adjusted such that the load abstracts maximum power from the source. The current drawn from the source is :
(A) $4E/R$ (B) $2E^2/R$
(C) E/R (D) $E/2R$
5. The minimum number of NAND gates required to implement a NOR gate is :
(A) 1 (B) 2
(C) 3 (D) none of the above
6. If A and B are boolean variables, the boolean expression $A + AB$ is :
(A) 0 (B) B
(C) 1 (D) A
7. Which one among Aluminum, Constantan, Mercury, Carbon have highest resistivity :
(A) Aluminum (B) Constantan
(C) Mercury (D) Carbon
8. For a two terminal device, resistance decreases when the temperature increases, the device is :
(A) made up of a metal (B) a semiconductor
(C) a dielectric (D) none of the above

9. Which one among the following has 2 fully stable states?
 (A) Astable multivibrator (B) Sweep generator
 (C) Flipflop (D) None of the above
10. In a hydro electric generation system, pressure variations due to rapid changes in velocity of water is mitigated using :
 (A) Tailrace pipe (B) Penstock
 (C) Surge tank (D) None of the above
11. In a complex network containing active voltage sources with zero internal resistances and linear bilateral elements the open circuit voltage across 2 terminals is 25V and the resistance of the network viewed from the open circuited terminal is 6.25Ω . If an equivalent circuit comprising of only a current source and impedance is made, the current source rating is :
 (A) 25A (B) 6.25A
 (C) 12.5A (D) 4A
12. A three phase balanced delta connected load of $5 + j6\Omega$ in each phase is connected to a line voltage of 400V is drawing a current from the supply. If another delta connected load of same nature and magnitude is connected in parallel, the line current drawn from the supply becomes :
 (A) Double (B) Four times
 (C) Less than half (D) One fourth
13. In an synchronous generator, selective elimination of odd harmonics can be done by :
 (A) Distribution of winding (B) Symmetrical winding
 (C) Short coding of winding (D) None of these
14. The surface integral of the normal component of Electric Field Intensity over a closed surface is equal to $\frac{1}{\epsilon_0}$ times the total charge inside it. This is the statement of :
 (A) Gauss's Theorem (B) Stoke's Theorem
 (C) Maxwell's Theorem (D) Poisson's Theorem
15. Smooth cylindrical type rotors with less diameter and large axial length are used for Synchronous generators driven by :
 (A) Water turbines (B) Radial turbines
 (C) Steam turbines (D) None of the above
16. If the number of poles in a synchronous machine is 6, a slot angle of 10° mechanical, when expressed in electrical degrees is :
 (A) 60 (B) 20
 (C) 30 (D) 15

17. If the number of turns of an inductive coil is doubled and core length is quadrupled, other parameters being the same, the inductance of the coil became :
- (A) doubled (B) halved
(C) quadrupled (D) unchanged
18. Which one among the following is TRUE regarding the selection of working flux density in transformer design?
- (A) High flux density in the core results into the reduction in Core loss
(B) High flux density in the core results into an increase in Copper loss
(C) High flux density in the core results into high all day efficiency
(D) High flux density in the core results into saving in cost of iron
19. If the ratio of average charge voltage to average discharge voltage in a lead acid cell is $\frac{4}{3}$, the ratio of its Watt Hour efficiency to Ampere hour efficiency is :
- (A) 0.75 (B) $\frac{4}{3}$
(C) $\frac{16}{9}$ (D) None of the above
20. A three phase induction motor runs at 2% slip and its rotor frequency is 1Hz. Stator frequency in Hertz is :
- (A) 60 (B) 50
(C) 40 (D) 20
21. To have a smooth, quiet running of an induction motor by reducing humming and to prevent cogging, the technique used is called :
- (A) Damping (B) Concentrating
(C) Skewing (D) None of the above
22. If the flux per pole of a shunt-wound DC generator is halved and the number of poles is doubled, the generated e.m.f. at constant speed :
- (A) remains the same (B) doubled
(C) is halved (D) none of the above
23. In dc generators, the winding used in a machine delivering low voltage, high current load is :
- (A) progressive simplex wave winding (B) lap winding
(C) any type of wave winding (D) any of the above
24. Which among the following can support a synchronous motor in Starting :
- (A) Damper winding (B) Frequency divider
(C) Interpole (D) All the above

25. Two reaction theory is used in the analysis of Synchronous machine to take into account the :
- (A) Difference in the number of poles in stator and rotor of a Cylindrical pole machine
 - (B) Non uniformity of air gap between stator and rotor of a salient pole machine
 - (C) Non uniformity of air gap between stator and rotor of a cylindrical pole machine
 - (D) Difference in the number of poles in stator and rotor of a salient pole machine
26. In a transformer delivering a variable load, Zero voltage regulation can occur at :
- (A) 0.45 lagging power factor load
 - (B) unity power factor load
 - (C) 0.8 lagging power factor load
 - (D) 0.7 leading power factor load
27. In an alternating voltage supply of constant voltage feeding a Transformer, the presence of higher order harmonics can cause significant changes in :
- (A) Copper losses
 - (B) Regulation
 - (C) Core losses
 - (D) All of the above
28. The Maximum percentage efficiency of a 1KVA transformer with iron losses equal to 125 W at upf load is :
- (A) 90
 - (B) 72
 - (C) 60
 - (D) 80
29. Which among the following logic families are fastest in operation?
- (A) ECL
 - (B) TTL
 - (C) CMOS
 - (D) DTL
30. De Morgan's Law says :
- (A) NOR Gate is NOTed AND Gate
 - (B) NAND Gate is NOTed OR Gate
 - (C) Both (A) and (B) above
 - (D) None of the above
31. Which of the following is/are the features of an Asynchronous counter?
- (A) The same clock pulses are applied to all the constituent Flip flops at a time
 - (B) Outputs of the flip flop are connected to the inputs of the very next flip flop
 - (C) Propagation delay limits the speed of operation
 - (D) None of the above
32. Which one of the following is fully CORRECT regarding 8085 microprocessor?
- (A) It does not support handshaking in I/O operations
 - (B) It has only 6 flags
 - (C) It supports queue
 - (D) It has hardware and software interrupts

33. Which among the following is TRUE about an 8086 microprocessor?
(A) Its address and data bus are multiplexed
(B) Its accumulator size is 32 bit
(C) It supports the queue/pipelining feature
(D) It does not have Master and Slave Mode operations
34. The excess-3 code corresponding to decimal number 156 is :
(A) 100010001010 (B) 010010110011
(C) 010010001001 (D) None of the above
35. A Mod-31 synchronous Counter ideally has _____ number of flipflops.
(A) 6 (B) 3
(C) 4 (D) 5
36. Which among the following is/are TRUE regarding the OP AMP circuit?
(A) Voltage follower employs positive feedback
(B) Integrator amplifies noise
(C) In Differentiator, gain is increased with an increase in frequency
(D) Adder always have an attenuation
37. When comparing Active and Passive filters, which of the following statements are Wrong?
(A) Active filters require power source(s)
(B) Active filters have high input impedance
(C) Active filters have low output impedance
(D) All the above are correct
38. For unipolar operation, an 8 bit Digital to Analog Converter has a resolution of :
(A) 128 (B) 256
(C) 64 (D) Given data insufficient
39. In a circuit containing a transistor, both of its junctions are forward biased. It operates in _____ region.
(A) Cut off (B) Saturation
(C) Active (D) Pinch off
40. Number of valance electrons in Germanium is :
(A) 2 (B) 5
(C) 6 (D) 4
41. The Switched Mode Power Supplies have higher energy efficiency compared to Linear Power Supplies because :
(A) it uses isolation transformers
(B) it has devices with large space charge capacitance
(C) it does not work in active region
(D) it has high switching frequency

42. Gain of an amplifier can be stabilized by :
(A) Employing Positive feedback (B) Employing Negative feedback
(C) Proper dc bias (D) Proper dc isolation
43. If only 5 bites are used for addressing the memory of a computer system, the memory size is :
(A) 64 (B) 128
(C) 32 (D) 256
44. The ripple factor and efficiency of a half wave rectifier are respectively :
(A) 1.21 and 81.2% (B) 1.21 and 40.6%
(C) 0.482 and 81.2% (D) 0.482 and 40.6%
45. For a short transmission with series impedance Z , all the capacitances being negligibly small, the ABCD constants of the line are :
(A) $A = 1, B = Z, C = 0, D = 1$ (B) $A = Z, B = 1, C = 1, D = 0$
(C) $A = 1, B = 0, C = Z, D = 1$ (D) $A = Z, B = 1, C = 0, D = 1/Z$
46. The load flow analysis algorithm having the least rate of convergence is :
(A) Newton Raphson Method (B) Fast Decoupled Load-Flow Method
(C) Gauss Seidel Method (D) None of the above
47. The Opposition to the flow of current in a conductor can increase in alternating circuits compared to dc circuits due to :
(A) Proximity effect (B) Skin effect
(C) Ferranti effect (D) (A) and (B) above
48. What is meant by a flat line or Infinite line?
(A) Line open circuited
(B) Line with surge impedance equals the characteristic impedance
(C) Line terminated with charesteric impedance
(D) Line through which Power transmitted is high
49. Which one among the following is a method for equalizing the potential across the various units of a string insulator?
(A) Usage of smaller cross arm (B) Usage of step grading
(C) Dynamic sheilding (D) All of the above
50. Under ground cables are less preferable in high voltage transmission because of :
(A) poor insulation (B) high charging current
(C) safety (D) none of the above

51. The metals normally used in a HRC fuse are :
(A) Tin and lead (B) Tin and Silver
(C) Aluminium and lead (D) Aluminium and Copper
52. The transient stability of a power system can be improved by :
(A) Using rotor of lower Moment of Inertia for generator
(B) Using parallel lines
(C) Using low system voltage
(D) None of the above
53. For economic load dispatch :
(A) Incremental efficiency of each machine should be same
(B) Incremental production cost of each machine should be same
(C) Incremental fuel cost of each machine should be same
(D) None of the above
54. In a power system, the cost of generated electrical energy will be low if :
(A) both load factor and diversity factor are low
(B) both load factor and diversity factor are high
(C) Load factor high. Diversity factor low
(D) Load factor low, Diversity factor high
55. An over excited synchronous machine has a lagging powerfactor. The machine is :
(A) Motoring (B) Generating
(C) Floating (D) Can be Generating or motoring
56. Which among the following is/are CORRECT about an RC phase shift oscillator?
(A) The RC network provides a phase shift of 180°
(B) It makes use of positive feedback
(C) Loop gain of the oscillator is almost one
(D) All the above
57. In class B operation of power amplifiers, the collector current flows for :
(A) Less than a quarter of a cycle (B) The whole cycle
(C) Half the cycle (D) Less than half a cycle
58. For the characteristic equation $2S^4 + S^3 + 3S^2 + 5S + 10 = 0$, the number of roots in the left half S plane is :
(A) 2 (B) 1
(C) 3 (D) 4

59. The unity negative feedback system with $GH(S) = \frac{(10s+1)}{(s^2+8as+4k)}$ oscillates at 2rad/s only when :
- (A) $k=1$ (B) $k=2$ and $a=1$
(C) $k=1$ and $a=2$ (D) $a=2$
60. The steady state error of a negative feedback system with forward path gain function $G(S) = \frac{3}{(S+5)}$ and feedback path gain function $H(S) = \frac{5}{(S+1)}$ for a unit step input is given by :
- (A) infinity (B) zero
(C) 0.25 (D) 10%
61. The ratio of total power in the Amplitude modulated wave to the unmodulated carrier power when the modulation index is 'm'
- (A) $1+2m^2$ (B) $1+0.5m^2$
(C) $1+m^2$ (D) None of the above
62. The voltage across a load element is $40\angle-15^\circ$ and the current through the element is $2.5\angle-30^\circ$. The circuit powerfactor is :
- (A) Lagging (B) Leading
(C) Unity (D) Data insufficient
63. 100 numbers of 1Ω linear bilateral resistances are connected in parallel and the combination is fed by a 10A constant current source. The power delivered by the source is :
- (A) 10 W (B) 1 W
(C) 100 W (D) 0 W
64. Referring to a power plant, the term hot reserve refers to :
- (A) Reserve generating capacity not in service, but in operation
(B) Reserve generating capacity not in service, but available
(C) Reserve generating capacity in service, but not in operation
(D) All the above
65. Power supply used for dielectric heating will normally have a frequency in the range :
- (A) 1 to 5 kHz (B) 1 to 5 MHz
(C) 10 to 50 MHz (D) 10 to 50 kHz

66. As per Kelvin's Law, the most economical size of conductor is that for which :
- (A) The variable part of the annual charges is equal to the cost of annual energy losses
 - (B) The constant part of the annual charges is equal to the cost of energy losses per year
 - (C) The variable part of the energy charges is equal to the cost of annual energy losses
 - (D) The constant part of the energy charges is equal to the cost of annual energy losses
67. Output voltage of a simple ideal buck type dc-dc converter working in continuous current mode with an input voltage of 12V and turn ON time 5ms and switching frequency 50Hz is :
- (A) 6V
 - (B) -6V
 - (C) 3V
 - (D) -3V
68. A power electronic circuit which can give a 2.5V, 30Hz output wave from a supply of 5V, 60Hz supply is :
- (A) Voltage Source Converter
 - (B) Cyclo converter
 - (C) Flyback Converter
 - (D) None of the above
69. In a power electronic circuit, a free wheeling diode is used across a dc load to :
- (A) Reduce output voltage ripple
 - (B) Prevent reversal of load voltage
 - (C) Control output current ripple
 - (D) All of the above
70. Ten, 15V batteries each having an internal resistance of 3Ω are connected in series such that one is aiding the others. Its Norton's equivalent circuit has :
- (A) A current source of 0.5A and parallel resistance of 3Ω
 - (B) A current source of 5A and parallel resistance of 30Ω
 - (C) A current source of 2.5A and parallel resistance of 30Ω
 - (D) None of the above
71. The value of specific gravity of a lead acid battery under fully charged condition is approximately :
- (A) 1.21
 - (B) 2
 - (C) 2.8
 - (D) None of the above
72. Which one of the following is equal to one ampere of current?
- (A) Siemens/second
 - (B) Watt/second
 - (C) Joule/second
 - (D) Coulomb/second

73. An Ammeter is found to have a cramped scale. This is because :
- (A) it employs eddy current damping
 - (B) it has spring control
 - (C) its deflecting torque has a nonlinear variation with respect to current
 - (D) of both (B) and (C)
74. Of the power electronic circuits, circuit employing Power MOSFETs has a higher switching frequency because :
- (A) MOSFET is a majority carrier device
 - (B) MOSFET has high input impedance
 - (C) MOSFET has insulated gate
 - (D) MOSFET has low signal to noise ratio
75. A measure of repeatability of measurement of a quantity is :
- (A) Precision
 - (B) Accuracy
 - (C) Significant
 - (D) None of the above
76. The analogous electrical circuit quantity corresponding to the magnetic circuit quantity, permeability is :
- (A) Conductivity
 - (B) Resistivity
 - (C) Susceptibility
 - (D) None of the above
77. In load flow analysis the role of a slack bus is :
- (A) as the reference bus
 - (B) as a bus which can absorb and gives out active power
 - (C) as a bus which can absorb and gives out reactive power
 - (D) all of the above
78. Rotation of a Rotating Induction Type Mechanical Energy Meter under no load condition can be reduced by :
- (A) Copper shading bands
 - (B) Compensating coils
 - (C) Eddy current damping
 - (D) Drilling holes in the disc
79. The needle of a MI Ammeter oscillates around a central value. It may be due to poor :
- (A) Damping torque
 - (B) Controlling torque
 - (C) Deflecting torque
 - (D) None of the above
80. The range of an Ammeter is to be extended from 250 mA to 2A. If the 250 mA meter has an internal resistance of 10Ω , what is the approximate value of the shunt resistance required to extend the range :
- (A) 1.43Ω
 - (B) 2.5Ω
 - (C) 5Ω
 - (D) 3.5Ω

81. Time taken by the Constituent Assembly to prepare Constitution is?
(A) 2 years 10 Months 8 days (B) 2 years 11 Months 17 days
(C) 2 years 10 Months 17 days (D) 2 years 11 Months 18 days
82. In India Fundamental duties are adopted from :
(A) UK Constitution (B) USA Constitution
(C) USSR Constitution (D) German Constitution
83. Who is the author of Ente Gurunathan?
(A) Vallthol Narayana Menon (B) G Sankara Kurup
(C) Kumaranasan (D) Poonthanam
84. The place where Ayyankali started a school for depressed classes?
(A) Neyyatinkara (B) Varkala
(C) Ulloor (D) Vengannoor
85. Who started the News Paper 'Mithavadi' in 1907?
(A) Moorkoth Kumaran (B) Vakkom Moulavi
(C) Dr Palpu (D) Theruvath Raman
86. Who wrote 'Sahithya Vicharam'?
(A) Joseph Mundassery (B) Kesava Dev
(C) KC Kesava Pillai (D) M.P. Poul
87. How many people signed in 'Ezhava Memorial'?
(A) 10028 (B) 13716
(C) 13176 (D) 100001
88. 'Jathy Kummy' which criticized the prevailing caste system was written by :
(A) T K Madhavan (B) Pandit Karuppan
(C) K P Vellon (D) Abraham Malpan
89. Who introduced the 'Subsidiary Alliance System'?
(A) Warren Hastings (B) Lord Lytton
(C) Lord Wellesly (D) Lord Curzon
90. The national Anthem of India 'Jana gana Mana' was first sung at :
(A) Calcutta 1911 (B) Delhi 1912
(C) Mumbai 1913 (D) Lahore 1919
91. Who is known as 'Kerala Kalidasan'?
(A) A R Raja Raja Varma
(B) Raja Ravi Varma
(C) Kerala Varma Valiya Koil Thampuran
(D) Kodungaloor Kunjikuttan Thampuran

92. 'Oru Theruvinte Kadha' was written by :
(A) Ponkunnam Varkey (B) S K Pottakkad
(C) Vaikkam Muhammed Basheer (D) Thakazhy Sivasankara Pillai
93. Who was the first Indian to be elected to the British parliament?
(A) Gopala Krishna Ghokhale (B) Mottilal Nehru
(C) BalaGangadhara Thilak (D) Dadabhai Naoroji
94. The great Victoria Desert is located in :
(A) Africa (B) Europe
(C) Australia (D) North America
95. Ajanta Caves are located in the state of :
(A) Gujarat (B) Orissa
(C) Maharastra (D) Karnataka
96. At which place Gauthama Buddha delivered his first sermon?
(A) Lumbini (B) Magadha
(C) Vaisaly (D) Saranath
97. In which of the following states does 16th National Women Boxing Championship take place?
(A) Meghalaya (B) Assam
(C) Orissa (D) Maharastra
98. Who has been elected as the first male member of national Commission for women?
(A) Alok Rawat (B) Chethan Bhagat
(C) Sudeep Nagarkar (D) Kailash Satyarthi
99. Who has won the Nobel Prize 2015 in Literature?
(A) Patrick Modiano (B) Youyou Tu
(C) Svetlana Alexievich (D) Joseph William
100. World Water Day is celebrated every year on :
(A) July 12 (B) May 22
(C) March 22 (D) June 24