

**SCREENING TEST TO THE POST OF ASSISTANT EXECUTIVE ENGINEERS IN  
ELECTRICAL ENGINEERING**

**150 QUESTIONS. 150 MARKS. 150 MINUTES.**

**FINAL KEY**

**PART A**

**GENERAL STUDIES AND MENTAL ABILITY**

**50 QUESTIONS 50 MARKS**

Q. 1. In which of the following city The Saha Institute of Nuclear Physics is situated?

**Ans: Kolkata**

Q. 2. Which of the following is/are correct?

- a. ASTROSAT is the India's first astronomical satellite.
- b. GSAT-6 is the 25<sup>th</sup> geostationary communication satellite of India built by DRDO.
- c. Kepler is a space observatory launched by ISRO.

**Ans: only a**

Q. 3. Recently India has funded for Public Library in which of the following country?

**Ans: Afghanistan**

Q. 4. Which of the following country has hosted the 13<sup>th</sup> G-20 Summit?

**Ans: Argentina**

Q. 5. Which of the following statements is/are correct about United Nations?

- a) 'United Nations' name was devised by Franklin D. Roosevelt.
- b) All the member states meet once after every two years in General Assembly Hall, New York.
- c) It is the General Assembly which elects all the 54 members for Economic and Social Council.

d) Judges of the International Court of Justice are elected for 8 years.

**Ans: a and c**

Q. 6. When was Asia Pacific Economic Cooperation (APEC) established?

**Ans: 1989**

Q. 7. 'Operation Greens' is related with which of the following Ministry?

**Ans: Ministry of food Processing Industries**

Q. 8. Match the following List (I) Year with List (II) Chief Guest:

List (I)

Republic Day Year

a. January 26, 2014

b. January 26, 2015

c. January 26, 2016

d. January 26, 2017

List (II)

Chief Guest

I. Francois Hollande

II. Mohammed Bin Zayed Al Nahyan

III. Shizo Abe

IV. Barack Obama

**Ans:**

III

IV

I

II

Q. 9. Which city of India hosted 'Owl Festival'?

**Ans: Pune**

Q. 10. Which of the following cities of Andhra Pradesh are the part of 'Ease of Living Index 2018'?

a. Vijayawada

b. Warangal

c. Nellore

d. Kakinada

**Ans: a and d**

Q. 11. Which of the following state has topped the 'Ease of Doing Business Ranking- 2018'?

**Ans: Andhra Pradesh**

Q. 12. In which year Election Commission of India has introduced NOTA on EVMs? **Ans: 2013**

Q. 13. Which of the following is/are correct about East Asia Summit?

- a. 13<sup>th</sup> East Asia Summit held in Singapore.
- b. It is an ASEAN-Centered Forum.
- c. It can only be chaired by an ASEAN Member.
- d. East Asia Summit comprises the ten member states of the ASEAN.

**Ans: All of the above**

Q. 14. 'Blue Economy is related with:

**Ans: Ocean Resources**

Q. 15. Which was the first state to be re-organized on the basis of language?

**Ans: Andhra Pradesh**

Q.16.Which of the following Article enables High court to issue writs?

**Ans: Article 226**

**Q.17.Which of the following statements is/are correct about the Governor?**

- a. He can nominate one member to the state legislature assembly from the Anglo Indian Community.**
- b. He can seek any information relating to the administration of the affairs of the state and proposals for legislation from the Chief Minister.**
- c. A person completed the age of 30 can be appointed as governor.**
- d. The governor acts as agent of the central government.**

**Ans: a and b**

**Q. 18. Who among the following has not been the governor of Andhra Pradesh?**

**Ans: Nikhil Kumar**

**Q. 19. Who among the following has served as the shorted-term as a Chief Minister of Andhra Pradesh?**

**Ans: N. Bhaskara Rao**

**Q. 20. Which of the following statement is/are incorrect about Election Commission of India?**

- a. Election Commission of India conducts elections for Lok Sabha, Vidhan Sabha and Gram Sabha.**
- b. Election Commission of India conducts elections only for Lok Sabha.**
- c. Election Commission of India conducts elections only for Vidhan Sabha.**
- d. Election Commission of India conducts elections for only Lok Sabha and Vidhan Sabha.**

**Ans: Deleted**

**Q. 21. Which of the following statements is/are correct about NITI Ayog?**

- a. NITI Ayog was introduced by Government of India in 2014.**
- b. Vice-Chairperson of NITI Ayog is appointed by President of India.**
- c. It has Governing Council comprising the Chief Ministers of all the states and Lt. Governors of Union Territories.**
- d. Regional Councils of NITI Ayong are formed for specified tenure.**

**Ans: c and d**

Q.22. In which year Telugu language got the classical status?

**Ans. 2008**

**Q. 23. Which of the following statements regarding 'Stupa' are correct?**

- a. They are pre Buddhist structures.**
- b. They are built on the relics of Buddha.**
- c. They are built as objects of devotion by Buddhist monasteries.**
- d. They are built to commemorate important events in Buddha's life**

**Select the correct code from the following:**

**Ans: All of the above**

Q. 24. On the demand for exams in India, Lord Dufferin appointed Atchison Commission in 1886. It suggested for:

- a. Recruit young men from high class families and social positions
- b. Simultaneous exams in London and India
- c. To strengthen the provincial services
- d. To establish imperial, provincial and subordinate Civil Services

Which among the above is/are the correct suggestions?

Code:

**Ans: c and d**

Q. 25. Which of the following statement is not correct?

**Ans: The Swadeshi movement was exclusively a political movement which remained aloof from the cultural sphere.**

Consider the following statements:

- a. Individual Satyagraha was launched by Congress in 1940 to oppose the August Declaration.

b. VinobaBhave was the first to offer Individual Satyagrah in 1940.

Q. 26 Which of the statements given above is/are correct?

**Ans: Only b**

Q. 27 Consider the following statements:

a. Lord Mountbatten came to India as Viceroy in 1945.

b. In February 1947, Clement Attlee, British Premier, declared that the British would Quit India by June 1948.

Which of the above statements is/are correct?

**Ans: Only b**

Q. 28 Which of the following statements is/are incorrect regarding the Dual system of administration prevalent in Bengal in the 18th century:

a. The Nawab controlled the defence of Bengal, while the East India Company controlled its finances.

b. The system was advantageous to the East India Company as it had power without responsibility.

c. The weaving industry of the Bengal mostly suffered due to the dual system of the administration.

d. The separation of power resulted in efficient administration and checked the drain of wealth

**Ans: a and d**

Q. 29. Amravati, the designated capital of Andhra Pradesh, was historical capital of:

**Ans: Satavahanas Dynasty**

Q. 30. Andhra Pradesh comes under which earthquake classified zone:

**Ans: Zone 2 and Zone 3**

Q. 31 Which of the following pair is/are correctly matched:

	Indian State		Founders
a.	Hyderabad	:	Nizam-ul-Mulk
b.	Bengal	:	Saadat Ali Khan
c.	Awadh	:	MurshidQuli Khan

**Ans:** only a

Q. 32 With reference to the First Factory Act, 1881, consider the following statements:

- a. The Act tried to limit the working hours for children and also fix a minimum age limit for employment in a factory.
- b. The Act got wide support from early nationalists, especially moderates.

Which of the following statements given above is/are correct?

**Ans:** only a

Q. 33. Consider the following statements regarding the role of the Reserve Bank of India (RBI):

- a. The RBI manages the public debt on behalf of the Central and State governments in India.
- b. The RBI acts as a banker to various State governments in India.

Which of the statements given above is/are incorrect?

**Ans:** Neither a nor b

Which of the following state does not share a boundary with Andhra Pradesh?

**Ans:** Madhya Pradesh

Which of the following is a part of Union Territory located in Andhra Pradesh?

**Ans:** Yanam

Q. 36. Which of the following is the smallest Ocean:

**Ans: Arctic Ocean**

Kaziranga National Park is situated in which of the following state:

**Ans: Assam**

Tawa Project is associated with which of the following state:

**Ans: Madhya Pradesh**

Q. 39. Consider the following statements in respect of financial emergency under Article 360 of the Constitution of India:

a. A proclamation of financial emergency issued shall cease to operate at the expiration of two months, unless before the expiration of that period it has been approved by their solutions of both Houses of Parliament.

b. If any proclamation of financial emergency is in operation it is competent for the President of India to issue directions for the reduction of salaries and allowances of all or any class of persons serving in connection with the affairs of the Union but excluding the Judges of the Supreme Court and the High Courts.

Which of the statements given above is/are correct?

**Ans: Only a**

Q. 40. Which one of the following statements correctly describes the Fourth Schedule of the Constitution of India?

**Ans: It allocates seats in the Council of States**

Q. 41. Which of the following district of Andhra Pradesh has highest number of Mandals?

**Ans: Chittoor**

Q 42. The Planning commission of India was set up in March, 1950 by:

**Ans: A resolution of the government of India**

Q 43. Which of the following programme was announced on 1<sup>st</sup> July, 1975 as part of Fifth Five Year Plan?



**Ans: 20-Point Economic Programme**

Q 44 . In partnership with Government of Andhra Pradesh, which of the following has created a dashboard for monitoring the real time progress of the districts?

**Ans: NITI Aayog**

Q 45. According to the UNDP report on Human Development Index-2018, the HDI rank of India, out of 189 countries, is:

**Ans: 130**

Q 46. The Central Pollution Control Board (CPCB) was constituted in September-1974 under:

**Ans: The Water (Prevention and Control of Pollution) Act-1974**

Q 47. In the union budget 2016-17, *tax on coal* was renamed as:

**Ans: Clean Environment Cess**

Q 48. What is the "Population Ratio" of successor states of Andhra Pradesh and Telangana as per 2011 Census.

**Ans: 58.32: 41.68**

Q 49. When was the Andhra Pradesh Reorganization Bill passed in the Lok Sabha?

**Ans: 18 February, 2014**

Q 50 . When does APCRDA has been formed

**Ans: 30 December, 2014**

**PART - B**

**ELECTRICAL ENGINEERING**

**100 QUESTIONS 100 MARKS**

Q51. The material filled in breather of transformer is

**Ans: Silica gel**

Q52 A soft-iron toroid is concentric with a long straight conductor carrying a direct current  $I$ . If the relative permeability  $\mu_r$  of soft-iron is 100, the ratio of the magnetic flux densities at two adjacent points located just inside and just outside the toroid, is

**Ans: Deleted**

Q53 The power factor in a transformer

**Ans: Depends on power factor of load.**

Q54. A salient pole synchronous motor is running at no load. Its field current is switched off. The motor will

**Ans: continue to run at synchronous speed.**

Q55. No-load current in a transformer

**Ans: lags behind the voltage by about  $75^\circ$**

Q56. In the transformer following winding has got more cross-section area

**Ans: low voltage winding**

Q57. The maximum efficiency of a distribution transformer is

**Ans: at 50 % full load and at 80% full load**

Q58. For a transformer, operating at constant load current, maximum efficiency will occur at

**Ans: unity power factor**

Q59. Which of the following protection is normally not provided on small distribution transformers?

**Ans: Buchholz relay**

Q60. When a synchronous motor is running at synchronous speed, the damper winding produces

**Ans: no torque.**

Q61. Maximum permissible earth resistance at large power stations is

**Ans: 0.5 ohm**

Q62. A 3-phase slip-ring induction motor is always started with a.

**Ans: full external resistance in rotor circuit**

Q63. The starting torque of the slip ring induction motor can be increased by

**Ans: adding resistance to the rotor**

Q64. Maximum permissible earth resistance for buildings is

**Ans: 8 ohms**

Q65. Filament lamps operate normally at a power factor of

**Ans: unity**

Q66. What percentage of the input energy is radiated by filament lamps?

**Ans: 10 to 15 percent**

Q67. Which of the following lamps is the cheapest for the same wattage?

**Ans: GLS lamp**

Q68. In the fluorescent tube circuit the function of choke is primarily to

**Ans: initiate the arc and stabilize it**

Q69. The function of capacitor across the supply to the fluorescent tube is primarily to

**Ans: improve the supply power factor**

Q70. The gas filled in vacuum filament lamps is

**Ans: none of the above**

Q71. Which of the following is present inside the fluorescent tube?

**Ans: mercury vapour**

Q72. The rating required for a DG set with 500 kW connected load and with diversity factor of 1.5, 80% loading and 0.8 power factor is

**Ans: 520 kVA**

Q73. Auxiliary power consumption of DG set at full load in its operating capacity is about \_\_\_\_\_.

**Ans: 1 - 2%**

Q74. The starting current value of DG set should not exceed\_% of full load capacity of DG set.

**Ans: 200**

Q75. The maximum permissible percentage unbalance in phase loads on DG sets is\_\_\_\_\_

**Ans: 10%**

Q76. The permissible percentage overload on DG sets for 1 hour in every 12 hours of operation is

**Ans: 10%**

Q77. Designed power factor of a DG set is generally at:

**Ans: 0.8**

Q78. Lower power factor of a DG set demands\_\_\_\_\_

**Ans: Higher excitation currents**

**Q79 Clearance of the lowest conductor (across the street) from the ground for HT lines should be**

**Ans: 20 ft.**

Q80. Motor output in HP=

**Ans: KW input x efficiency/0.746**

Q81. Power factor =

**Ans: True Power/Apparent power**

Q82. True power in three-phase circuit in Kilowatt is

**Ans:  $1.73 \times \text{volts} \times \text{amperes} \times \text{pf}/1000$**

Q83. Amperes drawn by single-phase motor are equal to

**Ans:  $\text{HP} \times 746 / (\text{Efficiency} \times \text{volts} \times \text{pf})$**

Q84. The emf induced in the primary of a transformer

**Ans: Lags behind the flux by 90 degrees and leads the flux by 90 degree**

Q85. The crawling in the induction motor is caused by

**Ans: flux wave produced by a stator winding is not pure sine wave**

Q86. It is advisable to avoid line starting of induction motor and use starter because

**Ans: motor take five to seven time its full load current**

Q87. If any two phases for an induction motor are interchanged

**Ans: the motor will run in reverse direction**

Q88. The power factor of an induction motor under no-load conditions will be closer to

**Ans: 0.2 lagging**

Q89. Size of a high speed motor as compared to low speed motor for the same H.P. will be

**Ans: smaller**

Q90. If the rotor circuit of a squirrel cage induction motor is open, the rotor will

**Ans: not run**

Q.91. The ABCD constants of a short transmission line are

**Ans:  $A=1, B=Z, C=0, D=1$**

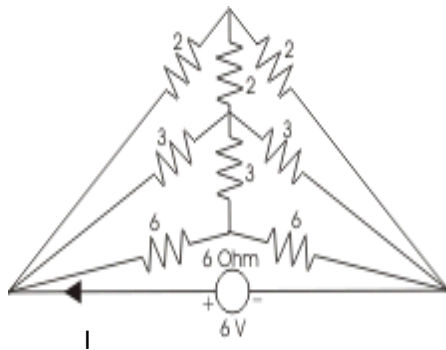
**Q.92. The ABCD parameters of medium length lines in Nominal-T configuration are:**

**Ans: Deleted**

Q93. The meter constant of a single phase 240 V induction watt hour meter is 400 revolutions per kWh. The speed of the meter disc for a current of 10 amperes of 0.8 power factor lagging will be

**Ans: 12.8 rpm**

Q94. Consider the following circuit. What is the value of current I in the circuit shown?



**Ans: 3 A**

Q95. A moving iron voltmeter is connected across the voltage source whose instantaneous value  $V(t) = 5 + 10\cos(314 + 30^\circ)$ . The reading of the meter is

**Ans:  $\sqrt{75}$  V**

Q96. The DC generator runs at a speed of 1000 rpm and flux per pole is 0.2 Wb, number of poles are 2, the winding is wave wound and having 480 conductors. The critical speed is 1200 rpm. Then the generated emf ( $E_g$ )

**Ans: 0 V**

Q.97. For a lossless line, the characteristic impedance of the line having  $L = 1.8$  mH and  $C = 0.02$   $\mu$ F will be:

**Ans: 300 ohm**

Q98. The synchronous speed for a 3 phase 6-pole induction motor is 1200 rpm. If the number of poles is now reduced to 4 with the frequency remaining constant, the rotor speed with a slip of 5% will be ?

**Ans: 1710 rpm**

**Q99.** The shaft output of a three-phase 60- Hz induction motor is 80 KW. The friction and windage losses are 920 W, the stator core loss is 4300 W and the stator copper loss is 2690 W. The rotor current and rotor resistance referred to stator are respectively 110 A and 0.15  $\Omega$ . If the slip is 3.8%, what is the percent efficiency?

**Ans: 87 %**

**Q100.** Three single-phase, 50 kVA, 2300/ 230 V, 60 Hz transformers are connected to form a 3-phase, 4000V / 230-V transformer bank. The equivalent impedance of each transformer referred to low-voltage is  $0.012 + j 0.016 \Omega$ . The 3-phase transformer supplies a 3-phase, 120 kVA, 230 V, 0.85 power-factor (lagging) load. Determine the primary voltage (line to line) required.

**Ans: 4000 V**

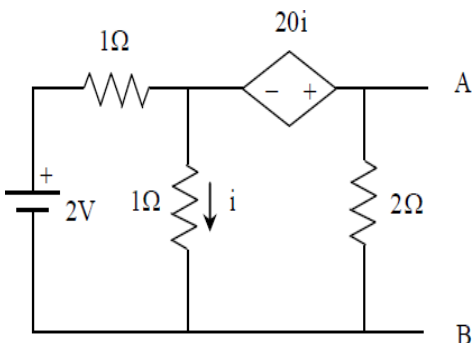
**Q101.** A 9-kVA, 208 V, 3-phase, Y-connected, synchronous generator has a winding resistance of 0.1 ohm per phase and a synchronous reactance of 5.6 ohms per phase. Determine the voltage generated (exciting emf) by the machine when it is delivering full-load at 0.8 power-factor lagging at rated voltage. Calculate the voltage regulation for rated load at 0.8 power-factor (leading).

**Ans: Deleted**

**Q102.** What is the distribution factor for a 108 slot, 12 pole, 3 -  $\Phi$  winding?

**Ans: 0.96**

**Q103.** For the given circuit the Thevenin equivalent is to be determined. The Thevenin voltage,  $V_{Th}$  (in volt), seen from terminal AB is ?



**Ans: 3.3 V**

Q.104. The expression of propagation constant of long transmission line is given by,

Ans:  $\gamma = \sqrt{yz}$

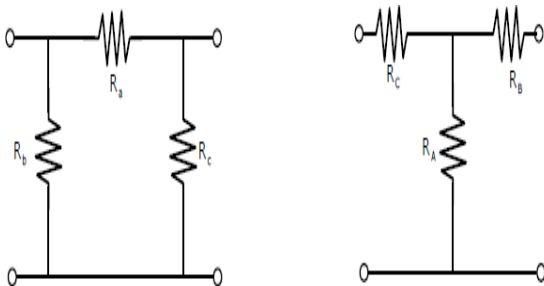
Q105. While measuring power of a three-phase balanced load by the two-wattmeter method, the readings are 100W and 250 W. The power factor of the load is?

Ans: **0.8**

Q106. Suppose that resistors  $R_1$  and  $R_2$  are connected in parallel to give an equivalent resistor  $R$ . If resistors  $R_1$  and  $R_2$  have tolerance of 1% each., the equivalent resistor  $R$  for resistors  $R_1=300\Omega$  and  $R_2 = 200\Omega$  will have tolerance of

Ans: **1 %**

Q107. Consider a delta connection of resistors and its equivalent star connection as shown below. If all elements of the delta connection are scaled by a factor  $k$ ,  $k>0$ , the elements of the corresponding star equivalent will be scaled by a factor of



Ans: **k**

Q108. The most accurate and versatile method of achieving reactive power compensation is by using

Ans: **fixed capacitor with controlled reactor**

Q109. Resonant converters are basically used to

Ans: **reduce the switching losses**



Q110. For a power system network with  $n$  nodes,  $Z_{33}$  of its bus impedance matrix is  $j0.5$  per unit. The voltage at node 3 is  $1.3 \angle 10^\circ$  per unit. If a capacitor having reactance of  $-j3.5$  per unit is now added to the network between node 3 and the reference node, the current drawn by the capacitor per unit is

Ans: Deleted

Q111 In a three phase transformer, if the primary side is connected in star and secondary side is connected in delta, what is the angle difference between phase voltage in the two cases.

Ans: Deleted

Q112. Determine the time of operation of a 1 A, 3s overcurrent relay having a Plug Setting of 125% and a Time Multiplier of 0.6. The supplying CT is rated 400 : 1A and the fault current is 4000 A.

Ans: Deleted

Q113. In a pure parallel LC circuit (shown in fig.) under resonance condition, current drawn from main supply is

Ans: Zero



Q.114. For inductance calculation, what will be the fictitious radius  $r'$  if conductor radius is  $r$ ,

Ans:  $r'=0.7788r$

Q115. A room heater of 2 kW, 125 V rating is to be operated on 230 V, 50 Hz, a.c. supply. the value of inductance, that must be connected in series with the heater so that heater will not get damaged due to over voltage is

Ans: 0.03 H

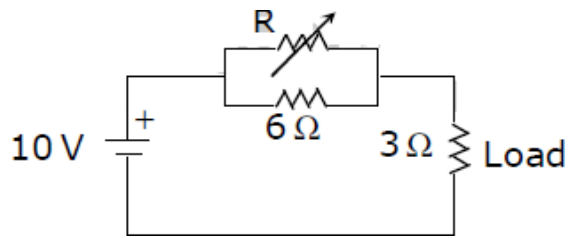
Q. 116. By using bundled conductors in transmission lines, the effective inductance and capacitance will respectively,

**Ans: decrease and increase**

Q.117. By increasing spacing between phase conductors, the line capacitance will,

**Ans: Decrease**

Q118. In the circuit given below, the value of R required for the transfer of maximum power to the load having a resistance of  $3\Omega$  is



**Ans: Zero**

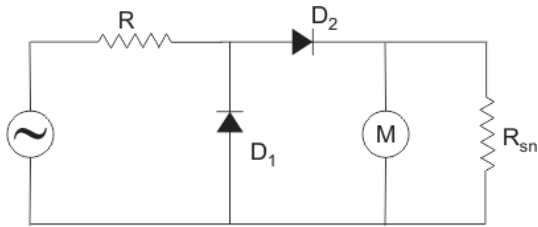
Q119. For enhancing the power transmission in along EHV transmission line, the most preferred method is to connect a

**Ans: Series capacitive compensator in the line**

Q120 How much power is developed when a hydro power plant operates under an effective head of 30 m and a discharge of  $40 \text{ m}^3/\text{S}$  .

**Ans: 11.77 MW**

Q121. In the multi-meter circuit shown in the figure for AC voltage measurement, the function of diode  $D_1$  is to



**Ans:** By pass reverse leakage current of  $D_2$  in the negative cycle of input.

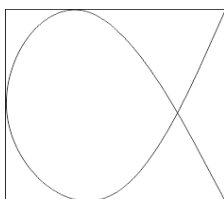
Q122. Consider the following statements in connection with measurement of temperature

- a). A thermistor is highly sensitive as compared with platinum resistance thermometer.
- b). The resistance of a thermistor is solely a function of its absolute temperature, whether the source of heat is external, internal or both.
- c). A thermistor has linear resistance temperature characteristic.
- d). More thermistors exhibit negative resistance temperature coefficient.

Which of these statements are correct?

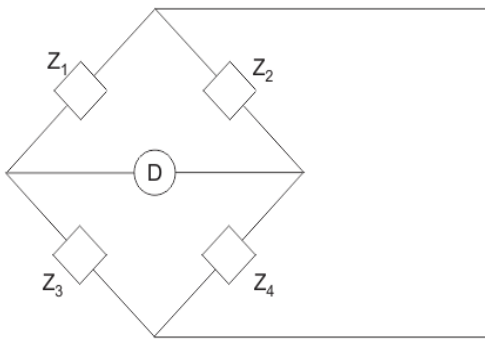
**Ans:** a, b and d.

Q123. A lissajous pattern, as in figure is observed on the screen of a CRO when voltage of frequencies  $f_x$  and  $f_y$  are applied to the 'X' and 'Y' plates respectively. Then  $f_x:f_y$  is equal to



**Ans:** 2:3

Q124. In figure  $Z_1 = 200\angle 60^\circ$  ohm.  $Z_2 = 400\angle -90^\circ$  ohm,  $Z_3 = 300\angle 0^\circ$ . Then  $Z_4$  for bridge to be balanced is



**Ans:  $600\angle -150^\circ$  ohm.**

Q125 A source  $V\cos 100\pi t$  has an internal impedance of  $(4 + j3)\ \Omega$ . If a purely resistive load connected to this source has to extract the maximum power out of the source, its value in  $\Omega$  should be

**Ans: 5**

Q126 A single-phase load is supplied by a single-phase voltage source. If the current flowing from the load to the source is  $10\angle 150^\circ$  A and if the voltage at the load terminals is  $100\angle 60^\circ$  V, then the

**Ans: load absorbs real power and absorbs reactive power.**

Q127 A single-phase transformer has no-load loss of 64 W, as obtained from an open-circuit test. When a short-circuit test is performed on it with 90% of the rated currents flowing in its both LV and HV windings, the measured loss is 81 W. The transformer has maximum efficiency when operated at

**Ans: 80.0% of the rated current.**

Q128 The flux density at a point in space is given by  $\mathbf{B} = k(4x\ \mathbf{ax} + 2ky\ \mathbf{ay} + 8\ \mathbf{az})$  Wb/m<sup>2</sup>. The value of constant  $k$  must be equal to

**Ans: -2**

Q129 Two wattmeter method is used for measurement of power in a balanced three-phase load supplied from a balanced three-phase system. If one of the wattmeters reads half of the other (both positive), then the power factor of the load is

**Ans: 0.866**

Q130 In a salient pole synchronous motor, the developed reluctance torque attains the maximum value when the load angle in electrical degrees is

**Ans: 45**

Q131. The advantage of a slip-ring induction motor over a squirrel cage induction motor is that

**Ans: it can be started with help of rotor resistance starter**

Q132. The value of average flux density in air gap in an induction motor, should be small

**Ans: to get good power factor**

Q133. A single-phase 100 kVA, 1000 V / 100 V, 50 Hz transformer has a voltage drop of 5% across its series impedance at full load. Of this, 3% is due to resistance. The percentage regulation of the transformer at full load with 0.8 lagging power factor is

**Ans: 4.8**

Q134. A separately excited dc motor has an armature resistance  $R_a = 0.05 \Omega$ . The field excitation is kept constant. At an armature voltage of 100 V, the motor produces a torque of 500 Nm at zero speed. Neglecting all mechanical losses, the no-load speed of the motor (in radian/s) for an armature voltage of 150 V is

**Ans: 600**

Q135. A  $1000 \times 1000$  bus admittance matrix for an electric power system has 8000 non-zero elements. The minimum number of branches (transmission lines and transformers) in this system are

**Ans: 3500**

Q136. A 0-1 Ampere moving iron ammeter has an internal resistance of 50 m $\Omega$  and inductance of 0.1 mH. A shunt coil is connected to extend its range to 0-10 Ampere for all operating frequencies. The time constant in milliseconds and resistance in m $\Omega$  of the shunt coil respectively are

**Ans: 2, 5.55**

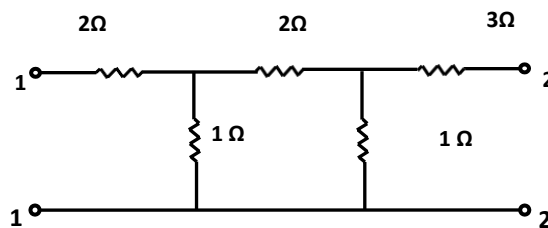
Q137. The per-unit power output of a salient-pole generator which is connected to an infinite bus, is given by the expression,  $P = 1.4 \sin \delta + 0.15 \sin 2\delta$ , where  $\delta$  is the load angle. Newton-Raphson method is used to calculate the value of  $\delta$  for  $P = 0.8$  pu. If the initial guess is  $30^\circ$ , then its value (in degree) at the end of the first iteration is

Ans: Deleted

Q138. A 3-phase 900 kVA, 3 kV / 1.732 kV ( $\Delta/Y$ ), 50 Hz transformer has primary (high voltage side) resistance per phase of  $0.3 \Omega$  and secondary (low voltage side) resistance per phase of  $0.02 \Omega$ . Iron loss of the transformer is 10 kW. The full load % efficiency of the transformer operated at unity power factor is

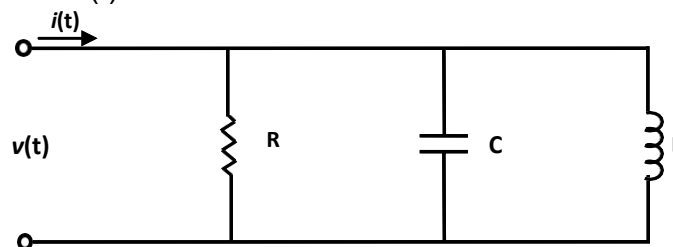
Ans: 97.20 to 97.55

Q139. The impedance parameters  $Z_{11}$  and  $Z_{12}$  of the two-port network in Fig. are



Ans:  $Z_{11}=2.7\Omega$  and  $Z_{12}=0.25\Omega$

Q140. The circuit shown in Fig, with  $R=1/3\Omega$ ,  $L=1/4H$ ,  $C=3F$  has input voltage  $v(t)=\sin 2t$ . The resulting current  $i(t)$  is



Ans:  $5 \sin (2t+53.1^\circ)$

**Q.141. The maximum sag of a conductor having span=200m and  $w=0.8\text{kg/m}$  for maximum allowable tension of 1600 kg will be,**

**Ans: Deleted**

Q142. A 200 V DC series motor, when operating from rated voltage while driving a certain load, draws 10 A current and runs at 1000 r.p.m. The total series resistance is  $1\ \Omega$ . The magnetic circuit is assumed to be linear. At the same supply voltage, the load torque is increased by 44%. The speed of the motor in r.p.m. (rounded to the nearest integer) is

**Ans: 823 to 827**

Q143. A power system has 100 buses including 10 generator buses. For the load flow analysis using Newton-Raphson method in polar coordinates, the size of the Jacobian is

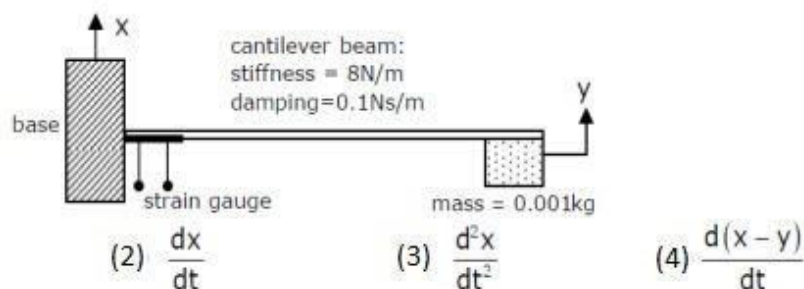
**Ans: 189 x 189**

**Q.144. Tellegens's theorem is applicable to**

**Ans: linear, non linear, passive or active and time invariant networks**

**Q145**

A strain gauge is attached on a cantilever beam as shown. If the base of the cantilever vibrates according to the equation  $x(t) = \sin \omega_1 t + \sin \omega_2 t$ , where  $2\text{rad/s} < \omega_1, \omega_2 < 3\text{rad/s}$  then the output of the strain gauge is proportional to



**Ans: Deleted**

Q146. The inductance and capacitance of a 400 kV, three-phase, 50 Hz lossless transmission line are  $1.6\ \text{mH/km/phase}$  and  $10\ \text{nF/km/phase}$  respectively. The sending

end voltage is maintained at 400 kV. To maintain a voltage of 400 kV at the receiving end, when the line is delivering 300 MW load, the shunt compensation required is

**Ans: inductive**

Q147. The damping factor of system is unity. The system is

**Ans: critically damped**

**Q148. A 50 MVA, 10 kV, 50 Hz, star-connected, unloaded three-phase alternator has a synchronous reactance of 1 p.u. and a sub-transient reactance of 0.2 p.u. If a 3-phase short circuit occurs close to the generator terminals, the ratio of initial and final values of the sinusoidal component of the short circuit current is**

**Ans: Deleted**

Q149. The direction of rotation of a single-phase capacitor run induction motor is reversed by

**Ans: interchanging the terminals of the auxiliary winding.**

Q.150. Calculate the string efficiency of 4-unit suspension insulator, if voltage across the bottom most unit is 30% of the total voltage,

**Ans: 83.33%**

**Sd/-  
Secretary.**