YEAR OF ADVT: 2018   DATE OF EXAM: 30-NOV-2024

89073

Booklet Serial No.

DO NOT BREAK THE SEAL OF THE BOOKLET UNTIL YOU ARE TOLD TO DO SO

QUESTION BOOKLET   SERIES : I

Subjects : General English, General Knowledge and Electrical Engineering

Full Marks : 300   **Time Allowed : 2½ Hours**

Read the following instructions carefully before you begin to answer the questions.

SEAL

INSTRUCTIONS TO CANDIDATES

1. This Booklet contains 150 Questions to be answered in a separate OMR Answer Sheet using Black Ballpoint Pen in the following three Parts :
   - Part—A : General English : 50 questions
   - Part—B : General Knowledge : 50 questions
   - Part—C : Electrical Engineering : 50 questions

2. **All** questions are compulsory.

3. You will be supplied the Answer Sheet separately by the Invigilator. You must complete the details of particulars asked for.

4. Answers must be shown by completely blackening the corresponding circles in the Answer Sheet against the relevant question number by Black Ballpoint Pen. OMR Answer Sheet without marking Series shall not be evaluated.

Example :

Suppose the following question is asked :

The Capital of Meghalaya is

(A) Guwahati

(B) Kohima

(C) Shillong

(D) Delhi

You will have four alternatives in the Answer Sheet for your response corresponding to each question of the Question Booklet as below :

(A) (B) (C) (D)
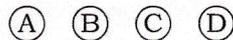
In the above illustration, if your chosen response is alternative (C), i.e., Shillong, then the same should be marked on the Answer Sheet by blackening the relevant circle with a Black Ballpoint Pen only as below :

(A) (B) ● (D)

The example shown above is the only correct method of answering.

5. Answer the questions as quickly and as carefully as you can. Some questions may be difficult and others easy. Do not spend too much time on any one question.

6. There will be NOT be any negative marking for wrong answers.

7. The Answer Sheet must be handed over to the Invigilator before you leave the Examination Hall.

8. No Rough Work is to be done on the Answer Sheet. Space for Rough Work has been provided in the Question Booklet.

PART—A : GENERAL ENGLISH

(*Marks* : 100)

Each question carries **2** marks

***Directions* : Fill in the blanks by choosing the correct options.**

1. He took off _____ coat and set to work.

   (A) a   (B) an

   (C) the   (D) his

2. You should change _____ wet shoes, or you'll catch another cold.

   (A) your   (B) my

   (C) her   (D) his

3. The barman seized the drunk by _____ collar.

   (A) an   (B) the

   (C) their   (D) his

4. Peter thinks that this is quite _____ cheap restaurant.

   (A) the   (B) their

   (C) a   (D) an

5. Someone threw _____ egg which struck the teacher on his shoulder.

   (A) an   (B) my

   (C) the   (D) a

6. Ask _____ woman in front of you for directions.

   (A) a   (B) an

   (C) the   (D) my

7. At most meetings, people vote by raising _____ right hands.

   (A) your   (B) my

   (C) her   (D) their

8. I have a stabbing pain in _____ shoulder.

   (A) my   (B) an

   (C) a   (D) their

9. She was on _____ knees, scrubbing the kitchen floor.

   (A) his   (B) her

   (C) your   (D) a

10. He pointed to a woman in _____ green dress.

    (A) an   (B) my

    (C) a   (D) your

11. (A) Acknowledgement

    (B) Aknowledgment

    (C) Aknowledgement

    (D) Acknoledgment

12. (A) Collaegue

    (B) Collegue

    (C) Colleague

    (D) Coleague

13. (A) Entrepeneur

    (B) Entrepreneur

    (C) Entreprenur

    (D) Entreperneur

14. (A) Licience

    (B) Lisence

    (C) License

    (D) Lisense

15. (A) Succesfull

    (B) Successful

    (C) Sucessful

    (D) Succesful

16. In one corner of the room

upon a shelf	elephant
P	Q

a small silver	stood
R	S

    (A) QSRP

    (B) PSRQ

    (C) RQSP

    (D) QPRS

17. One afternoon

on the floor	Jack	in the holidays
P	Q	R

was sitting
S

    (A) RSPQ

    (B) RPSQ

    (C) QRPS

    (D) RQSP

18. The highway man

behind the treetops
P

when the sun disappeared
Q

rode to the cottage
R

where his beloved lived
S

(A) RPSQ   (B) RQPS

(C) QRPS   (D) RSPQ

19. She sang

at U Soso Tham Auditorium
P

last night   beautifully
Q   R

in the concert
S

(A) PSQR   (B) QRSP

(C) RPQS   (D) RSQP

20. My Aunt

shuts out the world   who
P   Q

by closing her eyes   is a loner
R   S

(A) SPQR   (B) QSPR

(C) SQRP   (D) RPQS

Directions : **In the following questions, a word is given in capital letters followed by four alternative words or group of words. Select from the alternatives, the word or group of words that conveys the same meaning as the word given in capital letters.**

21. SHUN

(A) Destroy   (B) Weaken

(C) Avoid   (D) Include

22. ABET

(A) Force   (B) Discourage

(C) Assist   (D) Neglect

23. COLOSSAL

(A) Dangerous   (B) Gigantic

(C) Fatal   (D) Honourable

24. BOISTEROUS

(A) Boiling   (B) Hot

(C) Noisy   (D) Dangerous

25. UNDAUNTED

(A) Careless

(B) Not discouraged

(C) Worthless

(D) Prudent

26. He was not at all <u>abashed</u> by her open admiration.

    (A) delighted

    (B) piqued

    (C) embarrassed

    (D) livid

27. Nikita was amazed at how <u>affable</u> her new employer was.

    (A) demanding   (B) polite

    (C) repulsive   (D) class-conscious

28. Since our plans are <u>amorphous</u> we shall send you the detailed programme at a later date.

    (A) impractical   (B) prohibitive

    (C) inimical   (D) formless

29. Rahul's <u>arduous</u> efforts had sapped his energy.

    (A) overambitious

    (B) strenuous

    (C) sterile

    (D) apocryphal

30. The teacher's <u>articulate</u> explanation of the poem impressed his students.

    (A) well-prepared

    (B) effective

    (C) superficial

    (D) banal

31. INSOLENT

    (A) Sullen   (B) Rich

    (C) Determined   (D) Affable

32. ILLUSORY

    (A) Nimble   (B) Realistic

    (C) Powerful   (D) Underrated

33. CLANDESTINE

    (A) Above ground

    (B) Public

    (C) Cordial

    (D) Agile

34. SYCOPHANCY

    (A) Insult   (B) Appease

    (C) Magnify   (D) Overestimate

35. REPULSIVE

    (A) Inducive   (B) Dull

    (C) Attractive   (D) Attentive

36. He showed a marked antipathy to foreigners.

(A) Profundity

(B) Fondness

(C) Objection

(D) Willingness

37. The authorities took the corrective action with celerity.

(A) Reluctance

(B) Delay

(C) Promptness

(D) Lack of judgement

38. It seems churlish to refuse such a generous offer.

(A) Polite

(B) Wise

(C) Sensible

(D) Immature

39. A conscientious editor, Namrata, checked every definition for its accuracy.

(A) Novice

(B) Careless

(C) Unscientific

(D) Biased

40. Albert's craven refusal to join the protest was criticized by his comrades.

(A) Strategic

(B) Bold

(C) Diplomatic

(D) Well-thought

41. Man is still a/an _____ in the labour market.

(A) structure

(B) commodity

(C) monument

(D) accessory

42. The teacher _____ his students _____ being late to school.

(A) shouted, at

(B) reprimanded, for

(C) reminded, with

(D) narrated, of

43. Indians need sincere leaders, not people of _____ integrity.

(A) doubting

(B) doubtful

(C) doubtless

(D) double

44. In many ways, riding a bicycle is similar to _____.

(A) the driving of a car

(B) when you drive a car

(C) driving a car

(D) when driving a car

45. It costs about a thousand rupees to have a tooth _____.

(A) filling

(B) filled

(C) to fill

(D) fill

Directions : Each of the following sentences is divided into 3 (three) parts which are marked (A), (B), (C). One of these parts may contain an error or may not be acceptable in standard written communication. Mark that part as your answer. If there is no error, mark your answer as (D).

46. Janis had not forgotten
$\qquad$ (A)

the incident and could
$\qquad$ (B)

clear remember all the details.
$\qquad$ (C)

No error
(D)

47. If my father   will approve
(A)   (B)

I will go to America.   No error
(C)   (D)

48. One of the drawbacks
$\qquad$ (A)

of modern education are
$\qquad$ (B)

that it does not encourage original thinking.
$\qquad$ (C)

No error
(D)

49. Some people   consider wealth
(A)   (B)

superior than wisdom.   No error
(C)   (D)

50. The man disappeared
$\qquad$ (A)

after he has committed   a murder.
(B)   (C)

No error
(D)

PART—B : GENERAL KNOWLEDGE

(*Marks* : 100)

Each question carries **2** marks

51. Who among the following has become the fourth Indian to win a Grand Slam?

(A) Sania Mirza

(B) Rohan Bopanna

(C) Mahesh Bhupathi

(D) Leander Paes

52. Which of the following companies buys eBay's Indian operations?

(A) Flipkart

(B) Amazon

(C) Snapdeal

(D) Paytm

53. Which of the following is **not** a Baltic State?

(A) Estonia

(B) Latvia

(C) Belarus

(D) Lithuania

54. The Sabin Award is given for the conservation of

(A) amphibians

(B) reptiles

(C) birds

(D) corals

55. Objects at the surface of water can be viewed from a submarine under the water by using which instrument?

(A) Stethoscope

(B) Periscope

(C) Kaleidoscope

(D) Telescope

56. Greta Thunberg, the founder of 'school strike for climate', is from

(A) New Zealand

(B) Sweden

(C) Poland

(D) Canada

57. Which city under Smart Cities Mission has developed a mobile application called 'Saiyam' which aims at tracking home-quarantined people?

(A) Mumbai

(B) Pune

(C) Chennai

(D) Hyderabad

58. The Pulie Badze Wildlife Sanctuary, a natural habitat of grey-bellied tragopan, is located in which State?

(A) Mizoram

(B) Tripura

(C) Manipur

(D) Nagaland

59. Which Indian higher education institution has developed a seed ball named 'BEEG'?

(A) IIT Madras

(B) IIT Kanpur

(C) BITS

(D) NIT Trichy

60. Which American astronaut has recently set the record for the longest stay in space by a woman?

(A) Jessica Meir

(B) Anne McClain

(C) Nicole Aunapu Mann

(D) Christina Koch

61. Which type of animal is Stegodon, the fossil of which has been recently found in Uttar Pradesh?

(A) Turtle

(B) Elephant

(C) Lion

(D) Giraffe

62. Longleng and Chiulan are the names of which migratory bird recently mentioned by the Union Environment Ministry?

(A) Amur falcon

(B) Eurasian hobby

(C) Caspian hobby

(D) Spotted kestrel

63. Which of the following plants have respiratory roots?

(A) Marshy plants

(B) Mangroves

(C) Submerged hydrophytes

(D) Epiphytes

64. The death anniversary of which former Indian Prime Minister is observed as Anti-Terrorism Day?

(A) Rajiv Gandhi

(B) Indira Gandhi

(C) Atal Bihari Vajpayee

(D) Morarji Desai

65. As of 2020, the largest cricket stadium of the world is located in which country?

(A) Australia

(B) India

(C) South Africa

(D) New Zealand

66. WISPA is related to which of the following sports?

(A) Football

(B) Chess

(C) Cricket

(D) Squash

67. Entomology is the science that studies

    (A) the origin and history of technical and scientific terms

    (B) the behavior of human beings

    (C) the formation of rocks

    (D) insects

68. Which of the following places is known as the 'Mecca of Indian Football'?

    (A) Delhi

    (B) Mumbai

    (C) Kolkata

    (D) Chennai

69. The first Asian Games were held in

    (A) Manila

    (B) Tokyo

    (C) Jakarta

    (D) New Delhi

70. SAARC was founded in December 1985 in

    (A) New Delhi

    (B) Dhaka

    (C) Geneva

    (D) Thimphu

71. The first Defence Minister of India was

    (A) K. M. Cariappa

    (B) Gopalaswami Ayyangar

    (C) Baldev Singh Chokkar

    (D) Sardar Patel

72. Who was the Mughal Emperor to have lifted the 'Jaziya' on Hindus?

    (A) Babur

    (B) Akbar

    (C) Jahangir

    (D) Shah Jahan

73. Deficiency of which of the following vitamins causes the disease of slow blood clotting?

    (A) Vitamin C

    (B) Vitamin D

    (C) Vitamin E

    (D) Vitamin K

74. Which of the following places is famous for Chikankari work, which is a traditional art of embroidery?

    (A) Lucknow

    (B) Hyderabad

    (C) Jaipur

    (D) Mysore

75. During the era of industrialization, the workers of which country revolted against the exploitative industrialist, which led to the celebration of May Day?

    (A) France

    (B) Russia

    (C) United States

    (D) Germany

76. The Press Council of India is a

(A) profitable organization

(B) constitutional quasi-judicial body

(C) statutory quasi-judicial body

(D) None of the above

77. When metal reacts with dilute acid, which gas is formed?

(A) Carbon dioxide

(B) Helium

(C) Neon

(D) Hydrogen

78. Which type of forest among the following occupies the largest area in India?

(A) Tropical moist deciduous forest

(B) Tropical dry deciduous forest

(C) Tropical dry evergreen forest

(D) Montane dry temperate forest

79. Which of the following is a scalar quantity?

(A) Force

(B) Pressure

(C) Momentum

(D) Acceleration

80. Who is the head of the Goods and Services Tax (GST) Council?

(A) The RBI Governor

(B) The Union Finance Minister

(C) The Finance Commission Chairperson

(D) The NITI Aayog CEO

81. When the East India Company was formed, the Mughal Emperor in India was

(A) Jahangir

(B) Humayun

(C) Aurangzeb

(D) Akbar

82. Electric bulb filament is made of

(A) copper

(B) aluminum

(C) lead

(D) tungsten

83. Galileo was an Italian astronomer who

(A) developed the telescope

(B) discovered four satellites of Jupiter

(C) discovered that the movement of pendulum produces a regular time measurement

(D) All of the above

84. The Indian to beat the computer in mathematical wizardry is

(A) Ramanujan

(B) Rina Panigrahy

(C) Raja Ramanna

(D) Shakuntala Devi

85. Ashok Pandit is known for his outstanding performance in which field?

(A) Wrestling

(B) Kabaddi

(C) Shooting

(D) Swimming

86. Which one of the following Himalayan passes was reopened around the middle of the year 2006 to facilitate trade between India and China?

(A) Chang La

(B) Jara La

(C) Nathu La

(D) Shipki La

87. Which of the following tribes is **not** found in Central India?

(A) Gond

(B) Toda

(C) Bhil

(D) Munda

88. The capital of Lakshadweep is

(A) Port Blair

(B) Silvassa

(C) Aizawl

(D) Kavaratti

89. In February 2023, India's biggest helicopter manufacturing plant was inaugurated in which one of the following places?

(A) Chakeri, Uttar Pradesh

(B) Nasik, Maharashtra

(C) Tumakuru, Karnataka

(D) Coimbatore, Tamil Nadu

90. Which movement got the support of both Hindus and Muslims?

(A) Non-Cooperation Movement

(B) Quit India Movement

(C) Champaran Satyagraha

(D) Anti-Partition Movement

91. Sergio Ramos has announced his retirement from international football. Which of the following countries does he belong to?

(A) Morocco

(B) Spain

(C) Portugal

(D) Brazil

92. Which scheme was launched in 2015 to promote organic farming among small and marginal farmers?

(A) Pradhanmantri Kisan Vikas Yojana

(B) Paramparagat Krishi Vikas Yojana

(C) Organic Farming Mission

(D) Operation Green

93. M. Fathima Beevi has distinction of being the first lady as the

(A) Prime Minister

(B) Judge of District Court

(C) Chief Minister of State

(D) Judge of the Supreme Court

94. The Dronacharya Award is given to

(A) sportsmen

(B) coaches

(C) umpires

(D) sports editors

95. Which country is currently the largest producer of palm oil?

(A) Turkey

(B) Nigeria

(C) Malaysia

(D) Indonesia

96. After Jharkhand and Andhra Pradesh, which State has entered into uranium mining in India?

(A) Odisha

(B) West Bengal

(C) Rajasthan

(D) Karnataka

97. Scientists from which country have developed a new technology to filter microplastic from water?

(A) India

(B) South Korea

(C) Japan

(D) UAE

98. Which is the first National Park established in India?

(A) Velavadar National Park

(B) Periyar National Park

(C) Bandipur National Park

(D) Corbett National Park

99. 'Maya' is the world's first cloning of which animal?

(A) Wild Arctic wolf

(B) One-horned rhino

(C) Lion-tailed macaque

(D) Great Indian bustard

100. Asia's largest tulip garden opens for public in which State/UT?

(A) Sikkim

(B) Uttarakhand

(C) Jammu and Kashmir

(D) Assam

PART—C : ELECTRICAL ENGINEERING

(*Marks* : 100)

PAPER—I

(*Marks* : 50)

Each question carries **2** marks

101. The unit step signal $u[n] = 1$ for $n \geq 0$ has

   (A) finite energy and finite power

   (B) finite energy and infinite power

   (C) finite power and infinite energy

   (D) infinite energy and infinite power

102. Which impulse response condition determines the causality of the LTI system?

   (A) Only if the value of an impulse response is unity for all positive values of time

   (B) Only if the value of an impulse response is zero for all positive values of time

   (C) Only if the value of an impulse response is unity for all negative values of time

   (D) Only if the value of an impulse response is zero for all negative values of time

103. The LTI system defined by the input $x[n]$ and output $y[n]$ relation $y[n] = nx[n]$ is

   (A) linear, stable and time variance

   (B) linear, non-stable and time variance

   (C) non-linear, stable and time variance

   (D) linear, stable and time invariance

104. The LTI system defined by the input $x[n]$ and output $y[n]$ relation $y[n] = (x[n])^2$ is

   (A) invertible and memoryless

   (B) invertible and memory

   (C) non-invertible and memoryless

   (D) non-invertible and memory

105. The solid area through which all the power is radiated by the antenna is

   (A) aperture area

   (B) beam area

   (C) effective area

   (D) None of the above

106. If the distance between the transmitting and receiving antenna is decreased by a factor 2 while other factors remain same, then the new power received by the antenna

   (A) decreases by a factor 2

   (B) increases by a factor 2

   (C) increases by a factor 3

   (D) increases by a factor 4

107. The free-space loss factor is

(A) $\dfrac{\lambda}{4\pi r}$

(B) $\left(\dfrac{\lambda}{4\pi r}\right)^{1/2}$

(C) $\left(\dfrac{\lambda}{4\pi r}\right)^{2}$

(D) $\dfrac{\lambda}{(4\pi r)^{2}}$

108. An envelope detector works as

(A) coherent detector

(B) synchronous detector

(C) asynchronous detector

(D) None of the above

**109.** Which of the following oscillators is/are **not** used in frequency modulation?

(A) Hartley oscillator

(B) Crystal oscillator

(C) Colpitts oscillator

(D) All of the above

110. The type of error occurred in the process of analog-to-digital conversion is referred to as

(A) sampling error

(B) resolution error

(C) quantization error

(D) Nyquist error

111. The R-C circuit shown in the figure behaves like
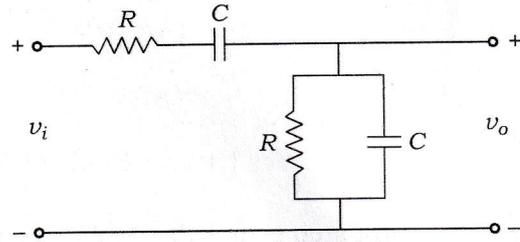
(A) a low-pass filter

(B) a band-pass filter

(C) a high-pass filter

(D) a band-reject filter

112. Which one of the following statements is incorrect regarding reciprocity theorem?

(A) It is applicable for single voltage source only.

(B) Initial conditions are assumed to be zero.

(C) There should not be any extra dependent or independent source in the network.

(D) It is applicable to the linear and unilateral networks only.

113. A series R-L-C circuit has inductance of 10 mH and resistance of 2 Ω. Assume the supply as 230 V, 1000 Hz. The maximum instantaneous energy stored in the inductor at resonance is

(A) 132·25 J

(B) 66·125 J

(C) 264·50 J

(D) 308·12 J

114. In a two-port network, the parameters are given as $Z_{11} = 2 \ \Omega$, $Z_{12} = Z_{21} = 5 \ \Omega$ and $Z_{22} = 1 \ \Omega$. The value of h_{12} is

(A) 5

(B) – 5

(C) 1/5

(D) – 1/5

115. Which of the following theorems enables a number of voltage sources to be combined directly into a single voltage source?

(A) Compensation theorem

(B) Reciprocity theorem

(C) Superposition theorem

(D) Millman's theorem

116. The relation of Parseval equality for a signal $x(t)$ and its Fourier transform $X(\omega)$ is

(A) $\int_{-\infty}^{\infty} |x(t)|^2 \, dt = \int_{-\infty}^{\infty} |X(\omega)|^2 \, d\omega$

(B) $\int_{-\infty}^{\infty} |x(t)|^2 \, dt = \frac{1}{\pi} \int_{-\infty}^{\infty} |X(\omega)|^2 \, d\omega$

(C) $\int_{-\infty}^{\infty} |x(t)|^2 \, dt = \frac{1}{2\pi} \int_{-\infty}^{\infty} |X(\omega)|^2 \, d\omega$

(D) $\int_{-\infty}^{\infty} |x(t)|^2 \, dt = \frac{1}{4\pi} \int_{-\infty}^{\infty} |X(\omega)|^2 \, d\omega$

117. The convolution value $y[n] = x[n] * h[n]$, where $x[n] = 0 \cdot 8^n \, u[n]$ and $h[n] = 0 \cdot 9^n \, u[n]$, is

(A) $y[n] = 9(0 \cdot 9)^n \, u[n] + 8(0 \cdot 8)^n \, u[n]$

(B) $y[n] = 8(0 \cdot 9)^n \, u[n] - 9(0 \cdot 8)^n \, u[n]$

(C) $y[n] = 9(0 \cdot 9)^n \, u[n] - 8(0 \cdot 8)^n \, u[n]$

(D) $y[n] = 8(0 \cdot 9)^n \, u[n] + 9(0 \cdot 8)^n \, u[n]$

118. What is the total average power P_{av} in the unit-amplitude square wave of period T and 50% duty cycle?

(A) $P_{av} = 0 \cdot 25$

(B) $P_{av} = 1$

(C) $P_{av} = 0 \cdot 57$

(D) $P_{av} = 0 \cdot 5$

119. Which of the following statements are correct?

Statement 1 : A signal with finite energy has zero power.

Statement 2 : A signal with finite energy has infinite power.

Statement 3 : A signal with finite power has zero energy.

Statement 4 : A signal with finite power has infinite energy.

(A) Statements 1 and 3

(B) Statements 1 and 4

(C) Statements 2 and 4

(D) Statements 2 and 3

120. A signal $m(t) = 5\cos(200\pi t)$ is used to modulate a carrier signal that produces an FM signal

$$10\cos[2\pi(10)^5 t + 15\sin(200\pi t)]$$

The approximate bandwidth of the FM signal would be

(A) 0·1 kHz

(B) 1·5 kHz

(C) 3·2 kHz

(D) 3 kHz

121. The bandwidth of R-L-C parallel circuit is independent of

(A) L

(B) R

(C) C

(D) None of the above

122. Which parameters represent the relationship between the input voltage and input current in a two-port network?

(A) Z-parameters

(B) H-parameters

(C) Y-parameters

(D) G-parameters

123. Which one of the following statements is incorrect?

(A) Ideal voltage sources of different values cannot be connected in parallel.

(B) Ideal current sources of different values cannot be connected in series.

(C) An ideal voltage source and an ideal current source cannot be connected in series.

(D) An ideal voltage source and an ideal current source can be connected in parallel.

124. The quality factor of the R-C parallel circuit is

(A) $Q = 1/(\omega CR)$

(B) $Q = \omega RC$

(C) $Q = \omega C/R$

(D) $Q = R/(\omega C)$

125. Two networks are set to be equal when

(A) their node equations are same

(B) their loop equations are same

(C) the loop equations of one network are analogous to the equations of the other

(D) the voltage sources of one network are analogous to the current sources of the other

126. The resistance of a conductor is given as $R\ \Omega$. If the diameter of the conductor is doubled and its length is halved, the new resistance will be

(A) $R/8\ \Omega$

(B) $R/2\ \Omega$

(C) $2R\ \Omega$

(D) $8R\ \Omega$

127. The equivalent resistance between two vertices along the face diagonal of a cube having resistance R in each branch is

(A) $3R/6$

(B) $3R/4$

(C) $5R/6$

(D) $5R/4$

128. The unit of resistivity is

(A) Ω

(B) Ω/m

(C) Ω-m

(D) Ω-m^2

129. The coefficient of coupling between two air core coils depends on

(A) self-inductance of two coils only

(B) mutual inductance and self-inductance of two coils

(C) mutual inductance between two coils only

(D) None of the above

130. The SI unit watt (W) can be represented as

(A) kg-m^2-s^{-2}

(B) kg-m^2-s^{-3}

(C) kg-m^{-2}-s^{-2}

(D) kg-m^2-s^3

131. Under no-load conditions, the transmission line carries a current because of

(A) heating effect

(B) transmission effect

(C) chemical effect

(D) capacitance effect

132. The dominant poles of a servo system are located at $s_1 = -2 - j2$ and $s_2 = -2 + j2$. The damping ratio of the system is

(A) 0·707

(B) 1·414

(C) 0·606

(D) 1·732

133. The type of the system for a feedback control system having transfer function

$$F(s) = \frac{2(s^2 + s + 1)}{s^3(s^2 + 2s + 1)}$$

is

(A) type–2 system

(B) type–3 system

(C) type–4 system

(D) type–5 system

134. The roots of the unity feedback system having open-loop transfer function

$$G(s) = \frac{1}{s^2 + 2s + 1}$$

are

(A) 1, 2

(B) 1, 3

(C) 1, 4

(D) 3, 4

135. The unity feedback system with open-loop transfer function

$$G(s) = \frac{K}{s(s + 1)(s + 2)}$$

has

(A) 1 valid branch of root locus

(B) 2 valid branches of root locus

(C) 3 valid branches of root locus

(D) 4 valid branches of root locus

136. The radar in which both transmission and reception are done using the same antenna is called

(A) dipole radar

(B) monostatic radar

(C) bistatic radar

(D) monopole radar

137. The device that converts a guided electromagnetic wave on a transmission line into a plane wave propagating in free space is

(A) radar antenna

(B) receiving antenna

(C) mixer antenna

(D) transmitting antenna

138. The area under load curve represents

(A) maximum demand

(B) average load

(C) load factor

(D) number of units generated

139. The _____ in GSM are intended to carry encoded speech or user data.

(A) noise channels

(B) traffic channels

(C) receiver channels

(D) transmitter channels

140. The full-scale output of a DAC is 10 mA. The minimum number of bits required to have resolution of 40 μA is equal to

(A) 5

(B) 6

(C) 7

(D) 8

141. A piezoelectric crystal has a Young's modulus of 130 GPa. The uniaxial stress that must be applied to increase its polarization from 500 to 520 cm^{-2} is

(A) 5·2 GPa

(B) 2·6 GPa

(C) 2·55 GPa

(D) 1·15 GPa

142. Two coupled coils have coefficient of coupling $K = 0·5$, primary turn $N_1 = 250$ turns, secondary turn $N_2 = 500$ turns and the mutual flux $= 0·7$ Wb. If the primary coil current is 70 A, then the primary coil self-inductance will be

(A) 1 H

(B) 2 H

(C) 3 H

(D) 5 H

143. The binary number $(011)_2$ is equivalent to _____ in octal system.

(A) $(0·50)_8$

(B) $(0·60)_8$

(C) $(0·70)_8$

(D) $(0·80)_8$

144. A three-phase synchronous generator with constant steam input supplies power to an infinite bus at a lagging power factor. If the excitation is increased, then

(A) both power angle and power factor decrease

(B) both power angle and power factor increase

(C) the power angle decreases while the power factor increases

(D) the power angle increases while the power factor decreases

145. For a slip-ring induction motor, if the rotor resistance is increased, then the

(A) starting torque decreases but efficiency increases

(B) starting torque and efficiency increase

(C) starting torque increases but efficiency decreases

(D) starting torque and efficiency decrease

146. Reversing the direction of rotation of split-phase induction motor is done by

1. reversing the terminal of main winding

2. reversing the terminal of starting winding

Which of the above is/are correct?

(A) 1 only

(B) 2 only

(C) Neither 1 nor 2

(D) Both 1 and 2

147. When a d.c. series motor drives a load, the motor is unsaturated and the load torque is proportional to the square of speed. For a speed of 500 r.p.m., the motor line current is 25 A. What would be the line current if the speed is 900 r.p.m.?

(A) 40 A

(B) 45 A

(C) 50 A

(D) 20 A

148. A transformer designed for operation of 60 Hz supply is working on 50 Hz supply without changing its voltage and current ratings. When compared with full efficiency at 60 Hz, the transformer efficiency on the full load at 50 Hz will

(A) increase by a factor of 2

(B) increase marginally

(C) remain unaltered

(D) decrease marginally

149. Consider the following statements about torque in a stepper motor :

1. Residual torque is maximum of the static torque with the phase winding unexcited.

2. Holding torque is maximum torque produced by the stepper motor at standstill.

Which of the above statements is/are correct?

(A) 1 only

(B) 2 only

(C) Neither 1 nor 2

(D) Both 1 and 2

150. Crawling in an induction motor is due to

(A) slip-ring rotor

(B) time harmonics in supply voltage

(C) space harmonics

(D) insufficient starting torque