		PARTICULARS TO BE FILLED IN BY THE CANDIDATE	
1390575		Name of the Candidate	
		Roll Number	
Paper Code	XBEE/139	Application Number	
		Name of the Centre	
Question Booklet Number	**1390575**	Centre Code	
		Date of the Test	
Question Paper Series	A	Signature of the Candidate	

Maximum Marks: 100   Test Duration: 02 hours

INSTRUCTIONS

- Complete all entries on the cover page and put your signature in the space provided.

- Use only Ball Point Pen (black / blue) for making entries in the Question Booklet and the OMR Answer Sheet.

1. The Question Booklet consists of **16** pages and contains **100** multiple choice questions (MCQs). Count the number of pages and questions before attempting the questions. Discrepancy, if any, must immediately be brought to the notice of the Invigilator.

2. The Test duration as specified above shall be reckoned from the moment of distribution of the Question Booklets.

3. Blank space in the Question Booklet may be used for rough work.

4. Each MCQ is followed by four alternative answers. Select only one answer, which you consider as the most appropriate. Shade the relevant circle against the corresponding question number on the OMR Answer Sheet. Selecting more than one answer for a question, even if one of the selected answers is correct, would result in its being treated as an incorrect answer.

5. Answers for MCQs should ONLY be marked on the OMR Answer Sheet. No answer should be written/marked on the Question Booklet.

6. The candidate is required to separate the original OMR Answer Sheet and its carbonless copy at the perforation carefully after the Admission Test. He / She shall hand over the original OMR Answer Sheet and Admit Card to the Invigilator before leaving his/her seat and take with him/her the carbonless copy of the OMR Answer Sheet and the Question Booklet.

7. Failure to handover the original OMR Answer Sheet will lead to cancellation of the candidature.

1. A PMMC voltmeter is connected across a series combination of a DC voltage source $V_1 = 5$ Volt and AC voltage source $V_2(t) = 3 \sin(314t)$ volt. The meter reading would be :

   (a) 5 Volt   (b) 15 Volt

   (c) $\left(5 + \frac{\sqrt{3}}{2}\right)$ Volt   (d) $\frac{\sqrt{34}}{2}$ Volt

2. Kelvin's double bridge method is used for the measurement of

   (a) Low value capacitance   (b) Low resistance

   (c) High value capacitance   (d) High value resistance

3. Electrodynamic type instruments can be used as

   (a) Ammeter   (b) Voltmeter

   (c) Wattmeter   (d) All of the above

4. The moving coil in a dynamometer wattmeter is connected

   (a) In series with the fixed coil   (b) Across the supply

   (c) In series with the load   (d) Across the load

5. In a Cathode Ray Oscilloscope, linear sweep is applied at the

   (a) Horizontal plates   (b) Vertical plates

   (c) Nether at the vertical or horizontal plates   (d) Both horizontal and vertical plates

6. The Linear Variable Differential Transformer / Transducer is

   (a) Resistive Transducer   (b) Capacitive Transducer

   (c) Inductive Transducer   (d) Resistive / capacitive Transducer

7. Transient performance of a plant can be improved by :

   (a) ON-OFF Controller   (b) Proportional Controller

   (c) Derivative Controller   (d) Integral Controller

8. The polar plot is often called

   (a) Bode plot   (b) Nichols plot

   (c) Inverse polar plot   (d) Nyquist plot

9. In Bode plot, for the system to be stable the gain cross-over frequency is less than the phase cross-over frequency, the gain margin and phase margin

   (a) both the negative

   (b) gain margin is positive and phase margin is negative

   (c) phase margin is positive and gain margin is negative

   (d) both are positive

10. The response of the first le system to a unit impulse function is represented by the mathematical equation as :

   (a) $c(t) = 1 - e^{-t/T}$ (b) $c(t) = \frac{1}{T} e^{-t/T}$

   (c) $c(t) = 1 - T e^{-t/T}$ (d) $c(t) = t - T + T e^{-t/T}$

P.T.O.

11. Thermistor is a transducer. Its temperature coefficient is

(a) Zero

(b) Positive

(c) Negative

(d) May be positive or negative depending on temperature range

12. A second order system is critically damped, when damping ratio (ξ) :

(a) $\xi = 1$

(b) $\xi < 1$

(c) $\xi > 1$

(d) $\xi = 0$

13. The scale of an instrument is uniform. Its type is

(a) Moving Iron

(b) Moving coil (PMMC)

(c) Induction

(d) Dynamometer

14. The bridge method commonly used for the measurement of mutual induction is :

(a) Wien Bridge

(b) Schering Bridge

(c) De Sauty Bridge

(d) Heaviside Campbell Bridge

15. The minimum number of Wattmeter(s) used for the measurement of 3-phase 3-wire balanced ffor unbalanced power is

(a) 1

(b) 2

(c) 3

(d) 4

16. The pressure coil of dynamometer type Wattmeter is

(a) Highly inductive

(b) Highly resistive

(c) Purely resistive

(d) Purely inductive

17. An Analog voltmeter was external multiplier settings. With a multiplier setting of 20kΩ, it reads 440V and with multiplier setting of 80kΩ it reads 352 V. For a multiplier setting of 40 kΩ the voltmeter reads

(a) 371 V

(b) 383 V

(c) 394 V

(d) 406 V

18. For the system $\frac{2}{(S+1)}$, the approximate time taken for a step response to reach 98% of its final value is

(a) 1(s)

(b) 2(s)

(c) 4(s)

(d) 8(s)

19. A system is said to be a stable system if the poles of system lies in

(a) Left Half of S plane

(b) Right Half of S plane

(c) Imaginary jw axis of S plane

(d) Right Half and imaginary jw axis of S plane

20. The transfer function of a system is given as

$$H(S) = \frac{100}{S^2 + 20S + 100}$$

The system is

(a) An over damped system

(b) An under damped system

(c) A critically damped system

(d) An unstable system

21. If $(234)_x = (123)_{10}$ then the value of X is

(a) 7

(b) 2

(c) 8

(d) 16

22. The 2s complement of binary number 0000 is

(a) 1111

(b) 0000

(c) 0101

(d) 1010

23. Assuming the diode to be ideal, the current flowing through the 5kΩ resistance in Figure is
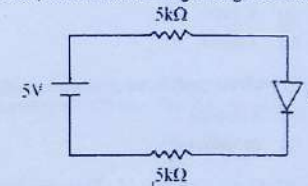
(a) 0.5 mA

(b) 2 mA

(c) 0.25 mA

(d) 1 mA

24. A special purpose diode which uses metals like gold, silver or platinum on one side of the junction, n type doped silicon on another side and has almost no charge storage in the junction is a

(a) Schottky diode

(b) Zener diode

(c) Varactor diode

(d) Tunnel diode

25. For a BJT connected in common base configuration : $I_E = 2$ mA, $I_B = 20\mu A$, the value of α is

(a) 0.5

(b) 0.99

(c) 0.25

(d) 0.75

26. Which of the following relationship between α and β is incorrect.

(a) $1 - \alpha = \frac{1}{1+\beta}$

(b) $\alpha = \frac{\beta}{1+\beta}$

(c) $\alpha = \frac{\beta}{1-\beta}$

(d) $\beta = \frac{\alpha}{1-\alpha}$

27. The man purpose of modulation is to

(a) produce sidebands

(b) transmit low-frequency information over long distances efficiently

(c) achieve wave shaping of carrier wave

(d) combine two waves of different frequencies

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P.T.O.

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28. In the following op-amp circuit the value of V_o is
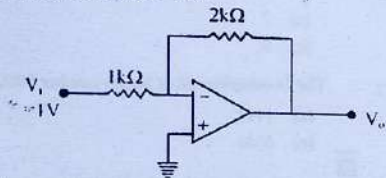
(a) $+2V$ (b) $-2V$

(c) $3V$ (d) $-3V$

29. The feedback path in an op-am integration consists of

(a) a resistor   (b) a capacitor

(c) an inductor   (d) a capacitor in series with a resistor

30. When an input voltage of $+2V$ is applied to an op-amp having $Av = 10^6$ and bias supply of $\pm15V$ the output voltage will be

(a) $15V$ (b) $10^6 V$

(c) $2\times10^6 V$ (d) $15\,\mu V$

31. When the relative permeability of a material is slightly less than 1, it is called a

(a) Paramagnetic material   (b) Ferromagnetic material

(c) Diamagnetic material   (d) Magnetic material

32. A tiny particle carrying a charge of 0.3 col. is accelerated through a potential difference of 100V. The kinetic energy acquired by the particle is

(a) $10J$ (b) $90J$

(c) $30J$ (d) $9J$

33. Which of the following laws do not form a Maxwell equation

(a) Planck's Law   (b) Gauss Law

(c) Faraday's Law   (d) Ampere's Law

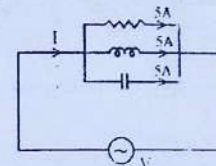34. Which of the following is the expression for Lorentz force

(a) qE (b) $q.(v\times B)$

(c) $m.a. + q.E.$ (d) $qE + q.(v\times B)$

35. Tick the correct Maxwell equation

(a) $\nabla \times D = \rho_v$ (b) $\nabla \times B = \rho_v$

(c) $\nabla \cdot B = 0$ (d) $\nabla \cdot E = \dfrac{-\partial B}{\partial t}$

36. Current (I) supplied by source is

(a) 15 Amp   (b) 5 Amp

(c) 10 Amp   (d) Zero Amp

37. Two identical coils coupled in series, the inductance measured is 80 mH (combination). The connection of one of the coil is reversed and the measured inductance value is now 20mH. The value of inductance of the coils are

(a) $20\,mH$ (b) $80\,mH$

(c) $25\,mH$ (d) $100\,mH$

38. Mutual inductance between two coils is 8H. If the current in one of the coil changes at a rate of 2A/sec, then emf induced in other coil is

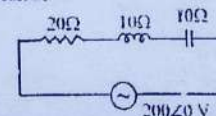(a) $16V$ (b) $8V$

(c) $2V$ (d) $32V$

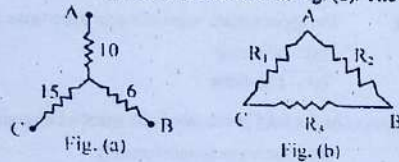39. The voltage applied to the circuit is
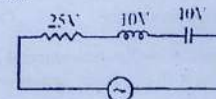
(a) $45V$ (b) $25V$

(c) $75V$ (d) $22.5V$

40. The power loss in the shown circuit is.
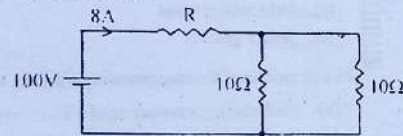

(a) $2\,KW$ (b) $1\,KW$

(c) $500\,W$ (d) $4\,KW$

41. The delta equivalent of star connected resistors is shown in Fig. (b). The value of R_1, R_2, R_3 are
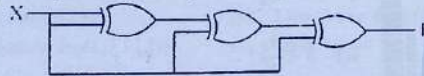

Fig. (a) Fig. (b)

(a) 20, 30, 50
(b) 50, 20, 30
(c) 4.8, 1.9, 2.9
(d) 30, 50, 20
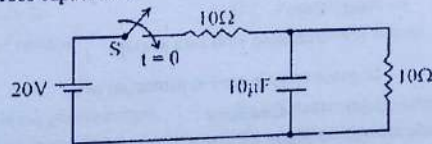
42. In the figure given below the value of R is

(a) 2.5 Ω
(b) 5.0 Ω
(c) 7.5 Ω
(d) 10.0 Ω

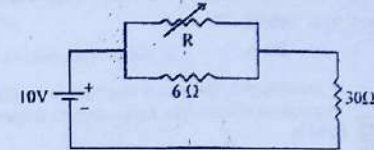**43.** For the circuit shown, the output F is given by

(a) $F = X$
(b) $F = \overline{X}$
(c) $F = 1$
(d) $F = 0$

44. In the given figure, the initial capacitor voltage was zero. The switch is closed at $t = 0$. The final steady state voltage across capacitor is

(a) 20 V
(b) 10 V
(c) 5 V
(d) 0 V

45. In the circuit given below, the value of R required for the transfer of maximum power to the load having a resistance of 30 Ω is

(a) Zero
(b) 30 Ω
(c) 6 Ω
(d) Infinite

46. Calculate the voltage induced in the armature winding of a 4-pole, lap-wound dc machine having 750 active conductors and running at 1500 rpm. The flux per pole is 30 mWb.

(a) 327.6 V
(b) 504.4 V
(c) 562.5 V
(d) 650 V

47. What is the phase difference between the output and corresponding input line voltage of the three-phase star-delta connection of a transformer

(a) 45°
(b) 60°
(c) 90°
(d) 30°

48. Which of the following motor has a good speed regulation from no load to full load

(a) DC shunt motor
(b) DC series motor
(c) Differential Compound DC motor
(d) Stepper motor

49. At 90° angle, the developed power by synchronous motor is

(a) zero
(b) maximum
(c) minimum
(d) constant

50. A 220 V dc machine supplied 10A at 205 V as a generator. The armature resistance is 0.5 ohm. If the machine is now operated as a motor at same terminal voltage and current but with the flux increased by 10%, then the ratio of motor speed to generator speed is

(a) 0.86
(b) 0.95
(c) 0.96
(d) 1.06

51. What is the back emf, for maximum power developed if the applied voltage to a dc machine is 250 V.

(a) 230 V
(b) 250 V
(c) 500V
(d) 125 V

52. In a dc shunt machine, the inter pole winding should be connected in

(a) series with the armature winding
(b) series with the field winding
(c) parallel with the armature
(d) parallel with the field winding

53. Three phase synchronous motor drawn 200 A from the lines at unity power factor (UPF) at rated load. Considering the same line voltage and load, the line current at power factor of 0.5 leading is

(a) 400 A
(b) 300 A
(c) 200 A
(d) 100 A

54. A four (4) pole induction machine is working as n induction generator, the generator supply frequency is 60 Hz. The motor current frequency is 5 Hz. The mechanical speed of the motor in RPM is

(a) 1350
(b) 1650
(c) 1950
(d) 2250

55. In traction applications, why DC motors are used

(a) The speed is inversely proportional to the torque and the torque is proportional to square of armature current
(c) Torque is proportional to armature current
(b) Torque is proportional to square root of armature current
(d) Torque and speed are inversely proportional to armature current

56. The ratio of back emf to the applied voltage is 0.5, then the mechanical power developed by the shunt motor will be

(a) minimum
(b) maximum
(c) zero
(d) constant

57. How many field winding s are there in compound wound generator

(a) one
(b) two
(c) th...
(d) four

58. By changing the excitation of the synchronous generator which power will be delivered

(a) Active power
(b) Apparent power
(c) Reactive power
(d) both (a) and (b)

59. The armature copper loss in DC machine is also known as

(a) Variable loss
(b) Iron loss
(c) Friction and windage loss
(d) shunt field loss

60. A delta connected, 3.7 KW, 400A (line), three phase, 4-pole, 50Hz squirrel cage induction motor has the following equivalent circuit parameter per phase referred to the stator, $R_1 = 5.39\ \Omega$, $R_2 = 5.72\ \Omega$, $X_1 = X_2 = 8.22\ \Omega$. Neglect shunt branch in the equivalent circuit, the starting line current in ampere (round off to two decimal places) when it is connected to a 100V (line), 10Hz, three phase AC source is

(a) 14.95 A
(b) 16.32 A
(c) 20.9 A
(d) 7.3 A

61. 6-pole, 50 Hz, 3-phase induction motor runs at full load to develop a useful torque of 160 N-m with rotor emf making 120 complete cycles per minute. The motor develops out put shaft power of :

(a) 20.08 kW
(b) 16.08 kW
(c) 18.03 KW
(d) 15.02 kW

62. The approximate value of surge impedance for overhead lines is

(a) 40 ohms
(b) 100 ohms
(c) 300 ohms
(d) 400 ohms

63. As the load is increased, the speed of a dc shunt motor

(a) increases proportionately
(b) remains constant
(c) increases slightly
(d) decreases slightly

64. The process of achieving uniformity in the dielectric stress by using layers of different dielectrics is known as

(a) induction grading
(b) capacitance grading
(c) power grading
(d) insulation grading

65. In a dc machine, the compensating winding serves the purpose of

(a) neutralizing armature mmf
(b) reducing critical resistance of field
(c) increasing number of poles
(d) providing mechanical balance to ro...

66. Condition for operation of a definite-distance relay is given as

(a) $Z < \dfrac{k_2}{k_1}$
(b) $Z < \sqrt{\dfrac{k_2}{k_1}}$
(c) $Z < \dfrac{k_1}{k_2}$
(d) $Z < \sqrt{\dfrac{k_1}{k_2}}$

Where, Z is the impedance of protected zone k_1 and k_2 are the constants dependent upon voltage and current actuated electromagnets of the relay

67. Total Instantaneous power supplied by a 3-phase ac supply to a balanced R-L load is

(a) Zero
(b) Constant
(c) Pulsating with zero average
(d) Pulsating with non-zero average

68. Distance relay is used in protection of :

(a) D.C. Generator
(b) Transmission line
(c) 3-phase Induction motor
(d) Synchronous Machin

69. Buchholz Relay is used for protection of

(a) Bus Bars
(b) Transformer
(c) Turbines
(d) Alternators

70. The transmission line distance protection relay having the property of being inherently directional is

(a) impedance relay
(b) MHO relay
(c) OHM relay
(d) Reactance relay

71. For an induction motor, operating at a slip s, the ratio of gross power output to air gap power is equal to

    (a) $(1-s)^2$

    (b) $(1-s)$

    (c) $\sqrt{(1-s)}$

    (d) $\sqrt{1-\sqrt{s}}$

72. In a single phase induction motor driving a fan load, the reason having a high resistance rotor is to achieve

    (a) Low starting torque

    (b) Quick Acceleration

    (c) High efficiency

    (d) Reduced size

73. An ideal op-amp which is not true :

    (a) Infinite A_v

    (b) Infinite R_i

    (c) Infinite R_0

    (d) Infinite R_o

74. The transfer function of a linear system is the

    (a) ratio of the derivative of the output and input

    (b) ratio of the output and input

    (c) ratio of the Laplace transform of the output and input with all initial conditions zero

    (d) None

75. The most common type of fault which occurs in overhead transmission line is

    (a) Line to ground fault (LG)

    (b) Line to line fault (LL)

    (c) Triple line to ground fault (LLLG)

    (d) Open circuit fault

76. Number of covalent bonds present in butane are

    (a) 10

    (b) 11

    (c) 12

    (d) 13

77. PAN, a secondary pollutant is known as

    (a) Peroxy acrylonitrile

    (b) Peracetyl nitrate

    (c) Perhydroxyacyl nitrate

    (d) Peroxyacyl nitrate

78. The corrosion is

    (a) An electrochemical phenomenon

    (b) An electrolytic phenomenon

    (c) A decomposition phenomenon

    (d) A displacement phenomenon

79. Which of the following is not an alloy of copper ?

    (a) Brass

    (b) German silver

    (c) Bronze

    (d) Solder

80. $1°Fr$ is equal to

    (a) 100 ppm

    (b) $0.7°$ Cl

    (c) 0.02 meq/L

    (d) 1 mg/L

81. A pH value less than 5 represent

    (a) Acidic condition

    (b) Neutral condition

    (c) Basic condition

    (d) Slightly basic condition

82. The calorific value and hardness is highest in

    (a) Peat

    (b) Lignite

    (c) Bituminous Coal

    (d) Anthracite

83. Dacron is formed by condensation polymerization of

    (a) Terephthalic acid dichloride and 1,3-diamino benezene

    (b) Butadiene and sytrene

    (c) Hexamethylenediamine and adipic acid

    (d) Ethylene glycol and Terephthalic acid

84. Rate of corrosion is highest in

    (a) Mg

    (b) Zn

    (c) Ag

    (d) Pt

85. The critical angle of a certain medium is $\sin^{-1}(3/5)$. The polarising angle of the radium is

    (a) $\sin^{-1}(4/5)$

    (b) $\tan^{-1}(5/3)$

    (c) $\tan^{-1}(3/4)$

    (d) $\tan^{-1}(4/3)$

86. Two 1000 W heater when connected in parallel across 220V supply produce heat H_p in time t. If they are connected in series across the some power supply the heat produced in the same time is H_s. What is (H_p/H_s) ?

    (a) 0.25

    (b) 4

    (c) 0.5

    (d) 2

87. The half life of a radioactive substance is 140 days. After how much time 15 gm will decay from its 16 gm sample ?

    (a) 120 days

    (b) 240 days

    (c) 380 days

    (d) 560 days

88. The displacement y (in cm) produced by a simple harmonic wave is given by

    $$y = \left(\frac{10}{\pi}\right)\sin 2000\left(\pi t - \frac{\pi x}{17}\right)$$

    The periodic time maximum velocity of the particle is the medium will respectively be

    (a) 10^{-3} sec and 330 m/s

    (b) 10^{-4} sec and 20 m/s

    (c) 10^{-3} sec and 200 m/s

    (d) 10^{-2} sec and 2000 cm/s

89. A particle executes S.H.M. of amplitude A. If T_1 and T_2 are the time taken by the particle to traverse from 0 to $\frac{A}{2}$ and from $\frac{A}{2}$ to A respectively, then $\left(\frac{T_1}{T_2}\right)$ will be equal to

(a) 1

(b) $\frac{1}{2}$

(c) $\frac{1}{4}$

(d) 2

90. The energy of a system is 81 J. The units of force and length are made three times of their initial values. The energy of the system in new units will become

(a) 9

(b) 81

(c) 243

(d) 729

91. Determine the current I for the given network
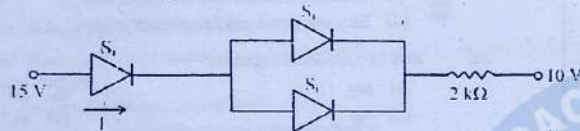
(a) 1.4 mA

(b) 2.0 mA

(c) 1.8 mA

(d) 2.4 mA

92. If the work done in blowing a soap bubble of volume V is W, then the work done in blowing a soap bubble of volume 2V will be

(a) W

(b) 2W

(c) $\sqrt{2}$W

(d) $(4)^{1/3}$ W

93. The value of $\cos 10^\circ + \cos 110^\circ + \cos 130^\circ$ is

(a) 0

(b) 1

(c) 2

(d) 3

94. The polar form of the complex number $\frac{-16}{1+i\sqrt{3}}$ is

(a) $8\left(\cos\frac{2\pi}{3} - i\sin\frac{2\pi}{3}\right)$

(b) $8\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$

(c) $8\left(\cos\frac{\pi}{6} - i\sin\frac{\pi}{6}\right)$

(d) $8\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$

95. If the sum of an infinite geometric series is 15 and the sum of the squares of these terms is 45, then the series :

(a) $5 + \frac{10}{3} + \frac{20}{9} + \frac{40}{27} + \cdots$

(b) $1 + \frac{5}{3} + \frac{10}{9} + \frac{20}{27} + \cdots$

(c) $10 + 5 + \frac{5}{2} + \frac{5}{4} + \cdots$

(d) $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \cdots$

96. If Z_1 and Z_2 are complex numbers such that $\left|\frac{Z_1 - 3Z_2}{3 - Z_1\bar{Z_2}}\right| = 1$ then $|z_2| \neq 1$ then $|z_1|$ is

(a) 3

(b) −3

(c) 3i

(d) −3i

97. If $\vec{a}$ is any vector, then the value of $\hat{i} \times (\vec{a} \times \hat{i}) + \hat{j} \times (\vec{a} \times \hat{j}) + \hat{k} \times (\vec{a} \times \hat{k})$ is

(a) $\vec{a}$

(b) $2\vec{a}$

(c) $3\vec{a}$

(d) 0

98. If the vectors $\vec{a}, \vec{b}, \vec{c}$ are the coplanar, then the scalar triple product $[\vec{a} + \vec{b}, \ \vec{b} + \vec{c}, \ \vec{c} + \vec{a}]$ is equal to

(a) 0

(b) $\vec{a} + \vec{b} + \vec{c}$

(c) $2(\vec{a} + \vec{b} + \vec{c})$

(d) None of these

99. If $y = \sqrt{\frac{x}{a}} + \sqrt{\frac{a}{x}}$, then $\frac{dy}{dx}$ at $x = a$, is

(a) 0

(b) $\frac{1}{2}$

(c) $\sqrt{a}$

(d) $\sqrt{2a}$

100. The value of $\lim\limits_{x \to \infty} 2^{x-1} \tan\left(\frac{a}{2^x}\right)$ is equal to

(a) $\frac{1}{2}$

(b) $\frac{a}{2}$

(c) a

(d) 2a

ALIGARH COACHING CENTRE
An Institute of Science & Commerce

ALIGARH MUSLIM UNIVERSITY, ALIGARH
Answer Key BE (ELECTRICAL) Admission Test 2020-21
SERIES: A

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer
1	A	41	B	81	A
2	B	42	C	82	D
3	D	43	D	83	D
4	B	44	B	84	A
5	A	45	A	85	B
6	C	46	C	86	B
7	C	47	D	87	D
8	D	48	A	88	C
9	D	49	B	89	B
10	B	50	A	90	A
11	C	51	D	91	C
12	A	52	A	92	D
13	B	53	A	93	A
14	D	54	C	94	B
15	B	55	A	95	A
16	B	56	B	96	A
17	D	57	B	97	B
18	C	58	C	98	A
19	A	59	A	99	A
20	C	60	A	100	B
21	A	61	B		
22	B	62	D		
23	A	63	D		
24	A	64	B		
25	B	65	A		
26	C	66	B		
27	B	67	B		
28	B	68	B		
29	B	69	B		
30	A	70	B		
31	C	71	B		
32	C	72	B		
33	A	73	D		
34	D	74	C		
35	C	75	A		
36	B	76	D		
37	C	77	D		
38	A	78	A		
39	B	79	D		
40	A	80	B		

COORDINATOR
DATED: 16.11.2020