

**DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO**

**TEST BOOKLET**  
**AP (EE)—2017**

Time Allowed : 2 Hours]

[Maximum Marks : 100

All questions carry equal marks.

**INSTRUCTIONS**

1. Immediately after the commencement of the examination, you should check that test booklet does not have any unprinted or torn or missing pages or items, etc. If so, get it replaced by a complete test booklet.
2. Write your Roll Number only in the box provided alongside.   
Do not write anything else on the Test Booklet.
3. This Test Booklet contains 100 items (questions). Each item comprises four responses (answers). Choose only one response for each item which you consider the best.
4. After the candidate has read each item in the Test Booklet and decided which of the given responses is correct or the best, he has to mark the circle containing the letter of the selected response by blackening it completely with Black or Blue ball pen. In the following example, response "C" is so marked :  

(A)    (B)    ●    (D)
5. Do the encoding carefully as given in the illustrations. While encoding your particulars or marking the answers on answer sheet, you should blacken the circle corresponding to the choice in full and no part of the circle should be left unfilled. After the response has been marked in the ANSWER SHEET, no erasing/fluid is allowed.
6. You have to mark all your responses ONLY on the ANSWER SHEET separately given according to 'INSTRUCTIONS FOR CANDIDATES' already supplied to you. Responses marked on the Test Booklet or in any paper other than the answer sheet shall not be examined.
7. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet. There will be no negative marking and 1/4 (0.25) of the marks will be deducted as penalty for wrong answers.
8. Before you proceed to mark responses in the Answer Sheet fill in the particulars in the front portion of the Answer Sheet as per the instructions sent to you.
9. If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct.
10. After you have completed the test, hand over the Answer Sheet only, to the Invigilator.

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1. In an induction type of meter, maximum torque is produced when phase angle between two fluxes is :  
(A)  $0^\circ$  (B)  $45^\circ$   
(C)  $60^\circ$  (D)  $90^\circ$
2. Which of the following instruments indicates the instantaneous value of the electrical quantity being measured at the time at which it is being measured ?  
(A) Absolute instrument (B) Indicating instrument  
(C) Recording instrument (D) Integrating instrument
3. The source of emission of electrons in a Cathode Ray Tube is :  
(A) PN junction diode  
(B) A barium and strontium oxide coated cathode  
(C) Accelerating anodes  
(D) Post-accelerating anodes
4. Megger is an instrument used for the measurement of :  
(A) High resistance and insulation resistance  
(B) Medium resistance  
(C) Low resistance  
(D) Leakage resistance

5. Instrument whose deflection depends upon average value, is :
- (A) Moving iron type (B) Hot wire type  
(C) Rectifier type (D) Induction type
6. In an Anderson bridge the unknown inductance is measured in terms of :
- (A) Known inductance and resistances  
(B) Known resistances  
(C) Known capacitance and resistances  
(D) Known capacitance
7. An ammeter of 0-25 A range has a guaranteed accuracy of 1% of full scale reading. The current measured is 5A. The limiting error is :
- (A) 1% (B) 1.25%  
(C) 2.5% (D) 5%
8. In two wattmeter method of 3 phase power measurement, when does one wattmeter read negative ?
- (A) When power factor is less than 0.5 lagging  
(B) When power factor is greater than 0.5 lagging  
(C) When power factor is less than 0.5  
(D) When power factor is unity

9. The input resistance of VTVM is :
- (A)  $1000 \Omega$  (B)  $10 \text{ k}\Omega$   
(C)  $20 \text{ k}\Omega$  (D)  $10 \text{ M}\Omega$
10. Which of the following can be used to measure capacitance ?
- (A) Maxwell's bridge (B) Anderson bridge  
(C) De Sauty's bridge (D) Hay's bridge
11. By increasing the transmission voltage double of its original value, the same power can be dispatched keeping the line loss :
- (A) Equal to original value  
(B) Half of the original value  
(C) Double the original value  
(D) One-fourth of the original value
12. Corona loss increases with :
- (A) Decrease in conductor size and increase in supply frequency  
(B) Increase in both conductor size and supply frequency  
(C) Decrease in both conductor size and supply frequency  
(D) Increase in conductor size and decrease in supply frequency

13. A power factor meter has :
- (A) One current coil and one pressure coil
  - (B) One current coil and two pressure coils
  - (C) Two current coils and one pressure coil
  - (D) Two pressure coils and two current coils
14. To avoid creep in energy meter :
- (A) Two shading bands are put on shunt magnet
  - (B) Two shading bands are put on series magnet
  - (C) Two holes are cut in the disc on opposite side of spindle
  - (D) The potential coil is made of thin wire
15. If  $M$  is mutual inductance between fixed coil and moving coil and  $\theta$  is deflection, then :
- (A)  $\theta \propto \frac{dM}{d\theta}$
  - (B)  $\theta \propto M$
  - (C)  $\theta \propto \left(\frac{dM}{d\theta}\right)^2$
  - (D)  $\theta \propto M^2$
16. The single most important property that makes  $\text{SF}_6$  a very efficient medium for circuit breaking is :
- (A) It is non-toxic and non-inflammable
  - (B) It has high dielectric constant
  - (C) It has high breakdown strength
  - (D) It is highly electronegative in nature

17. When fault occurs in a high voltage transmission line, first the :
- (A) Circuit breaker operates, then relay
  - (B) Relay operates, then circuit breaker
  - (C) Relay operates, then successively the isolator and circuit breaker
  - (D) Isolator operates, then successively the relay and the circuit breaker
18. The relay used for feeder protection is :
- (A) Undervoltage relay
  - (B) Translay relay
  - (C) Thermal relay
  - (D) Buchholz relay
19. A distance relay is said to be inherently directional if its characteristics on R-X diagram :
- (A) is a straight line offset from origin
  - (B) is a circle that passes through origin
  - (C) is a circle that encloses origin
  - (D) is a straight line passes through origin
20. The amount of energy available in the wind at any instant is proportional to :
- (A)  $V$
  - (B)  $V^2$
  - (C)  $V^3$
  - (D)  $\sqrt{V^3}$

21. The inductance of line is minimum when :
- (A) GMD is high (B) GMR is high  
(C) Both GMD and GMR high (D) GMD is low and GMR is high
22. In a short transmission line, voltage regulation is zero. Then power factor angle of the load on receiving end side is :
- (A)  $\tan^{-1} \frac{X}{R}$  (B)  $\tan^{-1} \frac{R}{X}$   
(C)  $\tan^{-1} \frac{X}{Z}$  (D)  $\tan^{-1} \frac{R}{Z}$
23. The main drawback of underground system over overhead system is :
- (A) Exposure to lightning  
(B) Heavy initial cost  
(C) Exposure to atmospheric hazard  
(D) Inductive interference between power and communication circuits
24. Bundled conductors are used to :
- (A) Reduce inductance of the line  
(B) Reduce both inductance and capacitance of the line  
(C) Reduce capacitance of the line  
(D) Reduce corona loss and line inductance

25. Transmission efficiency of transmission line increases with :
- (A) Decrease in power factor and voltage
  - (B) Increase in power factor and voltage
  - (C) Increase in power factor but decrease in voltage
  - (D) Decrease in power factor but increase in voltage
26. Which relay is used to detect and protect internal faults of transformer ?
- (A) Over-current relay
  - (B) Thermal relay
  - (C) Buchholz relay
  - (D) Distance relay
27. Which of the following distribution systems is preferred for good efficiency and high economy ?
- (A) Single-phase, two-wire
  - (B) 2-phase, 3-wire system
  - (C) 3-phase, 3-wire system
  - (D) 3-phase, 4-wire system
28. Which of the following power stations will take least time in starting from cold to full load operation ?
- (A) Nuclear power plant
  - (B) Steam power plant
  - (C) Hydro power plant
  - (D) Gas turbine plant



29. The purpose of synchronizing control in a CRO is to :
- (A) Focus the spot on the screen
  - (B) Lock the display of the signal
  - (C) Adjust the amplitude of the display
  - (D) Control the intensity of the spot
30. A digital voltmeter measures :
- (A) Peak value
  - (B) RMS value
  - (C) Peak to peak value
  - (D) Average value
31. The resistivities of copper and aluminium are respectively :
- (A)  $2.83 \times 10^{-8}$  and  $1.72 \times 10^{-8}$  Ohm-metre
  - (B)  $41.72 \times 10^{-8}$  and  $2.83 \times 10^{-8}$  Ohm metre
  - (C)  $1.60 \times 10^{-8}$  and  $1.72 \times 10^{-8}$  Ohm metre
  - (D)  $1.72 \times 10^{-8}$  and  $1.60 \times 10^{-8}$  Ohm metre
32. The correct order of insulation classes for increasing maximum permitted temperature is :
- (A) A B E Y
  - (B) A E B Y
  - (C) Y A E B
  - (D) Y A B E

33. In transformers, silicon is added to core steel to :
- (A) increase the resistivity of the steel
  - (B) reduce the resistivity of the steel and also to reduce the hysteresis loss
  - (C) increase the permeability of the steel and to increase the mechanical strength
  - (D) decrease the resistivity of the steel and to increase the mechanical strength
34. The superposition theorem can be applied to solve networks when the network contains :
- (A) two or more than two voltage sources and no current source
  - (B) two or more than two current sources and no voltage source
  - (C) only one source of any type
  - (D) two or more than two sources of any one, or both types
35. Core loss in a transformer :
- (A) increases directly proportional to the applied voltage
  - (B) increases directly proportional to the square of the applied voltage
  - (C) increases directly proportional to the load on the transformer
  - (D) increases directly proportional to the flux in the core

36. The phase difference between the sinusoidal quantities  $100 \cos (\omega t - 30^\circ)$  and  $200 \sin (\omega t + 30^\circ)$  is :
- (A)  $0^\circ$  (B)  $30^\circ$   
(C)  $60^\circ$  (D)  $90^\circ$
37. The power to a balanced three-phase system is given by :
- (A)  $\sqrt{V_{\text{line}} I_{\text{line}} \cos \phi}$  (B)  $\sqrt{V_{\text{line}} I_{\text{phase}} \cos \phi}$   
(C)  $\sqrt{V_{\text{phase}} I_{\text{line}} \cos \phi}$  (D)  $\sqrt{V_{\text{phase}} I_{\text{phase}} \cos \phi}$
38. The emf induced in a coil rotating in a uniform magnetic field is maximum when :
- (A) the flux linkages by the coil is zero  
(B) the flux linkages by the coil is maximum  
(C) the rate of change of flux linkages of the coil is minimum  
(D) the coil is at right angle to the magnetic field
39. A dc series motor should always be started with load because :
- (A) at no-load it will rotate at dangerously high speed  
(B) at no-load it will not develop high starting torque  
(C) it draws a small current at no load  
(D) it cannot start without load

40. The speed of a dc shunt motor :
- (A) increases greatly as load torque increases
  - (B) falls greatly as load torque increases
  - (C) falls only a little as load torque increases
  - (D) increases only a little as load torque increases
41. In the armature-voltage control method of speed control of a dc shunt motor, as the speed is increased :
- (A) the torque increases and the power remains constant
  - (B) the torque remains constant and the power decreases
  - (C) the torque increases and the power decreases
  - (D) the torque remains constant and the power increases
42. The no-load power factor of a transformer is approximately :
- (A) 0
  - (B) 0.2
  - (C) 0.7
  - (D) 1

43. In a transformer :
- (A) the voltage regulation increases and efficiency decreases as load power factor increases
  - (B) the voltage regulation increases and efficiency also increases as load power factor increases
  - (C) the voltage regulation decreases and efficiency also decreases as load power factor increases
  - (D) the voltage regulation decreases and efficiency increases as load power factor increases
44. For a transformer :
- (A) iron loss can be found by short-circuit test and copper loss by open-circuit test
  - (B) iron loss can be found by open-circuit test and copper loss by short-circuit test
  - (C) open-circuit test results can enable us to determine voltage regulation
  - (D) short-circuit test results can enable us to determine efficiency
45. If the full-load iron loss of a transformer is 100 W, the iron loss at half-load is :
- (A) 100 W
  - (B) 200 W
  - (C) 50 W
  - (D) 25 W

46. A single-phase transformer is supplying power to a load at terminal voltage of 11 kV. On disconnecting the load, the terminal voltage rises to 11550 V. The voltage regulation of the transformer for this load is :

- (A) 55%
- (B) 5%
- (C) 2.5%
- (D) 11.55%

47. The speed of a 50 Hz, three-phase induction motor under full-load condition is 720 rpm. The number of poles of the motor is :

- (A) 4
- (B) 6
- (C) 8
- (D) 12

48. In a 50Hz, three-phase induction motor, the frequency of the rotor currents is about :

- (A) 50 Hz
- (B) 10 Hz
- (C) 2 Hz
- (D) Zero

49. In a three-phase induction motor :
- (A) The developed torque is approximately directly proportional to slip in normal running range and inversely proportional to it in the low speed range
  - (B) The developed torque is approximately directly proportional to slip in normal running range as well as in the low speed range
  - (C) The developed torque is approximately inversely proportional to slip in normal running range as well as in the low speed range
  - (D) The developed torque is approximately inversely proportional to slip in normal running range and directly proportional to it in the low speed range
50. The torque developed by a three-phase, 400 V induction motor is 200 N-m. If the supply voltage is 200 V, the developed torque then is :
- (A) 200 N-m
  - (B) 100 N-m
  - (C) 50 N-m
  - (D) 400 N-m
51. If the rotor circuit resistance of a three-phase induction motor is increased :
- (A) both the starting torque and the maximum torque developed increase
  - (B) both the starting torque and the maximum torque developed remain unchanged
  - (C) the starting torque increases but the maximum torque developed decreases
  - (D) the starting torque increases and the maximum torque developed remains unchanged

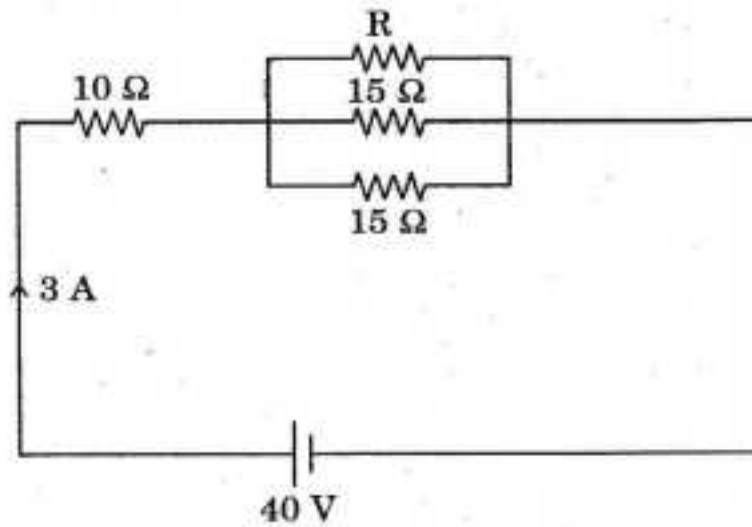
52. If  $f$  is the frequency in Hz,  $n_s$  the synchronous speed in rps, and  $p$  is the number of pairs of poles, the relation between  $f$ ,  $n_s$  and  $p$  for a three-phase machine is :
- (A)  $f = n_s p$  (B)  $f = n_s p/120$   
(C)  $f = n_s/p$  (D)  $n_s = 2f/p$
53. Comparing same size single-phase induction motors, which one of the following has the highest starting torque ?
- (A) Resistance split-phase motor  
(B) Capacitor-start motor  
(C) Capacitor-start capacitor-run motor  
(D) Shaded-pole motor
54. The direction of rotation of an ordinary single-phase shaded-pole induction motor :
- (A) can be reversed by reversing the supply terminals connections to the stator winding  
(B) cannot be reversed  
(C) can be reversed by removing one shading ring  
(D) can be reversed by open circuiting the shading rings



55. In synchronous generators, generally :
- (A) salient-pole type of rotors are driven by steam turbines and cylindrical type rotors are driven by hydro-turbines
  - (B) salient-pole type of rotors are driven by hydro-turbines and cylindrical type rotors are driven by steam turbines
  - (C) both types of rotors are driven by steam turbines only
  - (D) both types of rotors are driven by hydro turbines only
56. The major component in synchronous impedance of a synchronous machine is :
- (A) armature winding resistance
  - (B) rotor winding resistance
  - (C) armature winding leakage reactance
  - (D) armature reaction reactance
57. In synchronous machines, V-curves are :
- (A) plots of armature current against field current at constant voltage
  - (B) plots of field current against armature current at constant voltage
  - (C) plots of armature current against field current at constant power
  - (D) plots of field current against armature current at constant power

58. In a synchronous generator connected to an infinite bus, as excitation is increased :
- (A) The generator terminal voltage and its power output increase
  - (B) The generator terminal voltage increases and no effect on its power output
  - (C) The machine's power factor becomes less leading or more lagging
  - (D) The machine's power factor becomes more leading or less lagging
59. At a speed other than synchronous speed :
- (A) the synchronous machine's voltage regulation increases
  - (B) the efficiency of the machine falls drastically
  - (C) the average value of the developed torque is zero
  - (D) the synchronous impedance falls
60. The damper winding in a synchronous machine is provided to :
- (A) develop high running torque and to damp out the oscillations
  - (B) develop starting torque and to damp out the oscillations
  - (C) damp out the oscillations and to increase machine's efficiency
  - (D) reduce copper loss and iron loss

61. In figure, the value of R should be :



(A)  $12\ \Omega$

(B)  $6\ \Omega$

(C)  $3\ \Omega$

(D)  $1.5\ \Omega$

62. To find current in a resistance connected in a network, Thevenin's theorem is used  $V_{TH} = 20\ \text{V}$  and  $R_{TH} = 5\ \Omega$ . The current through the resistance is :

(A)  $4\ \text{A}$

(B) more than  $4\ \text{A}$

(C) less than  $4\ \text{A}$

(D)  $0\ \text{A}$

63. Asymmetrical two-port networks have :

(A)  $Z_{sc1} = Z_{oc1}$

(B)  $Z_{sc1} = Z_{sc2}$

(C)  $Z_{oc1} \neq Z_{oc2} \times Z_{oc1}$

(D)  $Z_{sc1} \neq Z_{sc2}$  and  $Z_{oc1} \neq Z_{oc2}$

64. An attenuator is an :
- (A) R's network (B) RL network  
(C) RC network (D) LC network
65. The maximum output voltage of a certain low-pass filter is 15 V. The output voltage at the critical frequency is :
- (A) 20 V (B) 15 V  
(C) 10.6 V (D) 21.2 V
66. Two two-port network are connected in parallel. The combination is to be represented as a single two-port network. The parameters of this network that are obtained by addition of the individual parameters are :
- (A)  $z$ -parameter (B)  $h$ -parameter  
(C)  $y$ -parameter (D) ABCD parameter
67. Calculate the standing wave ratio with  $\rho = 0.126$  :
- (A) 2.29 (B) 1.29  
(C) 1.26 (D) 12.6
68. Which of the following can act as a high pass filter ?
- (A) An integrator circuit (B) A differentiator circuit  
(C) An adder circuit (D) Multiplier circuit

69. A transmission line is terminated by its characteristic impedance,  $Z_0$  :
- (A) The reflection is equal to incident wave
  - (B) The reflection is half of incident wave
  - (C) There is no reflection of the incident wave
  - (D) The reflection is double of incident wave
70. A transmission line with a characteristic impedance of  $75 \Omega$ , is terminated in a purely resistive load. While making measurements, it was observed that the load reflected a power of  $100 \text{ W}$  and the reflected voltage was  $100 \text{ V}$ . Calculate the reflection coefficient :
- (A) 0.143
  - (B) 0.24
  - (C) 0.17
  - (D) 0.35
71. If the gate current of an SCR is increased, the forward breakdown voltage will :
- (A) increase
  - (B) decrease
  - (C) not be affected
  - (D) infinite
72. For continuous conduction, in a single-phase semi-converter, each SCR conducts for :
- (A)  $\alpha$
  - (B)  $\pi$
  - (C)  $\alpha + \pi$
  - (D)  $\pi - \alpha$

73. For an ideal differential amplifier, the Common Mode Rejection Ratio (CMMR) should be :
- (A) as high as possible                      (B) as low as possible  
(C) constant                                      (D) none of these
74. Paschen's law is associated with :
- (A) breakdown voltage                      (B) ionization  
(C) thermal radiations                      (D) none of these
75. Active Power is a function of ....., and reactive power is a function of .....
- (A) voltage magnitude, voltage phase angle  
(B) voltage phase angle, voltage magnitude  
(C) voltage magnitude, voltage magnitude  
(D) voltage phase angle, voltage phase angle
76. .... is an example of series-series FACTS device.
- (A) UPFC    (B) SSSC  
(C) IPFC    (D) STATCOM

77. In a power station, the cost of generation of power reduces most effectively when :
- (A) Diversity factor alone increases
  - (B) Both diversity factor and load factor increase
  - (C) Load factor alone increases
  - (D) Both diversity factor and load factor decrease
78. SSSC in transmission system is analogous to ..... in distribution system.
- (A) UPQC
  - (B) SVC
  - (C) DSTATCOM
  - (D) DVR
79. In a full wave rectifier without filter, the ripple factor is :
- (A) 1.21
  - (B) 0.482
  - (C) 1.89
  - (D) 0.682
80. Which among the following can be used to detect the missing heart-beat ?
- (A) Monostable multivibrator
  - (B) Bistable multivibrator
  - (C) Schmitt trigger
  - (D) Astable multivibrator
81. Which of the following lakes is *not* in Kullu District of H.P. ?
- (A) Bhrigu
  - (B) Dhashahr
  - (C) Sareulsar
  - (D) Karali

82. At which place does river Beas leave Kangra district of H.P. ?
- (A) Mirthal (B) Sandhol  
(C) Hari ka Patan (D) Bajaura
83. In which District of H.P. is Narsing Tibba ?
- (A) Shimla (B) Bilaspur  
(C) Chamba (D) Kullu
84. Between which two places is Waru pass ?
- (A) Lahaul and Spiti (B) Dharamsala and Chamba  
(C) Rohru and Dodra Kwar (D) Shimla and Sirmaur
85. Which of the following Naga shrine is known for curing people of snake bite ?
- (A) Saloh (Palampur) (B) Nagchala (Mandi)  
(C) Kamru nag (Mandi) (D) All of these
86. Which community among the Hindus worhsip Bhairon, Sidh Masani and Mata Masani ?
- (A) Acharaj (B) Khatik  
(C) Chhimbe (D) Jheewar



87. Which one of the following hydro power projects is in central/joint/HP share sector in H.P. ?
- (A) Baira Siul (B) Chamera  
(C) Uhal (Shanan) (D) All of these
88. What is the extent of subsidy to the small and marginal farmers under the Crop Insurance Scheme in the amount of premium ?
- (A) 10 percent (B) 30 percent  
(C) 50 percent (D) 60 percent
89. How many Development Blocks are there in H.P. ?
- (A) 66 (B) 78  
(C) 82 (D) 94
90. What was the extent of growth in transport, storage, communications and trade sub sectors of tertiary sector in H.P. during the 2014-15 fiscal year ?
- (A) 13.2 percent (B) 14.6 percent  
(C) 13.9 percent (D) 11.4 percent
91. What was the performance of Rohan Bopanna and Sania Mirza in Tennis mixed doubles at the 2016 Rio Olympics ?
- (A) Lost in the first round  
(B) Lost in the second round  
(C) Lost in the Bronze medal play off  
(D) None of the above

92. Which Indian state has created a Ministry of Happiness ?
- (A) Sikkim (B) Goa  
(C) Uttarakhand (D) Madhya Pradesh
93. Which day is observed as National Girl Child Day in India ?
- (A) January 12 (B) January 24  
(C) March 8 (D) April 22
94. What is T.M. Krishna, the winner of Magsaysay Award, fighting for ?
- (A) Child rights  
(B) Social inclusiveness in culture  
(C) Reservation of Ezwahas in Govt. Jobs  
(D) Save the girl child campaign
95. In which state of India are Chitrakote water falls ?
- (A) H.P. (B) Chhattisgarh  
(C) J & K (D) Asom
96. What is the name of movement whose motto is to save the world by involving itself with environmental problems ?
- (A) Clean world (B) Happy world  
(C) Eco-friend (D) Green peace

97. Who was crowned Miss World 2015 in December, 2015 ?
- (A) Sofia Nikitchuk (B) Maria Harfanti  
(C) Sanneta Myrie (D) Mireia Lalaguna Royo
98. When did shooting take place inside the *Charlie Hebdo* newspaper office in France ?
- (A) January 2015 (B) July 2015  
(C) October 2015 (D) December 2015
99. Which of the following countries is *not* a member of TAPI pipeline project ?
- (A) Turkmenistan (B) Pakistan  
(C) India (D) Tajikistan
100. Which of the following has provided a 1.5 billion loan to India to end open defecation by 2019 A.D. ?
- (A) WTO (B) Asian Development Bank  
(C) World Bank (D) Brics Bank