

**Forest Guard Examination held on 18.01.2015 (Solutions - marked in Red)**

1. Our earth is spherical/almost spherical in shape. However, if the length of the radius of earth measured from the centre to any point on the equator is A, and the length of radius measured from the centre to any of the poles is B, which of the following relations exists between A and B?

- (A)  $B > A$
- (B)  $A > B$
- (C)  $A = B$
- (D)  $A = \sqrt{B}$
- (E)  $A = B^{2/3}$

2. The main cause for change of seasons on earth is-

- (A) The cooling and heating of sun.
- (B) The tilting of earth from its vertical axis.
- (C) **The revolution of earth around the sun and its tilt from its vertical axis.**
- (D) The shape of the earth and the temperature variations in sun.
- (E) The movement of moon around the earth.

3. Himalayas are an example of-

- (A) Volcanic Mountains.
- (B) Block or horst Mountains.
- (C) Dome Mountains.
- (D) Residual Mountains.
- (E) **Fold Mountains.**

4. The dry belt of the northern part of Karnataka has shown a marked change in cropping patterns. There is a marked increase in farmers growing-

- (A) Ragi.
- (B) Tobacco.
- (C) Vanilla.
- (D) **Fruits and Vegetables.**
- (E) Coffee.

5. The lines of contours on a map depict-

- (A) **Places which have same height above mean sea level.**
- (B) Places which have same pressure at different times of the year.
- (C) Places where the inclination of the rays of sun is the same.
- (D) Places which receive the same amount of rainfall during a year.
- (E) Places which have same temperature at a particular time of the year.

6. Indus valley civilization belonged to-

- (A) Old Stone age.
- (B) Medieval Stone age.
- (C) New Stone age.
- (D) **Metal age.**
- (E) Mesolithic age.

7. Vedas are considered to be oldest books of knowledge. Which one of the following correctly relates Vedas with medicine?

- (A) Rigveda.
- (B) Sama Veda.
- (C) Yajur Veda.
- (D) **Atharva Veda.**
- (E) Medicine is dealt with in Vedanta not Vedas.

8. The religion which was given patronage by Indian kings and which spread to nearby countries is-
- (A) Hinduism.
  - (B) Christianity.
  - (C) Islam.
  - (D) Jainism.
  - (E) **Buddhism.**
9. At the time of Independence, India was partitioned in two countries i.e., India and Pakistan. In which year was Bangladesh formed from Pakistan?
- (A) 1948.
  - (B) 1964.
  - (C) **1971.**
  - (D) 1976.
  - (E) 1981.
10. Abu Rayhan Beruni commonly known as Alberuni in history was-
- (A) A Mongolian king who invaded India.
  - (B) An architect who designed many of the buildings built by Shahjahan.
  - (C) The king with whom the slave dynasty commenced.
  - (D) One of the *Navratnas* in the Court of Akbar.
  - (E) **A Muslim scholar who studied and wrote about India.**
11. Who started the '*Brahmo Samaj*'?
- (A) Ramakrishna Paramhansa.
  - (B) Swami Dayanand Saraswati.
  - (C) **Raja Rammohan Roy.**
  - (D) Swami Vivekananda.
  - (E) Swami Bramhananda.

12. The Indigo Revolt of 1859-60 was mainly in the then State of-

- (A) **Bengal.**
- (B) Avadh.
- (C) Delhi.
- (D) Hyderabad.
- (E) Travancore.

13. Laishram Sarita Devi, generally known by the name Sarita Devi, is associated with which of the following sports?

- (A) Weight lifting.
- (B) Gymnastics.
- (C) **Boxing.**
- (D) Swimming.
- (E) Shooting.

14. The 7th Schedule of the constitution of India contains-

- (A) The list of regional languages recognized by the Constitution.
- (B) **The Union, State and Concurrent lists.**
- (C) The provisions for disqualification of members on grounds of defection.
- (D) The provisions for the administration of tribal areas.
- (E) The subjects on which Panchayaths have been given administrative control.

15. By the Forty Fourth Constitutional Amendment, which of the following fundamental Rights was omitted?

- (A) **Right to Property.**
- (B) Right against exploitation.
- (C) Cultural and education rights.
- (D) Right to freedom of Religion
- (E) Right to freedom of speech.

16. A parliamentary Bill passed by the Lok Sabha is sent to the President of India for his/her assent. The President sends it back to the Lok Sabha for reconsideration. If the Lok Sabha again passes the Bill and sends it to the President for assent, the President-

- (A) **has no choice but to give his/her assent.**
- (B) can again send the Bill for consideration one time again.
- (C) can take advice of the Supreme court in deciding whether to give assent.
- (D) can ask for a referendum on the contents of the Bill.
- (E) can refer the Bill to the Rajya Sabha.

17. After the new Government has been formed at the Centre in 2014, the institution revamped and given the name National Institution for Transforming India (NITI) Commission is-

- (A) The Press Council of India.
- (B) The Defence Ministry.
- (C) **The Planning Commission.**
- (D) The Human Resource Development Ministry.
- (E) The Human Rights Commission.

18. "Lock jaw" is a typical symptom of-

- (A) Plague.
- (B) Meningitis.
- (C) **Tetanus.**
- (D) Diphtheria.
- (E) Scurvy.

19. Who has been announced to be the Chief Guest of India at the Republic Day function of 2015?

- (A) Girija Prasad Koirala.
- (B) Nawaz Shareef.
- (C) Yingluck Shinawatra.
- (D) **Barack Obama.**
- (E) A person other than the four mentioned above.

20. 'POCSO' has been in the news recently many a times. It is -

- (A) A Mining Company.
- (B) **An Act of the Parliament.**
- (C) A rare breed of dog.
- (D) A place in Odisha having large Aluminium deposits.
- (E) An Act proposed for punishing those who do money laundering.

21. "Jnanapeetha" awards are given in the field of-

- (A) Adult Education.
- (B) Social Work.
- (C) Teaching.
- (D) Scientific Research.
- (E) **Literature.**

22. In late 2014 the State of India which suffered from heavy floods due to blocking of river courses and unprecedented rains is-

- (A) Maharashtra.
- (B) Odisha.
- (C) Uttarakhand.
- (D) Bihar.
- (E) **Jammu and Kashmir.**

23. Nalanda was an old prominent centre for education and learning. It has been revived recently as an University. The University is located in the state of-

- (A) Jharkhand.
- (B) **Bihar.**
- (C) Uttar Pradesh.
- (D) Madhya Pradesh.
- (E) Odisha.

24. On very high mountains one feels breathless because-

- (A) **The density of air there is very less thus lesser quantity of oxygen is available in breathing in.**
- (B) The air is very cold which increases the demand for air in the body.
- (C) All activity on mountains is strenuous.
- (D) The atmospheric pressure is less which increases metabolic rate.
- (E) We wear heavy woollen clothes that absorb carbon dioxide around the body.

25. The Government Scheme '*Pradhan Mantri Jan Dhan Yojana*' aims to-
- (A) have money in circulation in rural areas.
  - (B) ensure that rural people develop a habit of saving money.
  - (C) reduce the accumulation of black money in rural areas.
  - (D) **provide / involve the poorest of poor in using Banking services.**
  - (E) reduce the frauds taking place in rural bank loans.
26. "*Swachh Bharat Abhiyan*", a scheme to clean India, was launched on-
- (A) 25<sup>th</sup> December 2014.
  - (B) 15<sup>th</sup> August 2014.
  - (C) **02<sup>nd</sup> October 2014.**
  - (D) 31<sup>st</sup> October 2014.
  - (E) 14<sup>th</sup> November 2014.
27. The Indian king Ashoka belonged to which dynasty?
- (A) Kushan dynasty.
  - (B) Gupta dynasty.
  - (C) **Maurya dynasty.**
  - (D) Magadha dynasty.
  - (E) Vardhan dynasty.
28. Which of the following is not a feature of the "*Mangalyan*", Mars Orbiter Mission (MOM) of India?
- (A) Very low cost.
  - (B) **The time taken to build it was much longer than taken by NASA to build their space craft for Mars called MAVEN.**
  - (C) Successful in the first attempt.
  - (D) Indian technology was used to a very large extent.
  - (E) The journey to Mars took about 301 days.



29. The place 'Incheon' was in news recently for a major sports event. This place is located in-
- (A) North Korea.
  - (B) **South Korea.**
  - (C) Indonesia.
  - (D) Malaysia.
  - (E) Singapore.
30. Ebola virus disease or Ebola haemorrhagic fever or simply Ebola, is a disease of humans and other primates caused by ebolaviruses. The virus is initially carried to humans mainly by-
- (A) **Fruit bats.**
  - (B) Monkeys.
  - (C) Gorillas.
  - (D) Lion Tailed Macaque.
  - (E) Slender loris.
31. The "Barium meal test" is used for -
- (A) **X- raying the human upper digestive tract.**
  - (B) X- raying the human brain.
  - (C) X- raying the human heart.
  - (D) X- raying the human prostate.
  - (E) X- raying the human pancreas.
32. The "Collegium system" in our country refers/referred to the system-
- (A) of decision on necessity of colleges.
  - (B) of appointment of First Class Judicial Magistrates.
  - (C) of appointment of Government Pleaders.
  - (D) **of appointment of Judges to the Supreme Court of India.**
  - (E) of review of college level education.

33. Epiphytes are plants which-

- (A) are adapted to grow in dark and dry climates.
- (B) are adapted to grow in sunny but wet climates.
- (C) cling/grow on other plants and take nutrition from them.
- (D) **cling/grow on other plants but do not take nutrition from them.**
- (E) are adapted to grow in caves and crevices.

34. Uppalapu Srinivas who passed away in September 2014 was renowned in playing the-

- (A) Violin.
- (B) Veena.
- (C) Mridangam.
- (D) Sitar.
- (E) **Mandolin.**

35. The dance drama form “*Yakshagana*” was revived by-

- (A) Smt. M S Subbalakshmi.
- (B) Shri Kuvempu.
- (C) Smt. Gangubai Hangal.
- (D) Shri T Chowdaiah.
- (E) **Dr. Shivram Karanth.**

36. Milk is pasteurized in order to-

- (A) Enhance its taste and flavour.
- (B) Remove fat from milk.
- (C) Make fat content of the milk uniform.
- (D) **Destroy the microorganisms present in milk.**
- (E) Detect adulteration in milk.

37. When ice/ water is heated from  $0^{\circ}\text{C}$  to  $90^{\circ}\text{C}$  the volume of water-

- (A) Continuously increases.
- (B) Continuously decreases.
- (C) First increases then decreases.
- (D) **First decreases then increases.**
- (E) First increases then decreases and then again increases.

38. Which of the following is the hardest element/substance?

- (A) Iron.
- (B) Silicon.
- (C) Copper.
- (D) **Diamond.**
- (E) Steel.

39. To improve the financial position of our country, the present approach of Indian Government is-

- (A) **To promote Foreign Direct Investment (FDI) and production.**
- (B) To increase the export of gems and jewellery.
- (C) To have goodwill with neighbouring countries to improve trade.
- (D) To improve productivity and production of cash crops.
- (E) To reduce the spending in defence sector.

40. The instrument used to measure blood pressure in human beings is-

- (A) Manometer.
- (B) Stethoscope.
- (C) **Sphygmomanometer.**
- (D) Stroboscope.
- (E) Gyroscope.

41. Research in the field of Genetics can give best results in-
- (A) Stopping or reducing climate change.
  - (B) **Promoting health by promoting disease resistant genes.**
  - (C) Helping replenishment of natural resources.
  - (D) Creating wealth for the population in general.
  - (E) Reducing pollution of the atmosphere.
42. Nanotechnology deals with distances in the range of-
- (A)  $10^{-6}$  metre.
  - (B)  **$10^{-9}$  metre.**
  - (C)  $10^{-12}$  metre.
  - (D)  $10^{-15}$  metre.
  - (E)  $10^{-18}$  metre.
43. The Bhabha Atomic Research Centre (BARC) is located in-
- (A) Tarapur.
  - (B) Indore.
  - (C) **Mumbai.**
  - (D) Pune.
  - (E) Ahmedabad.
44. The following is **not a function** of the National Bank for Agriculture and Rural Development (NABARD)?
- (A) **Fixing the interest rates of agricultural loans.**
  - (B) Providing refinance to lending institutions in rural areas.
  - (C) Evaluating, monitoring and inspecting its client banks.
  - (D) Acting as a coordinator in the operations of rural credit institutions.
  - (E) Acting as regulator for cooperative banks and Regional Rural Banks.

45. Turmeric is obtained from which part of the plant?

- (A) **Stem.**
- (B) Root.
- (C) Seed.
- (D) Fruit.
- (E) It is the dried secretion of a plant.

46. Amongst the following, the full or part figures of which set of animals is found in the National Emblem?

- (A) Lion and Bull.
- (B) **Bull and Horse.**
- (C) Horse, Tiger and Bull.
- (D) Lion and Elephant.
- (E) Tiger and Elephant.

47. Why did Rabindranath Tagore renounce his knighthood?

- (A) To express solidarity with the leaders of Non Cooperation Movement.
- (B) To express solidarity with the leaders of Quit India Movement.
- (C) **To protest against the Jallianwala Bagh massacre.**
- (D) To express solidarity with the leaders against the Simon Commission.
- (E) To protest against the lathicharge on Lala Lajpat Rai.

48. Which scientist from Karnataka was honoured with the Bharat Ratna recently?

- (A) Dr. Roddam Narasimha.
- (B) Dr. A. K. Shastry.
- (C) Dr. Raja Ramanna.
- (D) Dr. C. V. Raman.
- (E) **Dr. C. N. R. Rao.**

49. Which country was in the news in 2014 for its two flights crashing in flight?

- (A) Japan.
- (B) Thailand.
- (C) Singapore.
- (D) Indonesia.
- (E) **Malaysia.**

50. The Morley-Minto Reforms were actually designed to create a rift between Hindus and Muslims. It was introduced by the British in the year-

- (A) 1929.
- (B) 1919.
- (C) 1916.
- (D) 1914.
- (E) **1909.**

51.If the resistance of a wire / conductor could reduce, the same current can produce better output for a longer time. The ideal situation in this direction is seen in-

- (A) Cryotechnology.
- (B) Superconductivity.
- (C) Nanotechnology.
- (D) Crystallography.
- (E) Radiation Science.

52.Bengaluru Bulls, Jaipur Pink Panthers and Bengal Warriors are the names of -

- (A) Premier Super League Hockey teams.
- (B) Indian Super League Cricket teams.
- (C) Hero Super League Football teams.
- (D) Indian Super League Volleyball teams.
- (E) Pro Kabaddi League teams.

53. Political Parties are not recognized in case of which of the following Elections in Karnataka?

- (A) Zilla Panchayath and Taluk Panchayath Elections.
- (B) Taluk Panchayath and Grama Panchayath Elections.
- (C) Zilla Panchayath and Grama Panchayath Elections.
- (D) Taluk Panchayath Elections.
- (E) Grama Panchayath Elections.

54. “Rods and cones” cells are found in which part/organ of the human Body?

- (A) **The eye.**
- (B) The brain.
- (C) The pancreas.
- (D) The Liver.
- (E) In the skin.

55. Biosphere consists of-

- (A) Only the Lithosphere.
- (B) Only the Hydrosphere.
- (C) Only the Atmosphere.
- (D) **Atmosphere, Hydrosphere and Lithosphere.**
- (E) Only Atmosphere and Hydrosphere.

56. The media office in France that was attacked by terrorist gunmen in January 2015 is of -

- (A) France Soir.
- (B) Le Figaro.
- (C) The Connexion.
- (D) **Charlie Hebdo.**
- (E) L'Express.

57. Consensus among scientists is that the climate change being noticed are mainly due to-

- (A) Rising temperature of the sun.
- (B) **Anthropogenic activity.**
- (C) Heating of the core of Earth.
- (D) Expanding Universe.



(E) Depletion of groundwater.

58. The minimum age to qualify for election to the Lok Sabha is-

(A) 21 years.

(B) 25 years.

(C) 30 years.

(D) 35 years.

(E) 40 years.

59. What can be the maximum time gap between two sessions of the Parliament in India ?

(A) 3 months.

(B) 4 months

(C) 6 months.

(D) 9 months.

(E) 12 months.

60. The vitamin that is associated with clotting of human blood is-

(A) Vitamin E.

(B) Vitamin A.

(C) Vitamin K.

(D) Vitamin B.

(E) Vitamin C.

61. If  $x$  satisfies the equation  $x^2 - 2x \cos \theta + 1 = 0$ ,

the value of  $x^n + \left[ \frac{1}{x^n} \right]$  will be –

(A)  $2^n \cos n\theta$ .

(B)  $2^n \cos^n \theta$ .

(C)  $2 \cos n\theta$ .

(D)  $2 \cos^n \theta$ .

(E)  $2^n \cos^n n\theta$ .

62. The value of  $4^{2 \log_9 3}$  will be-

- (A) 1.
- (B) 2.
- (C) 4.
- (D) 8.
- (E) 16.

63. Which of the following is **always true** for a Hermitian Matrix A?

- (A) A need not be a square matrix.
- (B)  $\overline{A^T} = A$ .
- (C)  $\overline{A^T} = -A$ .
- (D) The diagonal elements are either purely imaginary or zero.
- (E) The non-diagonal elements are either real.

64. Amar remembers only the first two digits of his ATM four digit Personal Identification Number (PIN). He knows that each of the last two digits is greater than 5. The ATM will allow 3 tries before blocking further access. If he guesses the last two digits, what is the probability of his getting access to the account?

- (A) 1/4.
- (B) 1/8.
- (C) 3/8.
- (D) 1/16.
- (E) 3/16.

65. A straight line makes angles of  $\alpha$ ,  $\beta$  and  $\gamma$  with the coordinate axes. The value of  $\sin^2\alpha + \sin^2\beta + \sin^2\gamma$  will be-

- (A) -1.
- (B) 0.
- (C) 1.
- (D) 2.
- (E) 3.

66. If  $x^2 + y^2 = xy$ , then  $[x + y]^4$  equals-

- (A)  $9x^2y^2$
- (B)  $x^2y^2$
- (C)  $xy$
- (D)  $9xy$
- (E)  $(x^2 + y^2)^2$

67. The sum of the squares of first 19 positive integers is-

- (A) 4940.
- (B) 2470.
- (C) 1235.
- (D) 1170.
- (E) 1120.

68.  $\lim_{x \rightarrow -2} \left( \frac{x^3 + 3x^2 + 2x}{x^2 - x - 6} \right)$  is equal to-

- (A)  $1/5$ .
- (B)  $-1/5$ .
- (C)  $2/5$ .
- (D)  $-2/5$ .
- (E) The limit does not exist.

69. Which of the following is not correct?

(A)  $\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$

(B)  $\sqrt[n]{xy} = \sqrt[n]{x} \cdot \sqrt[n]{y}$

(C)  $\log a + \log b + \log c = \log (a \times b \times c)$

(D)  $\log 1 + \log 2 + \log 3 = \log (1 + 2 + 3)$

(E)  $\sqrt[n]{x + y} = \sqrt[n]{x} + \sqrt[n]{y}$

70. If A, B, C are sets such that  $A \cap B = A \cap C$  and  $A \cup B = A \cup C$  then-

(A)  $B=C$

(B)  $A = B$

(C)  $A = C$

(D)  $A \cap C = \emptyset$

(E)  $A \cap B = \emptyset$

71. If  $x = -|x|$ , then which one of the following 3 statements could be true?

(P)  $x = 0$

(Q)  $x < 0$

(R)  $x > 0$

(A) None of P, Q and R.

(B) Only P.

(C) Only R.

(D) Only P and Q.

(E) Only Q and R.

72. For what largest integer 'n',  $2^n$  is a factor of  $20^8$ ?

- (A) 2
- (B) 4
- (C) 8
- (D) 16
- (E) 32

73. What is the number of diagonals that can be drawn by joining the vertices of an octagon?

- (A) 20
- (B) 28
- (C) 40
- (D) 48
- (E) 56

74. Let  $\hat{a}$  and  $\hat{b}$  be two unit vectors. If the vectors  $\vec{c} = \hat{a} + 2\hat{b}$  and  $\vec{d} = 5\hat{a} - 4\hat{b}$  are perpendicular to each other, then the angle between  $\hat{a}$  and  $\hat{b}$  is-

- (A) 0 degrees.
- (B) 30 degrees.
- (C) 45 degrees.
- (D) 60 degrees.
- (E) 90 degrees.

75. The angles of elevation of the top of the tower from two points at horizontal distances 'a' and 'b' from the base, and in the same straight line with it, are complementary. The height of the tower is-

- (A)  $ab$ .
- (B)  $\sqrt{ab}$ .
- (C)  $(a + b)$
- (D)  $(a - b)$

(E)  $a/b$ .

76. If  $\cos(\alpha+\beta) = 4/5$  and  $\sin(\alpha-\beta) = 5/13$  where  $0 \leq \alpha$  and  $\beta \leq \frac{\pi}{4}$

then  $\tan 2\alpha$  is equal to-

(A)  $25/16$ .

(B)  $16/56$ .

(C)  $56/33$ .

(D)  $25/56$ .

(E)  $16/33$ .

77. The equation of tangent to the curve  $y = x + \frac{4}{x^2}$  that is parallel to the

X-axis is-

(A)  $y = 0$ .

(B)  $y = 1$ .

(C)  $y = 2$ .

(D)  $y = 3$ .

(E)  $y = 4$ .

78. If the length of each side of a cube is increased by 50% the percentage increase in the surface area is-

(A) 100%.

(B) 125%.

(C) 150%.

(D) 200%.

(E) 250%.

79. The length of the diameter of the circle which touches the X-axis at

the point (1,0) and passes through the point (2,3) is-

- (A)  $5/3$  units.
- (B)  $10/3$  units.
- (C)  $4/3$  units.
- (D)  $8/3$  units.
- (E)  $8/5$  units.

80. All letters of the word "S E I Z E" are arranged randomly in a row. The probability that the two 'E's will come together is-

- (A)  $1/5$ .
- (B)  $2/5$ .
- (C)  $3/5$ .
- (D)  $4/5$ .
- (E)  $7/10$ .

81. For what value of  $m$ , the roots of  $12x^2+mx+5=0$  are in the ratio of 3:2?

- (A)  $5/12$
- (B)  $12/5$
- (C)  $(125)^{1/2}$
- (D)  $(200)^{1/2}$
- (E)  $(250)^{1/2}$

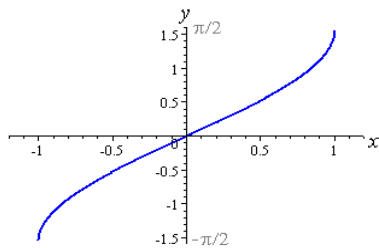
82. For all real  $x$ , if  $f(x) = 3x^3+x+3$  then-

- (A)  $f$  is one-one but not onto  $\mathbb{R}$ .
- (B)  $f$  is one-one and onto  $\mathbb{R}$ .
- (C)  $f$  is onto  $\mathbb{R}$  but not one-one.
- (D)  $f$  is neither one-one nor onto.
- (E) Nothing can be said about its being one-one or onto.

83. If  $\tan^{-1}x + \tan^{-1}y = 45^\circ$ , which of the following is equations is correct?

- (A)  $y - x + xy = 1.$
- (B)  $y - x - xy = 1.$
- (C)  $x - y + xy = 1.$
- (D)  $x + y - xy = 1.$
- (E)  $x + y + xy = 1.$

84. The graph (y axes depicts angle in radians) shown below corresponds best to-



- (A)  $y = \text{Cos}^{-1}x.$
- (B)  $y = \text{Cosec}^{-1}x.$
- (C)  $y = \text{Sec}^{-1}x.$
- (D)  $y = \text{Cot}^{-1}x.$
- (E)  $y = \text{Sin}^{-1}x.$

85. The determinant of the matrix A shown below is-

$$A = \begin{bmatrix} 5 & 3 & 2 \\ 0 & 4 & 1 \\ 0 & 0 & 3 \end{bmatrix}$$

- (A) 30.
- (B) 40.
- (C) 50.
- (D) 60.
- (E) 70.



86. The function  $f(x) = x^3 - 6x^2 + 9x + 91$  has,

- (A) a maxima at  $x = 1$  and a minima at  $x = 3$ .
- (B) a minima at  $x = 1$  and a maxima at  $x = 3$ .
- (C) a maxima at  $x = 1$  and no minima.
- (D) a minima at  $x = 3$  and no maxima.
- (E) a maxima at  $x = 3$  and no minima.

87. Which of the following is **not a requirement** of a binomial distribution?

- (A) There has to be a constant probability of success.
- (B) There have to be only two possible outcomes.
- (C) **The outcomes have to be equally likely.**
- (D) There has to be a fixed number of trials.
- (E) All the three mentioned in B, C and D above.

88. If the area between the curve and lines  $y = \sin x$ ,  $y = 0$  and  $x = \pi/4$  is  $A$ , the area between the curve and lines  $y = \cos x$ ,  $y = 0$  and  $x = \pi/4$  will be-

- (A)  $A$ .
- (B)  $2A$ .
- (C)  **$(1 - A)$ .**
- (D)  $(1 + A)$ .
- (E)  $(\pi + A)$ .

89. Which of the following three problems cannot be solved by Linear Programming?

- (P) Maximising profits given the constraints of capital, storage etc. by finding the optimal quantity of production.
- (Q) Designing a diet such that a prescribed minimum quantity of each nutrient is available to the person taking the diet.
- (R) Finding the Cheapest route of sending goods from the factory

to sale outlets.

- (A) Only P and Q.
- (B) Only Q and R.
- (C) Only P and R.
- (D) **All those detailed in P, Q and R.**
- (E) None of those detailed in P, Q and R.

90. For the function  $f(x) = \log x$  (the base of log is 'e') defined in the interval  $[1, e]$ , the point within this interval that satisfies Lagrange's mean value theorem is-

- (A)  **$(e - 1)$ .**
- (B)  $(1 - e)$
- (C)  $(e - 1)^{1/2}$ .
- (D)  $(e + 1)^{1/2}$ .
- (E)  $(1 - e)^{1/2}$ .

91. The hypotenuse of a right angled triangle is 10 cms. and the radius of the inscribed circle in it is 1 cm. The perimeter of the triangle is-

- (A) **22 cms.**
- (B) 21 cms.
- (C) 20 cms.
- (D) 19 cms.
- (E) 18 cms.

92. The perimeter of a square and the circumference of a circle are equal. The area of the square is  $121 \text{ cm}^2$ . The area of the circle is-

- (A)  $21 \text{ cm}^2$ .
- (B)  $28 \text{ cm}^2$ .
- (C)  $35 \text{ cm}^2$ .

(D)  $49 \text{ cm}^2$ .

(E)  $56 \text{ cm}^2$ .

93. If 1,  $\omega$  and  $\omega^2$  are cube roots of unity then of the four statements-

I)  $1 + \omega + \omega^2 = 0$ .

II)  $\omega^3 = 1$ .

III) Cube roots of unity cannot be represented in argand plane.

IV)  $(\omega^-)^2 = \omega^2$ .

(A) Only I is true.

(B) Only II is true.

(C) Only I and II are true.

(D) Only II and III are true.

(E) Only I, II and IV are true.

94. If  $\frac{x+y}{x-y} = \frac{1}{2}$ , then  $\frac{xy+x^2}{xy-x^2} =$

(A) 0.

(B)  $-0.5$ .

(C) 0.5.

(D) -1.

(E) 1.

95.  $\int_{-\pi}^{\pi} \{\sin x + (\sin x)^3 + (\sin x)^5\} dx =$

(A)  $-2\pi$

(B)  $-\pi$

(C) 0

(D)  $\pi$

(E)  $2\pi$

96. If the lines  $(p - q)x^2 + 2(p + q)xy + (q - p)y^2 = 0$  are mutually perpendicular, then-

- (A)  $p$  has to be more than  $q$ .
- (B)  $q$  has to be more than  $p$ .
- (C)  $p$  and  $q$  both should be positive numbers.
- (D)  $p$  and  $q$  both should be negative numbers.
- (E)  $p$  and  $q$  can have any values.

97. The velocity of a point moving along the X-axis at time  $t$  (in seconds) is given by  $V(t) = 4t^3 - 3t^2$ . If the point starts moving from  $x = 2$  at  $t = 0$ , its position at time  $t = 2$  seconds will be-

- (A)  $x = 8$
- (B)  $x = 10$
- (C)  $x = 30$
- (D)  $x = 36$
- (E)  $x = 38$

98. The probability of occurrence of an event-

- (A) Is more than or equal to 0 but less than or equal to 1.
- (B) Is positive and more than 0.
- (C) Can have a value less than 0.
- (D) Can have a value more than 1.
- (E) Can have any value positive or negative.

99. The position vectors of two points A and B are  $i + j - k$  and  $2i - j + k$  respectively. The unit vectors along the coordinate axes are  $I, j$  and  $k$ . The

shortest distance between A and B is-

- (A)  $3^{1/2}$  units.
- (B)  $6^{1/2}$  units.
- (C) 1 unit.
- (D) 2 units.
- (E) **3 units.**

100. The order of matrix  $A$  is  $m \times p$  and that of  $B$  is  $p \times n$ . Then the order of  $AB$  will be-

- (A)  **$m \times n$ .**
- (B)  $p \times n$ .
- (C)  $px m$ .
- (D)  $(m + n) \times (m - n)$ .
- (E)  $(m + p) \times (n - p)$ .