

# NATIONWIDE EDUCATION AND SCHOLARSHIP TEST

## (N.E.S.T.)

### SAMPLE QUESTIONS

**Important:** Please note that the questions given in this Sample Question Paper are for example only. The number and distribution of questions in each section of the actual paper will be as advertised in our publicity material in the relevant section of this website and posters sent to your college this year.

### Section-I

#### PHYSICS & CHEMISTRY

- An electron moving in an electromagnetic field moves –  
(a) In a straight path  
(b) Along the same plane in the direction of its propagation  
(c) Opposite to the original direction of propagation  
(d) In a sine wave
- The total work done on the particle is equal to the change in its kinetic energy  
(a) Always  
(b) Only if the forces acting on the body are conservative.  
(c) Only if the forces acting on the body are gravitational.  
(d) Only if the forces acting on the body are elastic.
- The following unit measure energy:  
(a) Kilo-watt hour.  
(b) Volt\*volt/sec\*ohm.  
(c) Pascal\*foot\*foot  
(d) (Coulomb\*coulomb)\*farad
- Astronauts in stable orbits around the earth are in a state of weightlessness because  
(a) There is no gravitational force acting on them.  
(b) The satellite and the air inside it have acceleration equal to that of gravitational acceleration there.  
(c) The gravitational force of the earth and the sun balance giving null resultant.  
(d) There is no atmosphere at the height at which the satellites move.
- An organ pipe, open at both ends and another organ pipe closed at one end, will resonate with each other, if their lengths are in the ratio of  
(a) 1:1 (b) 1:4 (c) 2:1 (d) 1:2
- During an isothermal expansion of an ideal gas  
(a) Its internal energy increases.  
(b) Its internal energy decreases.  
(c) Its internal energy does not change.  
(d) The work done by the gas is not equal to the quantity of heat absorbed by it.
- A parallel plate capacitor is charged and the charging battery is then disconnected. If the plates of the capacitor are moved further apart by means of insulating handles  
(a) The charge on the capacitor increases.  
(b) The voltage across the plates increases.  
(c) The capacitance increases.  
(d) The electrostatic energy stored in the capacitor decreases.
- Two equal negative charges q are fixed at point (0,a) and (0,-a) on the y-axis. A positive charge Q is released from rest at the point (2a,0) on the x-axis. The charge Q will  
(a) Execute simple harmonic motion about the origin  
(b) Move to the origin and remain at rest  
(c) Move to infinity  
(d) Execute oscillatory but not simple harmonic motion
- A square conducting loop of length L on a side carries a current I. The magnetic field at the centre of the loop is  
(a) Independant of L  
(b) Proportional to L  
(c) Inversely proportional to L  
(d) Directly proportional to L
- The focal length of a convex lens when placed in air and then in water will  
(a) Increase in water with respect to air  
(b) Increase in air with respect to water  
(c) Decrease in water with respect to air  
(d) Remain the same
- The maximum kinetic energy of the photoelectron emitted from the surface is dependant on  
(a) The intensity of incident radiation  
(b) The potential of the collector electrode  
(c) The frequency of incident radiation  
(d) The angle of incidence of radiation of the surface
- An electron orbiting in a circular orbit around the nucleus of the atom  
(a) Has a magnetic dipole moment  
(b) Exerts an electric force on the nucleus equal to that on it by the nucleus  
(c) Does not produce a magnetic induction at the nucleus  
(d) All of the above
- The X-rays beam coming from an X-ray tube will be:  
(a) Monochromatic  
(b) Having all wavelengths smaller than a certain minimum wavelength  
(c) Having all wavelengths larger than a certain minimum wavelength  
(d) Having all wavelengths lying between a minimum and a maximum wavelength
- The mass number of a nucleus is  
(a) Always less than its atomic number  
(b) Always more than its atomic number  
(c) Always equal to its atomic number  
(d) Sometimes more and sometimes equal to its atomic number
- Two successive elements belonging to the first transition series have the same number of electrons partially filling orbitals. They are  
(a) V and Cr (b) Ti and V (c) Mn and Cr (d) Fe and Co
- When  $n+1$  has the same value for two or more orbitals, the new electron enters the orbital where  
(a) n is maximum (b) n is minimum (c) l is maximum (d) l is minimum
- A balloon filled with ethylene is pricked with a sharp pointed needle and quickly placed in a tank full of hydrogen at the same pressure. After a while the balloon would have  
(a) Shrunk  
(b) Enlarged  
(c) Completely collapsed  
(d) Remain unchanged in size
- Which of the following statements is not true?  
(a) The ratio of the mean speed to the rms speed is independant of temperature  
(b) The square of the mean speed of the molecules is equal to the mean squared speed at a certain temperature  
(c) Mean kinetic energy of the gas molecules at any given temperature is independant of the mean speed  
(d) None
- Which of the following statements represent Raoult's Law?  
(a) Mole fraction of solvent = ratio of vapour pressure of the solution to vapour pressure of the solvent  
(b) Mole fraction of solute = ratio of vapour pressure of the solution to vapour pressure of the solvent  
(c) Mole fraction of solute = lowering of vapour pressure of the solution  
(d) Mole fraction of solvent = lowering of vapour pressure of the solution
- Elements having the same atomic number and the same atomic mass are known as  
(a) Isotopes  
(b) Isotones  
(c) Isomers  
(d) None of the above
- Which is the most acidic amongst  
(a) Nitrophenol  
(b) O-toulene  
(c) Phenol  
(d) Cresol
- Pure water does not conduct electricity because it is  
(a) Almost not ionised  
(b) Low boiling  
(c) Neutral  
(d) Readily decomposed
- In a salt bridge, KCl is used because  
(a) It is an electrolyte  
(b) The transference number of  $K^+$  and  $Cl^-$  is nearly the same  
(c) It is a good conductor of electricity  
(d) All of the above
- A depolarizer used in the dry cell batteries is  
(a) KCl (b)  $MnO_2$  (c) KOH (d) None of the above
- The hydrolysis of alkyl halides by aqueous NaOH is best termed as  
(a) Electrophilic substitution reaction  
(b) Electrophilic addition reaction  
(c) Nucleophilic addition reaction  
(d) Nucleophilic substitution reaction
- The hydrocarbon that gives a red precipitate with ammoniacal cuprous chloride is (where '□' means a triple bond)  
(a)  $CH_3-CH_2-CH_2-CH_3$   
(b)  $CH_3-C \equiv C-CH_3$   
(c)  $CH_2=CH-CH=CH_2$   
(d)  $CH_3-CH_2-C \equiv CH$
- Which of the following reagents is neither neutral nor basic  
(a) Lucas' reagent  
(b) Tollen's reagent  
(c) Bayer's reagent  
(d) Fehling's solution
- The substance which is most easily nitrated  
(a) Toluene  
(b) Benzene  
(c) Nitrobenzene  
(d) Chlorobenzene
- Carbylamine reaction is a test for  
(a) Primary amine  
(b) Secondary amine  
(c) Tertiary amine  
(d) Quarternary ammonium salt
- Which of the following oxides cannot be reduced by carbon to obtain metal  
(a) ZnO  
(b)  $Al_2O_3$   
(c)  $Fe_2O_3$   
(d) PbO
- Which of the following is not an oxide ore?  
(a) Cassiterite  
(b) Siderite  
(c) Pyrolusite  
(d) Bauxite
- Which among the following is called philosopher's wool  
(a) Cellulose  
(b) Calamine  
(c) Stellite  
(d) Cerussite
- When a bicycle is in motion, the force of friction exerted by the ground on the two wheels is such that it acts  
(a) In the backward direction on the front wheel and in the forward direction on the rear wheel.  
(b) In the forward direction on the front wheel and in the backward direction on the rear wheel.  
(c) In the backward direction on both the front and rear wheels.  
(d) None of the above.
- A certain radioactive element A, has a half life = t seconds. In  $(t/2)$  seconds the fraction of the initial quantity of the element so far decayed is nearly  
(a) 29%  
(b) 15%  
(c) 10%  
(d) 45%
- Which of the following plots would be a straight line ?  
(a) Logarithm of decay rate against logarithm of time  
(b) Logarithm of decay rate against logarithm of number of decaying nuclei  
(c) Decay rate against time  
(d) Number of decaying nuclei against time
- A radioactive element x has an atomic number of 100. It decays directly into an element y which decays directly into element z. In both processes a charged particle is emitted. Which of the following statements would be true?  
(a) y has an atomic number of 102  
(b) y has an atomic number of 101  
(c) z has an atomic number of 100  
(d) z has an atomic number of 101
- If the sum of the roots of the equation  $ax^2 + bx + c = 0$  is equal to the sum of the squares of their reciprocals then a/c, b/a, c/b are in  
(a) AP  
(b) GP  
(c) HP  
(d) None of these
- A man speaks the truth 3 out of 4 times. He throws a die and reports it to be a 6. What is the probability of it being a 6?  
(a) 3/8  
(b) 5/8  
(c) 3/4  
(d) None of the above.
- If  $\cos^2 A + \cos^2 B + \cos^2 C = 1$  then ABC is a  
(a) Right angle triangle  
(b) Equilateral triangle  
(c) All the angles are acute  
(d) None of these
- Image of point (3,8) in the line  $x + 3y = 7$  is  
(a) (-1,-4)  
(b) (-1,4)  
(c) (2,-4)  
(d) (-2,-4)
- The mass number of a nucleus is  
(a) Always less than its atomic number  
(b) Always more than its atomic number  
(c) Sometimes more than and sometimes equal to its atomic number  
(d) None of the above
- The maximum KE of the photoelectron emitted from a surface is dependent on  
(a) The intensity of incident radiation  
(b) The potential of the collector electrode  
(c) The frequency of incident radiation  
(d) The angle of incidence of radiation of the surface
- Which of the following is not an essential condition for interference  
(a) The two interfering waves must be propagated in almost the same direction or the two interfering waves must intersect at a very small angle  
(b) The waves must have the same time period and wavelength  
(c) Amplitude of the two waves should be the same  
(d) The interfering beams of light must originate from the same source
- When X-Ray photons collide with electrons  
(a) They slow down  
(b) Their mass increases  
(c) Their wave length increases  
(d) Their energy decreases.
- An electron emits energy  
(a) Because its in orbit  
(b) When it jumps from one energy level to another  
(c) Electrons are attracted towards the nucleus  
(d) The electrostatic force is insufficient to hold the electrons in orbits



## Section-II BIOLOGY

- During Prophase-I of meiosis-I, crossing over takes place between:
  - Some homologous pairs only.
  - non-sister chromatids of some homologous chromosomes only.
  - non-sister chromatids of each homologous pair.
  - All of these.
- In Mendelian experiments, an  $F_1$  individual produces gametes in the ratio of 1 : 1 : 1 : 1. This is because:
  - it is a dihybrid.
  - of independent assortment
  - it is dihybrid test cross ratio
  - both a and b
- A gene located a Y-chromosome and hence transmitted from father to son is known as :
  - Operator gene
  - Suppressor gene
  - Holandric gene
  - Sex-linked recessive gene
- A person shows blood pressure of 160/90. He is suffering from:
  - Hypotension
  - No tension
  - Hypertension
  - Arteriosclerosis
- One of the following is used as a green manure. Identify it.
  - Rhizobium radicicola*
  - Crotalaria juncea*
  - Bacillus polymyxa*
  - Plants with root nodules only.
- The types of gametes produced by a single heterozygous yellow round pea plant may be -
  - YR, Yr, yR, yr
  - YR, yR
  - YR, Yr
  - b or c
- One of the following is not a man made intergeneric hybrid -
  - Raphanobrassica*
  - Pomato
  - Secale cereale*
  - Triticale
- Genes are -
  - segments of chromosomes
  - made of DNA segments and associated histone proteins
  - specific polynucleotide sequences in DNA
  - all of these
- Producer gas differs from bio gas because -
  - it is produced through microbial action
  - it contains carbon monoxide
  - it does not burn with smokeless flame
  - it is produced in fermenter tank
- Agriculture is considered a primary industry in India because -
  - It accounts for nearly 2 / 5<sup>th</sup> of the Gross National Product.
  - It employs majority of working population
  - It gives primary education in starting an industry
  - All the three.
- Some pairs of codons and anticodons are given as follows -
  - AUG – UAC
  - GGU – CCU
  - CAG – GUC
  - AUU – UAA
- Point out the statement which is not applicable to the pesticides
  - many pesticides are not target specific
  - some pesticides are poisonous
  - pesticides pollute soil, water and air
  - pesticides minimize economic loss in agriculture
- The sex organs are totally absent but sexual reproduction takes place in –
  - Rhodophyceae
  - Basidiomycetes
  - Chlorophyceae
  - Imperfect fungi
- A pea plant with the genotype Rr YY TT is a -
  - trihybrid
  - dihybrid
  - monohybrid
  - single heterozygous dominant
- Which of the following are not naturally synthesized in human body?
  - proteins
  - enzymes
  - vitamins
  - all the three
- How many types of nitrogen containing bases are found in a nucleotide of DNA?
  - 2
  - 4
  - 3
  - 1
- DAP is a form of -
  - high energy containing compound used in cell metabolism.
  - biomass used for production of bioenergy
  - animal energy
  - organic waste of animal origin
- The flower in *Hibiscus* (China rose) is -
  - hypogynous
  - monadelphous
  - epipetalous
  - all of these
- Fragmentation is a type of -
  - sexual reproduction
  - asexual reproduction
  - clonal propagation
  - vegetative cultivation
- In aerobic respiration, total number of ATP formed without involving ETS comes to -
  - 6 ATP
  - 4 ATP
  - 2 ATP
  - 8 ATP
- Alleles are the -
  - two genes on the homologous chromosomes
  - two forms of the same gene
  - two genes present on the same locus of a homologous chromosomes
  - two homologous chromosomes with identical gene loci
- The hybrid, improved Mexican wheat varieties developed by Norman Borlaug were -
  - dwarf
  - susceptible to diseases
  - with high quality but poor yield
  - with high yield but poor quality and resistance to diseases
- Cycas* shows -
  - heterospory
  - heterophylly
  - heterogametophytes
  - all of these
- $CO_2$  is not released during -
  - aerobic respiration
  - anaerobic respiration
  - alcoholic fermentation
  - Lactic acid fermentation
- (i) Multiplication (ii) Propagation (iii) Perpetuation  
All of these represent –
  - rejuvenation
  - reproduction
  - replication
  - recreation
- Which one of the following is not an inexhaustible resource?
  - sun light
  - tidal power
  - coal
  - rainfall
- Two DNA strands are
  - parallel and complementary
  - antiparallel and non-complementary
  - antiparallel and complementary
  - parallel and non-complementary
- Plasmids are obtained from
  - fungi
  - algae
  - bacteria
  - virus
- Replication of DNA, new strand has
  - one parental and one old strand
  - both new strands
  - both old strands
  - one parental and one new strand
- r-RNA is called ribosomal RNA because
  - it is located in ribosome
  - synthesized in ribosome
  - destroy in ribosome
  - formed in ribosome
- DNA fragment of gene library are made up of -
  - dead plants
  - dead animals
  - living bacteria
  - dead bacteria
- What is scientific name of Holy basil?
  - Aloe vera*
  - Adathoda uasica*
  - Oscinum sanctum*
  - Azadirachta indica*
- In *Aloe vera* ..... active principal present
  - saponin
  - tannin
  - barbaloin
  - vasakin
- Rhizobium* fixes  $N_2$  in legumes due to
  - haemoglobin
  - leghaemoglobin
  - globulin
  - hematoglobin
- Transpiration is related to which of the following
  - wilting of leaves
  - shoot formation
  - flowering induction
  - bud formation
- In Hill reaction, Hill used ..... to prove the presence of oxygen.
  - ferric cyanide
  - ferric salt
  - haemoglobin
  - leghaemoglobin
- Photolysis of water requires
  - light and water
  - light and chlorophyll
  - light and  $CO_2$
  - $CO_2$  and  $H_2O$
- In plant during photosynthesis PGA is reduced by -
  - NAD
  - FAD
  - $NADPH_2$
  - $FADH_2$
- With  $H_2O$  and chlorophyll, the most essential raw material for photosynthesis is
  - $CO_2$
  - $O_2$
  - $H_2S$
  - CO
- During glycolysis 3 PGAL is phosphorylated into 1,3 – diPGA by using
  - phosphoric acid
  - ATP
  - ADP
  - AMP
- Pyruvic acid is formed after the glycolysis contains ..... carbon atoms.
  - 4
  - 6
  - 3
  - 2
- From following ..... is the common respiratory substrate.
  - amino acid
  - glucose
  - protein
  - fats
- The double fertilization includes fusion of one male gamete with female gamete and another male gamete with -
  - secondary nucleus
  - egg cell
  - nucellus
  - antipodal cell
- The female gametophyte is represented by -
  - nucellus
  - egg cell
  - embryo sac
  - antipodal cells
- The micropyle of anatropous ovule is closest to
  - hilum
  - chalaza
  - funicle
  - style



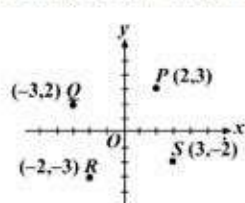
## Section-II MATHEMATICS

While the following sample questions do not collectively comprise an entire assessment, they do illustrate the manner in which many of the topics might be assessed. (Calculator use is optional in answering the multiple-choice questions.)

1. Which of the following is the graph of  $-3 \leq x < 2$ ?



2. In the figure below, which pair of points is on the line  $2x + 3y = 0$ ?



- (A) P and Q (B) Q and R (C) Q and S (D) R and S

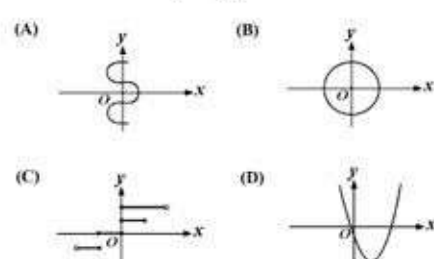
3. For the equation  $4y = 2x$ , which of the following statements is true?

- (A) The value of  $y$  increases 4 times as fast as the value of  $x$ .  
 (B) The value of  $y$  increases 2 times as fast as the value of  $x$ .  
 (C) The value of  $y$  increases  $\frac{1}{2}$  as fast as the value of  $x$ .  
 (D) The value of  $y$  increases  $\frac{1}{4}$  as fast as the value of  $x$ .

4. If  $x = -2$ ,  $y = 3$ , and  $z = -4$ , what is the value of  $\frac{2x^2 - y}{3z}$ ?

- (A)  $-\frac{13}{12}$  (B)  $-\frac{5}{12}$  (C)  $\frac{5}{12}$  (D)  $\frac{11}{12}$

5. Which of the following is a graph of a function of  $x$ ?



6. If  $4x - 3(x + 1) = 5$ , what is the value of  $x$ ?

- (A)  $\frac{1}{2}$  (B) 4 (C) 6 (D) 8

7. When a new movie opened at a local theater, the numbers of tickets sold in each of the first four days were  $w$ ,  $x$ ,  $y$ , and  $z$ , respectively. If  $w > x > y > z$ , then which of the following could be true?

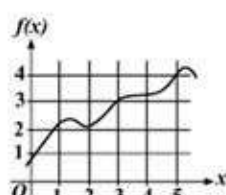
- (A)  $x = w + y$  (B)  $w = x + y$  (C)  $w + x = x + z$  (D)  $w + x + y = z$

8. What is the slope of the line  $2x - 5y = 15$ ?

- (A)  $-\frac{5}{2}$  (B)  $-\frac{2}{5}$  (C)  $\frac{2}{5}$  (D)  $\frac{5}{2}$

9. In the equation  $y = x^2$ , if  $x$  is increased by 3, then  $y$  is increased by

- (A) 6 (B) 9 (C)  $6x + 6$  (D)  $6x + 9$



10. The figure above shows a portion of the graph of a function  $f$ . According to the graph, if  $f(x) = 3.6$ , then  $x$  is between which of the following?

- (A) 1 and 2 (B) 2 and 3 (C) 3 and 4 (D) 4 and 5

11. There are 150 weights. While some are 1 kg, others are 2 kg. The sum of all the weights is 260. What is the number of 1 kg. weights?

- (a) 45 (b) 35 (c) 40 (d) 50

12. A car travels 12 kms. with his  $\frac{4}{5}$ th filled tank. How far will it travel if its tank is  $\frac{1}{3}$  filled?

- (a) 6 kms. (b) 4 kms. (c) 15 kms. (d) 5 kms.

13. The sum of the digits of a two-digit number is 8. When 18 is added to the number, the digits are reversed. Find the number?

- (a) 33 (b) 53 (c) 30 (d) 35

14. Father's age is 5 times his son's age. 4 years back the father was 9 times older than his son. Find the father's present age.

- (a) 42 years (b) 40 years (c) 45 years (d) 38 years

15. If 20 workers take 15 days to complete a job, in how many days can 25 workers finish the same job?

- a) 10 days b) 12 days c) 8 days d) 11 days

16. If Rs. 1,260 is divided between A, B and C in the ratio 2:3:4, what is C's share?

- (a) Rs. 560 (b) Rs. 550 (c) Rs. 540 (d) Rs. 650

17. If A is traveling at 72 km per hour on a highway. B is traveling at a speed of 21 meters per second on a highway. What is the difference in their speed in m/sec?

- (a) 1.2 m/sec (b) 1.1 m/sec (c) 1 m/sec (d) 0.8 m/sec

18. There is a six-letter word UGANDA. How many ways can you arrange the letters in the word in such a way that both A's are together.

- (a) 24 (b) 240 (c) 60 (d) none of these

19. Complete the series: 3, 8, \_\_, 24, \_\_, 48, 63.

- (a) 14, 34 (b) 12, 36 (c) 15, 35 (d) none of these

20. Complete the series: 4, -5, 11, -14, 22, \_\_.

- (a) 49 (b) -33 (c) -23 (d) -27

21. A finishes the work in 10 days & B in 8 days individually. If A works for only 6 days then how many days should B work to complete the remaining work?

- (a) 3.2 days (b) 3 days (c) 2.9 days (d) 3.6 days

22. A boy has Rs. 2. He wins or loses Re. 1 at a time. If he wins, he gets Re. 1 and if he loses the game, he loses Re. 1. He can loose only 5 times. He is out of the game if he earns Rs. 5. Find the number of ways in which this is possible?

- (a) 12 (b) 16 (c) 20 (d) 18

23.  $a + 2b = 6$ ,  $ab = 4$ ,  $2/a + 1/b =$  \_

- (a)  $3/2$  (b)  $1/3$  (c)  $2/3$  (d)  $3/4$

24. There is a certain number of rows in which if we place 5, 7, or 9 balls per row, then no ball remains. But if we place 11 balls, then one ball is less to complete the row. Find out no of balls.

- (a) 315 (b) 630 (c) 945 (d) cannot be determined

25. A frog tries to jump out of a well 30m high. It jumps 3m up and slips down 2m each time. After how many jumps will it come out of the well?

- (a) 30 (b) 27 (c) 28 (d) cannot be determined

26. Out of 10 white, 9 black and 7 red balls, in how many ways can we select one or more balls

- (a) 234 (b) 52 (c) 630 (d) 879

26. A and B throw a dice. The probability that A's throw is not greater than B's is

- (a)  $5/12$  (b)  $7/12$  (c)  $11/12$  (d)  $5/36$

27. Given two numbers A and B, let A denotes the single AM between these and S denotes the sum of n AMs between them. Then S/A depends upon

- (a) n (b) n,a (c) n,b (d) n,a,b

28. If the sum of the roots of the equation  $ax^2 + bx + c = 0$  is equal to the sum of the squares of their reciprocals, then,  $a/c$ ,  $b/a$ ,  $c/b$  are in

- (a) AP (b) GP (c) HP (d) None of the these

In the following questions (105 and 106),  $\int$  represents the integral sign, for example,  $\int_1^2 [f(x)]$  means integration of the function  $f(x)$  over the interval 1 to 2.

29. The value of  $\int_{-1}^2 [2 - x^2] dx$ , i.e. integration of the function  $[2 - x^2]$  over the interval -1 to 2 is

- (a) 0 (b) 1 (c) 2 (d) None of the above

30. If  $0 < \int_0^{\pi/4} \log \sin x dx = k$ , then the value of  $0 < \int_0^{\pi/4} \log(1 + \tan x) dx$ , where  $\pi$  stands for pi, is

- (a)  $-k/4$  (b)  $k/4$  (c)  $-k/8$  (d)  $k/8$

31. If a, b, c be in GP and p, q be respectively AM between a, b and b, c then

- (a)  $2/b = 1/p + 1/q$  (b)  $2/b = 1/p - 1/q$  (c)  $2/a = p - c/q$  (d) None of the above

32. A solution of  $\text{KMnO}_4$  is reduced to  $\text{MnO}_2$ . The normality of solution is 0.6. The molarity is

- (a) 1.8M (b) 0.6M (c) 0.1M (d) 0.2M

33. A person travels 12 km in the southward direction and then travels 5km to the right and then travels 15km toward the right and finally travels 5km towards the east, how far is he from his starting place?

- (a) 5.5 kms (b) 3 km (c) 13 km (d) 6.4 km

110. X's father's wife's father's granddaughter uncle will be related to X as

- (a) Son (b) Nephew (c) Uncle (d) Grandfather

34. Find the next number in the series 1, 3, 7, 13, 21, 31, \_

- (a) 43 (b) 33 (c) 41 (d) 45

35. If in a certain code "RANGE" is coded as 12345 and "RANDOM" is coded as 123678, then the code for the word "MANGO" would be

- (a) 82357 (b) 89343 (c) 84629 (d) 82347

36. Integrate  $3x + 5 / (x^3 - x^2 - x + 1)$

- (a)  $\frac{1}{2} \log |(x+1)/(x-1)| - 4/(x-1)$  (b)  $\log |2 + \tan x|$   
 (c)  $-(1 + \log x)x$  (d)  $2 \log(\tan x)(\tan x + 2)$

37. If  $y = \cos^{-1}(\cos x + 4 \sin x) / (17)^{1/2}$ , then  $dy/dx$  is

- (a) 0 (b) 1 (c) -1 (d) none of these



Section-III  
LOGIC / REASONING

Read the passage carefully and answer the following questions.

"There are six steps that lead from the first to the second floor. No two people can be on the same step. Mr. A is two steps below Mr. C and Mr. B is a step next to Mr. D. Only one step is vacant (No one is standing on that step). Denote the first step by step 1 and second step by step 2 etc."

1. If Mr. A is on the first step, which of the following is true?  
(a) Mr. B is on the second step  
(b) Mr. C is on the fourth step  
(c) Mr. E, could be on the third step  
(d) Mr. D is on higher step than Mr. C.
2. If Mr. E was on the third step & Mr. B was on a higher step than Mr. E, which step must be vacant?  
(a) step 1 (b) step 2 (c) step 4 (d) step 5
3. If Mr. B was on step 1, which step could A be on?  
(a) 2 & 3 only (b) 3 & 4 only (c) 3 & 5 only (d) 4 & 5 only.
4. If there were two steps between the step that A was standing and the step that B was standing or, and A was on a higher step than D, A must be on step \_\_\_\_\_.  
(a) 2 (b) 3 (c) 4 (d) 5
5. In a language, if intelligent is coded as hosfkmhhdos, how is 'suspect' coded?  
(a) ttotfdu (b) ttotfbu (c) rrvqdds (d) rrvqbd
6. In a class composed of x girls and y boys, what part of class is composed of girls?  
(a)  $y/(x+y)$  (b)  $x/xy$  (c)  $x/(x+y)$  (d)  $y/xy$
7. There are 200 questions on a 3 hr examination. Among these questions, 50 are maths problems. It is suggested that twice as much time be spent on each maths problem as for each other question. How many minutes should be spent on mathematics problems?  
(a) 36 (b) 72 (c) 60 (d) 100

Read the passage carefully and answer the following questions.

"All G's are H's. All G's are J's or K's.  
All J's and K's are G's.  
All L's are K's.  
All N's are M's.  
No M's are G's."

8. If no P's are K's, which of the following must be true?  
(a) All P's are J's  
(b) No P is a G  
(c) No P is an H  
(d) If any P is an H it is a G
9. Which of the following can be logically deduced from the conditions stated?  
(a) No M's are H's  
(b) No M's that are not N's are H  
(c) Both a and b are correct  
(d) None of the above is correct
10. Which of the following inconsistent with one or more of the conditions?  
(a) All H's are G's  
(b) All H's that are not G's are M's  
(c) Some H's are both M's and G's  
(d) No M's are H's

Read the passage carefully and answer the following questions.

"Six swimmers A, B, C, D, E, F compete in a race. The outcome is as follows.

- i. B does not win.
- ii. Only two swimmers separate E & D.
- iii. A is behind D & E
- iv. B is ahead of E, with one swimmer intervening
- v. F is ahead of D
- vi. F is ahead of D"

11. Who stood fifth in the race?  
(a) A (b) B (c) C (d) E
12. How many swimmers separate A and F?  
(a) 1 (b) 2 (c) 4 (d) cannot be determined
13. The swimmer between C & E is \_\_\_\_\_.  
(a) None (b) F (c) D (d) B
14. If at the end of the race, swimmer D is disqualified by the judges then swimmer B finishes in which place?  
(a) 1 (b) 2 (c) 3 (d) 4
15. If "PROMPT" is coded as QSPLOS, then "PLAYER" should be  
(a) QMBZFS (b) QWMFDW (c) QUREXM (d) URESTI

The questions 130-135 are based on the following pattern. The problems below contain a question and two statements giving certain data. You have to decide whether the data given in the statements are sufficient for answering the questions. The correct answer is

- (A) If statement (I) alone is sufficient but statement (II) alone is not sufficient.
- (B) If statement (II) alone is sufficient but statement (I) alone is not sufficient.
- (C) If both statements together are sufficient but neither of statements alone is sufficient.
- (D) If both together are not sufficient.
15. What is John's age?  
(I) In 15 years John will be twice as old as Dias would be (II) Dias was born 5 years ago
16. What is the distance from city A to city C in kms?  
(I) City A is 90 kms from City B (II) City B is 30 kms from City C
17. If  $A=C$ . A, B, C are real numbers, then -  
(I)  $A \cdot B = B \cdot C$  (II)  $A \cdot 2C = C \cdot 2B$
18. What is the 30th term of a given sequence?  
(I) The first two terms of the sequence are 1,  $\frac{1}{2}$  (II) The common difference is  $-\frac{1}{2}$
19. Was Avinash early, on time or late for work?  
(I) He thought his watch was 10 minutes fast (II) Actually his watch was 5 minutes slow
20. What is the value of A if A is an integer?  
(I)  $A^4 = 1$  (II)  $A^2 + 1 = 0$

## Section-IV ENGLISH LANGUAGE / VERBAL ANALYSIS

*Choose the correct synonyms.*

1. TO DISPEL  
a. to dissipate      b. to dissent      c. to distort      d. to disfigure
2. LATITUDE:  
a. scope      b. segment      c. globule      d. legislature
3. DEPRECIATION:  
a. Deflation      b. Depression      c. Devaluation      d. fall
4. DISPARITY:  
a. inequality      b. impartiality      c. unfairness      d. twist
5. OVATION:  
a. oration      b. gesture      c. emulation      d. applause
6. INSINUATE:  
a. invisible      b. hint      c. inaccurate      d. cause resentment
7. PROLIFIC:  
a. scarce      b. abundant      c. beseech      d. crave
8. RELINQUISH:  
a. repudiate      b. fecund      c. vanquish      d. cede
9. RUPTURE:  
a. break      b. continue      c. enthusiasm      d. happiness
10. NASCENT:  
a. latent      b. reactive      c. emerging      d. unstable

*Choose the correct antonyms.*

11. DILIGENCE:  
a. caution      b. Laziness      c. assiduousness      d. meticulousness
12. DOGMATIC:  
a. Flexible      b. Alternating      c. Imperfect      d. authoritarian
13. CRYPTIC:  
a. hidden      b. essential      c. explicit      d. smooth
14. ALIENATE:  
a. Estrange      b. warn      c. accept      d. irradiate
15. PRECARIOUS:  
a. uncertain      b. Stable      c. critical      d. causal
16. DEPRECATE:  
a. augment      b. reduce      c. approve      d. deny
17. CROSS:  
a. happy      b. divide      c. group      d. cropper
18. CHIMERICAL:  
a. chide      b. realistic      c. draconian      d. draught
19. UNTOWARD:  
a. unwieldy      b. plausible      c. convenient      d. phlegmatic
20. VAGRANT:  
a. ubiquitous      b. twaddle      c. retract      d. settled

*Choose correct alternatives.*

21. I saw her \_\_\_\_\_ the airport.  
a. at      b. on      c. in      d. into
22. Dr. Manoj Gupta specialises \_\_\_\_\_ pleasant, well-balanced wines.  
a. into      b. about      c. in      d. with
23. By the time I arrived \_\_\_\_\_ the pub she already left.  
a. in      b. on      c. at      d. into
24. What's the time \_\_\_\_\_ your watch?  
a. in      b. on      c. at      d. by
25. When will you come \_\_\_\_\_ the play?  
a. by      b. at      c. for      d. on

*Pick up the correct spellings.*

26. a. suparintendent      b. superintendent  
c. sweeperintendent      d. superentendant
27. a. separate      b. sepurate  
c. sweeprate      d. separte
28. a. suceed      b. succeed  
c. saxede      d. seccede
29. a. insurence      b. independence  
c. interperet      d. indelgense
30. a. despair      b. dispair  
c. souviner      d. covard



## Section-V

### GENERAL KNOWLEDGE

1. Which of the following is not correct about the characteristics of the roman Gods/goddesses?
  - a. **Jupiter**: Supreme God, linked to weather, heaven, agriculture, justice, war, peace treaties, and light.
  - b. **Juno**: Wife of Jupiter, protector women.
  - c. **Minerva**: Goddess of Wisdom, crafts, industries and trade.
  - d. **None** of the above.
2. To which musical Gharana does Bismillah Khan belong?
  - a. Delhi Gharana
  - b. Bamba Gharana
  - c. Cherinai Gharana
  - d. None of the above
3. In Hindu mythology, what is the name of the auspicious jewel Lord Vishnu wears on a pendant around his neck?
  - a. Kaustubham
  - b. Arindham
  - c. both
  - d. none
4. In Indian musical terminology, what is the feminine of Raga?
  - a. Raga Bhairvi
  - b. Raga Pahari
  - c. both
  - d. none
5. With reference to Indian Public Finance, consider the following statements:
  1. Disbursements from Public Accounts of India are subject to the Vote of Parliament.
  2. The Indian Constitution provides for the establishment of a Consolidated Fund, a Public Account and a Contingency Fund for each State.
  3. Appropriations and disbursements under the Railway Budget are subject to the same form of parliamentary control as other appropriations and disbursements.Which of the statements given above are correct?
  - (a) 1 and 2
  - (b) 2 and 3
  - (c) 1 and 3
  - (d) 1, 2 and 3
6. Consider the following statements:
  1. The First Session of the Indian National Congress was held in Calcutta.
  2. The Second Session of the Indian National Congress was held under the Presidentship of Dadabhai Naoroji.
  3. Both Indian National Congress and Muslim League held their sessions at Lucknow in 1916 and concluded the Lucknow Pact.Which of the statements given above is/are correct?
  - (a) 1 and 2
  - (b) 2 only
  - (c) 2 and 3
  - (d) 3 only
7. Which one of the following statements is correct?
  - (a) The Constituent Assembly of India was elected by the Provincial Assemblies in the year 1946.
  - (b) Jawaharlal Nehru, M.A. Jinnah and Sardar Vallabhbhai Patel were members of the Constituent Assembly of India.
  - (c) The First Session of the Constituent Assembly of India was held in January, 1947.
  - (d) The Constitution of India was adopted on 26<sup>th</sup> January, 1950.
8. Consider the following statements:
  1. The highest criminal court of the district is the Court of District and Sessions Judge.
  2. The District Judge are appointed by the Governor in consultation with the High Courts.
  3. A person to be eligible for appointment as a District Judge should be an advocate or a pleader of seven years' standing or more, or an officer in judicial service of the Union or the State.
  4. When the Sessions Judge awards death sentence, it must be confirmed by the High Court before it is carried out.Which of the statements given above are correct?
  - (a) 1 and 2
  - (b) 2, 3 and 4
  - (c) 3 and 4
  - (d) 1, 2, 3 and 4
9. Consider the following statements:
  1. The Speaker of Lok Sabha has the power to adjourn the House *sine die* but, on prorogation, it is only the President who summons the House.
  2. Unless sooner dissolved or there is an extension of the term, there is an automatic dissolution of the Lok Sabha by efflux of time, at the end of the period of five years, even if no formal order of dissolution is issued by the President.
  3. The Speaker of Lok Sabha continues in office even after the dissolution of the House and until 'immediately before the first meeting of the House'Which of the statements given above are correct?
  - (a) 1 and 2
  - (b) 2 and 3
  - (c) 1 and 3
  - (d) 1, 2 and 3
10. Consider the following statements:
  1. Non-function of lachrymal gland is an important symptom of deficiency of Vitamin A.
  2. Deficiency of Vitamin B can lead to indigestion and heart enlargement.
  3. Vitamin C deficiency can lead to pain in the muscles.
  4. Deficiency of Vitamin D causes increased loss of  $Ca^{++}$  in urine.Which of the statements given above are correct?
  - (a) 1 and 2
  - (b) 2, 3 and 4
  - (c) 1, 3 and 4
  - (d) 1, 2, 3 and 4
11. The hormone insulin is a
  - (a) Glycolipid
  - (b) Fatty acid
  - (c) Peptide
  - (d) Sterol
12. The Archaeological Survey of India (ASI) is an attached office of the Department /Ministry of:
  - (a) Culture
  - (b) Tourism
  - (c) Science and Technology
  - (d) Human Resource Development
13. Which of the following is a wrong statement?
  - a. AFFIDAVIT - A statement on oath for use as evidence in legal proceedings.
  - b. COPYRIGHT - Exclusive right of an author in his works.
  - c. DECREE - Judgment or decision having the force of law.
  - d. PLAINTIFF - A person who has to undergo emotional pain due to justice passed on is not in his favour.
14. Who is the original writer of the famous collection of poems *Rubaiyat*?
  - a. Arneer Khusru
  - b. Matthew Arnold
  - c. Harvansh Rai Bachchan
  - d. Gulzar
15. Which one of the following statements is not correct?
  - (a) The largest Buddhist monastery in India is in Assam
  - (b) The languages Konyak is spoken in Nagaland
  - (c) The largest river island in the world is in Assam
  - (d) Sikkim is the least-populated State of the Indian Union
16. Consider the following statements:
  1. The Chinese pilgrim Fa-Hien attended the fourth Great Buddhist Council held by Kanishka.
  2. The Chinese pilgrim Huen-Tsang met Harshavardhan and found him to be antagonistic to Buddhism.Which of the statements given above is/are correct?
  - (a) 1 only
  - (b) 2 only
  - (c) Both 1 and 2
  - (d) Neither 1 nor 2.
17. Consider the following crops:
  1. Cotton
  2. Groundnut
  3. Maize
  4. MustardWhich of the above are Kharif crops?
  - (a) 1 and 2
  - (b) 1, 2 and 3
  - (c) 3 and 4
  - (d) 1, 2, 3 and 4
18. Which one of the following statements is not correct?
  - (a) The largest Buddhist monastery in India is in Assam
  - (b) The languages Konyak is spoken in Nagaland
  - (c) The largest river island in the world is in Assam
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  4. Deficiency of Vitamin D causes increased loss of  $Ca^{++}$  in urine.Which of the statements given above are correct?
  - (a) 1 and 2
  - (b) 2, 3 and 4
  - (c) 1, 3 and 4
  - (d) 1, 2, 3 and 4
20. The hormone insulin is a
  - (a) Glycolipid
  - (b) Fatty acid
  - (c) Peptide
  - (d) Sterol
21. In which organ of the human body are the lymphocyte cells formed?
  - (a) Liver
  - (b) Long bone
  - (c) Pancreas
  - (d) Spleen
22. Water required per day per head in India is :
  - (a) 135 litres
  - (b) 200 lit
  - (c) 105 lit
  - (d) 150 lit
23. Department of survey of India is situated at
  - (a) Mumbai
  - (b) Chandigarh
  - (c) Dehradun
  - (d) Bangalore
24. Dr. A.P.J. Kalam is the
  - a. 11<sup>th</sup> President of India
  - b. 12<sup>th</sup> President of India
  - c. 13<sup>th</sup> President of India
  - d. 14<sup>th</sup> President of India
25. Which of the following statements is not correct?
  - The Taj Mahal is on the bank of River Yamuna.
  - b. The Indian capital Delhi is on the bank of River Yamuna.
  - c. The city of Kanpur is situated on the bank of Yamuna.
  - d. Golden Temple is in Amritsar.
26. The Taj Mahal was completed in
  - (a) 20 yrs
  - (b) 22 yrs
  - (c) 21 yrs
  - (d) 15 yrs
27. The Commercial capital of India is
  - (a) Delhi
  - (b) Calcutta
  - (c) Chennai
  - (d) Mumbai
28. Which among the following National Highway routes is the longest?
  - (a) Agra-Mumbai
  - (b) Chennai-Thane
  - (c) Kolkata-Hajira
  - (d) Pune-Machilipatnam
29. Which of the following authors won the Booker Prize twice?
  - (a) Margaret Atwood
  - (b) J. M. Coetzee
  - (c) Graham Swift
  - (d) Ian McEwan
30. In the well-known Lawn Tennis doubles team, Max Mirnyi – once the partner of Mahesh Bhupati - comes from which of the following countries?
  - (a) Italy
  - (b) Sweden
  - (c) Belarus
  - (d) Croatia
31. Which of the following cricketers holds the record for the highest score in a Test Cricket Team Match innings by an Indian?
  - (a) Sunil Gavaskar
  - (b) Vinoo Mankad
  - (c) Sachin Tendulkar
  - (d) V.V.S. Laxman
32. INS Trishul, acquired by the Indian Navy in 2003, has been built by
  - (a) Israel
  - (b) USA
  - (c) Russia
  - (d) France
33. INSAT-3E, India's communication satellite, was launched in 2003 from
  - (a) French Guiana
  - (b) Seychelles
  - (c) Mauritius
  - (d) Mauritania
34. Which one of the following statements is correct?
  - 'Deccan Odyssey' is
  - (a) A book on Chatrapati Shivaji
  - (b) A warship recently acquired by the Indian Navy
  - (c) A recently started air service between Mumbai and Colombo
  - (d) A luxury train which travels through Maharashtra and includes Goa in its Journey
35. Which one of the following cities (they were in the news in recent times) is not correctly matched with its country?
  - (a) Salamanca : Spain
  - (b) Carnes : Italy
  - (c) Cancun : Mexico
  - (d) Bruges : Belgium
36. Standard 18-carat gold sold in the market contains
  - (a) 82 parts gold and 18 parts other metals
  - (b) 18 parts gold and 82 parts other metals
  - (c) 18 parts gold and 6 parts other metals
  - (d) 9 parts gold and 15 parts other metals

\* \* \* \* \*